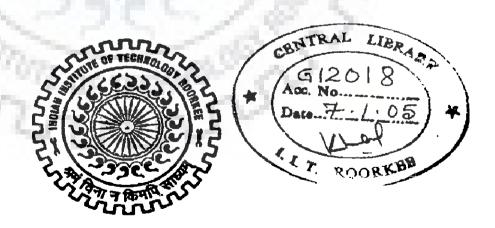
# OPTIMAL WATER UTILIZATION AND INTRA-BASIN WATER TRANSFERS IN CAUVERY BASIN, INDIA

#### A THESIS

Submitted in fulfilment of the requirements for the award of the degree of DOCTOR OF PHILOSOPHY in WATER RESOURCES DEVELOPMENT

By

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## CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the thesis entitled "OPTIMAL WATER UTILIZATION AND INTRA-BASIN WATER TRANSFERS IN CAUVERY BASIN, INDIA" in fulfillment of the requirement for the award of the Degree of Doctor of Philosophy, submitted in the Department of Water Resources Development Training Centre (WRDTC), Indian Institute of Technology Roorkee, Roorkee is an authentic record of my own work carried out during the period from July 2000 to March 2004 under the supervision of Prof. Nayan Sharma, WRDTC, IIT Roorkee and Prof. D.K. Srivastava, Department of Hydrology, IIT Roorkee, Roorkee (India).

The matter embodied in this thesis has not been submitted by me for the award of any other degree in this or any other institute.

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This is to certify that that the above statement made by the candidate is correct to the best of my knowledge.

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#### ABSTRACT

According to the National Water Policy 2002 of India, water resources development and management will have to be for a hydrological unit such as drainage basin as a whole or a sub-basin, taking into account surface and ground waters for sustainable use incorporating quantity and environmental considerations. All individual developmental projects and proposals should be formulated and considered within the frame work of such an overall plan keeping in view the existing agreements/awards for a basin or sub-basin so that the best possible combination of options can be selected and sustained. Water should be made available to water short areas by transfer from other areas including transfers from one river basin to another, if necessary, based on a national perspective, after taking into account the requirements of all areas/basins. Integrated and coordinated development of surface water and ground water resources and their conjunctive use, should be envisaged right from the project planning stage and should form an integral part of the project implementation. Irrigation intensity should be such as to extend the benefits of irrigation to as large a number of farm families as possible, keeping in view the need to maximize production. Irrigation being largest consumer of fresh water, the aim should be to get optimal productivity per unit of water. In view of the vital importance of water for human and animal life, for maintaining ecological balance and for economic and developmental activities of all kinds, and considering its increasing scarcity, the planning and management of this resource and its optimal and equitable use has become a matter of the utmost urgency.

The Cauvery is an inter state river in South India originating in the state of

Karnataka and flowing through the states of Karnataka, Kerala, Tamilnadu, and Pondicherry having a catchment area of 81,155 Km<sup>2</sup>. This basin has 16-sub-basins. It has 75% and 50% water year dependable surface water potential of 16,470 MCM and 20,776 MCM, respectively. The total of 3,866 MCM ground water potential is available for future use. The water requirement for the population of human and livestock projected to the year 2050AD for all purposes as estimated is 39516 MCM. There are 15 major reservoirs and 58 medium and a large number of minor irrigation projects in the basin. The total irrigable area is 2605200 Ha.

The sharing of the water resources of the Cauvery river is under dispute between Karnataka and Tamilnadu for a long time and creates a law and order problems in the states. The issue has been referred to The Cauvery Water Disputes Tribunal (CWDT). The purpose of the study is to find out the technological and realistic solution for the problem. The optimal allocation of surface water and ground water is therefore necessary so as to optimize the annual water utilizations for irrigation, domestic, industrial, hydropower and environmental uses. The interim award of CWDT (CWDTIA) is to release 5800 MCM (205 TMC ft) of water from Karnataka to Tamilnadu at Mettur reservoir.

To identify water surplus and water deficit basins, water balance studies are generally carried out on an annual basis, and are usually done on a lumped basis. They also do not take into account many important aspects, which influence the water balance of a river basin to a large extent. In the present study, some of the most important among them are considered for the water balance study, and two of them are (i) the timewise variability and distribution in the surface water availability and its use with respect to the yearly and the within year time periods, and (ii) the availability and

use of the ground water in the basin. Further, in conventional water balance studies it may not be possible to consider, the aerial variability and distribution of the surface and ground water available and its use in the basin, with respect to the locations of the various reservoirs and water use points. Therefore, an optimization model based on linear programming was applied, which incorporates the above aspects of planning effectively.

The main objectives of this study are as follows: (i) To evaluate the utilizable surface and ground water resources on monthly basis for all 16 sub-basins and Cauvery river basin as a whole, (ii) To estimate the water demands for the year 2050 AD for different uses and to make the water balance studies on monthly basis for all the 16 sub-basins and the Cauvery basin as a whole, (iii) To develop a linear programming optimization model for a river basin, planning and development for conjunctive water use, with the aim to maximize the water utilization including intra-basin water transfers, and to determine optimal and sustainable cropping pattern in terms of irrigation intensity and productivity per unit of water, and apply it to the Cauvery river, (iv) To study and analyze in detail the interim award given by the CWDT for sharing of the Cauvery waters by the co-basin states in respect of the present study objective at SI. No. (iii), and (v) To draw suitable conclusions from the above study.

It is found that during normal and bad water years, the Middle Cauvery sub-basin is the only water surplus sub-basin, where as the Noyil and Arkavathi sub-basins suffer the most from water deficit and the Chinnar sub-basin the least. The Kabini sub-basin is not able to fulfill its intra-basin requirements completely during normal and bad water years. From Mettur reservoir, a maximum of 7200 MCM can be exported (as intra-basin export) to the sub-basins below Mettur during a normal water year. During a

normal water year, the water share ratios above and below Mettur for 5800 MCM exports (as intra-basin export) from Mettur reservoir to the sub-basins below Mettur is 0.98. The intra-basin water importing needs from outside the Cauvery basin, during normal water year may be about 13444 MCM. From the linear programming results, during a normal water year, the water extensive crops would not completely acquire their respective crop areas at six reservoirs. The high benefit crops would acquire very little crop areas at two reservoirs. Two reservoirs would require import of Sugarcane. Upper Nugu reservoir is the most affected reservoir in terms of the crop area occupation. Out of sixteen sub-basins nine sub-basins would spill in all the months during a normal water year. Generally, a maximum monthly water utilization factor of I would be achieved in different months at all the sub-basins, except two sub-basins. Similarly, a minimum of about 0.25 monthly water utilization factors would be achieved, with and without ground water considerations. From the LP model result, the maximum annual water utilization factor of 1 at Chinnar sub-basin and the minimum annual water utilization factor 0.19 at Noyil sub-basin would be achieved.

Salary.

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(M. D. PATIL)

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# **NOTATIONS**

# (A) Variables with Normal Characters

| Variable                                 | Descriptions                                                                          |
|------------------------------------------|---------------------------------------------------------------------------------------|
| Notation  A <sup>k</sup> <sub>i, j</sub> | Irrigation area of crop k, for site i, in sub-basin j                                 |
| b k , j                                  | Net benefit from crop k, of site i, in sub-basin j                                    |
| CC <sub>i,j</sub>                        | Annual capacity of canal at site i, in sub-basin j                                    |
| C <sub>f</sub>                           | Conversion factor from m cm/month to mw-h                                             |
| Ē <sub>i,j,t</sub>                       | Secondary energy generated at dam in mw-h for site i, in sub-basin j, in time t       |
| E i, j                                   | Annual energy target at site i, in sub-basin j                                        |
| e <sub>i</sub> , <sub>j</sub>            | Turbine and generator efficiency of hydropower plant at site i, in sub-basin j        |
| E i, j, t                                | Total energy generated from hydropower plant at site i, in sub-basin j, in time t     |
| El i, j, t                               | Evaporation losses from site i, in sub-basin j, in time t                             |
| $FC_{i,j}$                               | Cereal food requirements of the people living in the area of site i, in sub-basin j   |
| F <sub>i,j,t</sub>                       | Contribution from upstream sites to the site i, in sub-basin j, in time t             |
| FO <sub>i,j</sub>                        | Oilseed crops requirements of the people living in the area of site i, in sub-basin j |
| Fp i, j                                  | Pulses food requirements of the people living in the area of site i, in sub-basin j   |
| He i, j, t                               | Average storage head at dam, for site i, in sub-basin j, in time t                    |
| H <sub>i</sub> , j                       | Hydro power capacity at site i, in sub-basin j                                        |
| H i, j, t                                | Number of hours in the period t at site i, in sub-basin j                             |
| Ī <sub>i, j, t</sub>                     | Local inflow from the surrounding area at site i, in sub-basin j, in time t           |
| $I_{i,j,t}$                              | Natural catchment inflow of site i, in sub-basin j, in time t                         |

| Variable<br>Notation               | Descriptions                                                                                      |
|------------------------------------|---------------------------------------------------------------------------------------------------|
| Ir,,,t                             | Water that joins the main stream just above the irrigation diversion canal site i, in sub-basin j |
| Ir ;                               | Total annual irrigation target from site i, in sub-basin j                                        |
| Ir <sub>i, j</sub>                 | Total annual ground water irrigation target from site i, in sub-basin j                           |
| Ir <sub>i, j</sub>                 | Total annual surface water irrigation target from site i, in sub-basin j                          |
| Iu f                               | Total annual upstream irrigation water use targets of site i, in sub-basin j                      |
| Iu <sup>r,s</sup>                  | Total annual upstream irrigation water use targets from surface water of site i, in sub-basin j   |
| Iu <sub>i, j</sub> <sup>r, g</sup> | Total annual upstream irrigation water use targets from ground water of site i, in sub-basin j    |
| Iu mj                              | Total annual upstream M & I water use target of site i, in sub-basin j                            |
| Iu m,s                             | Total annual upstream M & I water use target from surface water of site i, in sub-basin j         |
| Iu <sub>i,j</sub> <sup>m.g</sup>   | Total annual upstream M & I water use target from surface water of site i, in sub-basin j         |
| K' <sub>i,j,t</sub>                | Reservoir evaporation coefficient for site i, in sub-basin j, in time t                           |
| K i,j,t                            | % of return flow to river from irrigation from site i, in sub-basin j, in time t                  |
| K ", j, t                          | % of return flow to river from irrigation from site w, in sub-basin j, in time t                  |
| $K_{i,j,t}$                        | % annual irrigation from site i, in sub-basin j, in time t                                        |
| K <sub>w,j,t</sub>                 | Reservoir evaporation from site w, in sub-basin j, in time t                                      |
| N <sub>j</sub>                     | Number of sites, in sub-basin j                                                                   |
| NB                                 | Number of sub-basins                                                                              |
| NCI <sup>i, j</sup>                | Total number of irrigated crops at site i, in sub-basin j                                         |
| $NCI_{i,j}^{C}$                    | Number of cereal crops irrigated by the site i, in sub-basin j                                    |
| NCI <sup>O</sup> <sub>i, j</sub>   | Number of oilseed crops irrigated by the site i, in sub-basin j                                   |

| Variable<br>Notation             | Descriptions                                                                                                        |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------|
| $NCI_{i,j}^{P}$                  | Number of pulses crops irrigated by the site i, in sub-basin j                                                      |
| $OC_{i,j}^m$                     | Annual water supply diversion from sites i, in sub-basin j                                                          |
| OC r <sub>i,j</sub>              | Annual irrigation diversion from site i, in sub-basin j                                                             |
| $Od_{i,j,t}$                     | Total release at site i, in sub-basin j, in time t for irrigation and water supply                                  |
| · Od m                           | Release at site i, in sub-basin j, in time t, for water supply                                                      |
| $\operatorname{Od}_{i,j,t}^{r}$  | Release at site i, in sub-basin j, in time t, for irrigation                                                        |
| OE 4, j <sub>E</sub>             | Export from site i, in sub-basin j, to irrigation area p, upstream of site q, in importing sub-basin $j_{\epsilon}$ |
| Og <sub>i, j</sub>               | Total annual ground water target for irrigation, and municipal and industrial from site i, in sub-basin j           |
| Og <sup>m</sup>                  | Ground water available for municipal and industrial from site i, in sub-basin j, in time t                          |
| $Og_{i,j,t}^{r}$                 | Ground water available for irrigation, from site i, in sub-basin j, in time t                                       |
| Og <sup>r</sup> <sub>i,j</sub>   | Total annual ground water target for irrigation, and municipal and industrial from site i, in sub-basin j           |
| Og us                            | Annual upstream ground water available for site i, in sub-basin j                                                   |
| Og ds                            | Annual downstream ground water available for site i, in sub-basin j                                                 |
| $OI_{i,j,p}^{q,j}$               | Import to irrigation area p, upstream of site i, in sub-basin j, from site q of exporting sub-basin j <sub>E</sub>  |
| O <sub>i,j,t</sub>               | Total release from site i, in sub-basin j, in time t                                                                |
| $O_{i,j,t}^{m}$                  | Mandatory releases to downstream natural channel from site i, in sub-basin j, in time t                             |
| O <sup>m</sup> <sub>w,j, 1</sub> | Mandatory releases to downstream natural channel from site w, in sub-<br>basin j, in time t                         |
| р                                | $p^{th}$ irrigation area contributing regenerated flow to downstream site i                                         |
| $P_{i,j,t}$                      | Precipitation directly upon the site i, in sub-basin j, in time t                                                   |
| S i. j, t-1                      | Initial storage in the site i, in sub-basin j, in time t                                                            |

| Variable                        | Descriptions                                                                                       |
|---------------------------------|----------------------------------------------------------------------------------------------------|
| Notation                        |                                                                                                    |
| S i, j. t                       | Final storage in the site i, in sub-basin j, in time t                                             |
| $Sp_{i,j,t}$                    | Secondary water release (spill) from site i, in sub-basin j, in time t                             |
| S p <sub>w,t</sub>              | Secondary water release (spill) from site w, in time t                                             |
| TA <sub>i.j</sub>               | Total cultivable command area (CCA) irrigation for site i, in sub-basin j                          |
| TE 4. j,                        | Export from site i, in sub-basin j, to site q, of importing sub-basin j <sub>E</sub>               |
| $TI_{i,j}^{q,j_E}$              | Import to site i, in sub-basin j, from site q, of exporting sub-basin ji                           |
| $W_{i,j,t}^k$                   | Total water diversion requirements in depth of crop k, at site i, in sub-basin j, in time t        |
| Ws w,j                          | Total annual water supply target from site w, in sub-basin j                                       |
| Ws i, j                         | Annual water supply diversion from sites w, sub-basin j                                            |
| Wsi,j                           | Annual water requirement for industrial use from sites i, in sub-basin j                           |
| Ws RH                           | Annual water requirement for rural human domestic use from sites i, in sub-basin j                 |
| Ws R                            | Annual water requirement for rural domestic use from sites i, in sub-basin j                       |
| Ws <sub>i,j</sub>               | Annual water requirement for live stock use from sites i, in sub-basin j                           |
| Ws ",j                          | Annual water requirement for urban domestic use from sites i, in sub-basin j                       |
| $X_{i,j}$                       | Number of upstream irrigation areas contributing the regenerated flow to site i, in sub-basin j    |
| $\mathbf{y}_{\mathrm{i,j}}^{k}$ | Yield per quintal per hector area of crop k, from site i, in sub-basin j                           |
| Yd <sub>i,j</sub>               | Dead storage capacity of reservoir/site i, in sub-basin j                                          |
| Ydmin                           | Gross capacity up to the minimum pool level of the reservoir/site i, in subbasin j, in time t      |
| $Y_{i,j}$                       | Gross storage capacity of reservoir/site i, in sub-basin j                                         |
| Ymax <sub>i, j, 1</sub>         | Gross capacity up to the normal pool level of the reservoir/site i, in sub-basin j, in time t      |
| Z i, j                          | Number of upstream reservoirs/sites contributing to the flow of downstream site i, in sub-basin j. |

## (B) Variables with Special Characters

| Variable<br>Notation                        | Descriptions                                                                                                        |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| α <sub>i, j, t</sub>                        | Load factor at hydropower site i, in sub-basin j, in time t, for each period t is an indicator of the energy demand |
| α <sub>i, j, t</sub>                        | % of annual upstream water use for irrigation of site i, in sub-basin j, in time t                                  |
| α <sub>i, j, t</sub>                        | % of return flow to river from upstream water use for irrigation of site i, in sub-basin j, in time t               |
| β <sub>i, j, t</sub>                        | % of annual water supply from site i, in sub-basin j, in time t                                                     |
| β", j, t                                    | % of return flow to river from water supply from site i, in sub-basin j, in time t                                  |
| β ", j, t                                   | % of return flow to river from water supply from site w, in sub-basin j, in time t                                  |
| $\beta_{w,j,t}$                             | % of annual water supply (Ws w, j) from site w, in sub-basin j, in time t                                           |
| δ", , , t                                   | % of downstream mandatory release (O <sub>i,t</sub> ) returning to river from site w, in sub-basin j, in time t     |
| δ i, j, t                                   | Energy requirement in percentage at site i, in sub-basin j, in time t                                               |
| $\xi_{i,j,t}$                               | % of annual water use for industrial and urban from site i, in sub-basin j, in time t                               |
| ф <sub>i, j</sub>                           | % of annual ground water for industrial requirement from sites i, in sub-basin j                                    |
| φ 1 s                                       | % of annual surface water for industrial requirement from sites i, in sub-basin j                                   |
| φ <sup>RHg</sup> <sub>i, j</sub>            | % of annual ground water for rural human domestic requirement from site i, in sub-basin j                           |
| $\phi_{i,j}^{RH^s}$                         | % of annual surface water for rural domestic requirement from site i, in sub-basin j                                |
| φ <sup>RL<sup>g</sup></sup> <sub>i, j</sub> | % of annual ground water for live stock requirement from sites i, in sub-basin j                                    |
| $\varphi_{i,j}^{RL^s}$                      | % of annual surface water for live stock requirement from sites i, in sub-basin j                                   |
| $\phi_{i,j}^{U^g}$                          | % of annual ground water for urban domestic water requirement from site i, in sub-basin j                           |
| φ <sup>Us</sup> <sub>i,j</sub>              | % of annual surface water for urban domestic water requirement from site i, in sub-basin j                          |

| Variable                       | Danielia                                                                                    |
|--------------------------------|---------------------------------------------------------------------------------------------|
| Notation                       | Descriptions                                                                                |
| $\lambda_{i,j,t}^{k}$          | Land use coefficient for crop k, for site i, in sub-basin j, in time t                      |
| $\omega_{i,j}^{q,j_E}$         | % of export from site i, in sub-basin j, in time t, to site q, of importing sub-basin $j_E$ |
| $\psi_{i,j,t}^{q,j_{\bar{l}}}$ | % of import to site i, in sub-basin j, in time t, from site q, of exporting sub-basin $j_1$ |

# (C) Subscripts and superscripts

| Variable<br>Notation | Descriptions                                                           |
|----------------------|------------------------------------------------------------------------|
| i                    | Reservoir/site i                                                       |
| j                    | Sub-basin j                                                            |
| k                    | Crop k                                                                 |
| t                    | Time t                                                                 |
| w                    | Reservoir/site contributing to the flow of downstream reservoir/site i |
| jı                   | Exporting sub-basin j <sub>I</sub>                                     |
| jе                   | Importing sub-basin j <sub>E</sub>                                     |

# Symbols for Units

Ha

Hectare

Ham

Hectare-meter

Kg

Kilogram

Km

Kilometer

m

Meter

mm

millimeter

MCM

Million cubic meter

MW

Megawatts

MWhr Megawatt hours

TCM ft Thousand million cubic feet

#### **Abbreviations**

CCA Culturable command area

CGWB Central Ground Water Board, Ministry of Water Resources, Government

of India

CWDT Cauvery Water Dispute Tribunal

CWDTIA Cauvery Water Dispute Tribunal Interim Award

G & D Gauge and Discharge

NWDA National Water Development Agency, the society under the Ministry of

Water Resources, Government of India

NCIWRD The National Commission for Integrated Water Resources Development,

under the Ministry of Water Resources, Government of India

#### INTRODUCTION

#### 1.1 GENERAL

Water resources planning and management is broadly concerned with the accurate assessment, identification and development of different water resources systems. The careful planning for allocation of water resources to different activities has become extremely important to meet the ever increasing demand of water supply, hydropower, irrigation, and environmental purposes etc. It emphasizes the need of planning and development of river basin water resources, which is a complex and difficult task, creates numerous political, social, economical, environmental and engineering problems. Most of these difficulties are due to variable inflows and large number of possible alternatives. Optimum panning of a large-scale river basin as a unit of water resources system is having a high priority in the economic development of the country. This has resulted in an urgent need for accurate and efficient management of the water resources for its conservation and use. System engineering provides systematic methodologies for studying and analyzing various aspects of a system and its response to various parameters by using mathematical models. It assists in decisionmaking process for all pertinent constraints by using optimization techniques. Efficient planning of limited water resources is an important requirement in comprehensive planning of river basin water resources. Hence river basin water resource planning has become an increasingly important concept in comprehensive planning of water resources.

#### 1.2 INDIA'S NATIONAL WATER POLICY 2002

According to the National Water Policy 2002 of India, water resources development and management will have to be a hydrological unit such as drainage basin as a whole or a sub-basin, taking into account surface and ground water for sustainable use incorporating quantity and environmental considerations. All individual developmental projects and proposals should be formulated and considered within the framework of such an overall plan keeping in view the existing agreements/awards for a basin or sub-basin so that the best possible combination of options can be selected and sustained. Water should be made available to water short areas by transfer from other areas including transfers from one river basin to another, based on a national perspective, after taking into account the requirements of the areas/basins. Integrated and coordinated development of surface water and ground water resources and their conjunctive use, should be envisaged right from the project planning stage and should form an integral part of the project implementation. Irrigation intensity should be such as to extent the benefits of irrigation to as large number of farm families as possible, keeping in view the need to maximize production. Irrigation being the largest consumer of fresh water, the aim should be to get optimal productivity per unit of water. In view of the vital importance of water from human and animal life, for maintaining ecological balance and for economic and developmental activities of all kinds, and considering scarcity, the planning and, management of this resources and its optimal and equitable use has become a matter of the utmost urgency.

#### 1.3 STUDY AREA

The Cauvery is an inter state river in south India originating in the state of Karnataka and flowing through the states of Karnataka, Kerala, Tamil Nadu and

Pondicherry having a catchment area of 81,155 Km<sup>2</sup>. The state wise drainage areas of Cauvery river basin are Karnataka 34,273 Km<sup>2</sup> (42.2%); Tamilnadu 43,867 Km<sup>2</sup> (54.1%); Kerala 2,866 Km<sup>2</sup> (3.5)% and Pondicherry 149 Km<sup>2</sup> (0.2)%. This river basin has 16-sub-basins. It has 75% and 50% water year dependable surface water potential of 16,470 MCM and 20,253 MCM, respectively. The total of 3,866 MCM ground water potential is available for future use. The water requirement for the population of human and livestock projected to the year 2050AD for all purposes are estimated as 39516 MCM. There are 15 major reservoirs and 58 medium irrigation projects and a large number of minor irrigation projects in the basin. The total irrigable area is 2605200 Ha.

#### 1.4 IMPORTANCE OF THE STUDY

The utilization of the water resources of the transboundary Cauvery river system is under dispute. The interstate water dispute between Karnataka and Tamilnadu about sharing of water and intra basin water transfers is pending from a long time and sometimes creates a law and order problem in the states. The issue has been referred to The Cauvery Water Disputes Tribunal (CWDT). The Supreme Court of India has given the directives to the Government of India for interlinking of major rivers in the Himalayan and the Peninsular regions to reduce the natural imbalance of water in the country. The purpose of the study is also to find the technological and realistic solution for the problem of Cauvery basin. Optimal utilization of available water resources and conservation of the Cauvery river waters are the vital needs in the present context, to meet the growing needs of the population are the vital needs in the present context. The optimal allocation of surface water and ground water is therefore necessary so as to maximize the annual water utilization for irrigation, domestic, industrial, hydropower

and environmental uses. The interim award of CWDT is to release 5800 MCM (205 TMC ft) of water from Karnataka to Tamilnadu at Mettur, the 13<sup>th</sup> reservoir in the 8<sup>th</sup> sub-basin. It would be interesting to carry out the study in reference to the interim award of Cauvery Water Disputes Tribunal (CWDT).

#### 1.5 THE PROBLEM IDENTIFICATION

The transboundary Cauvery river basin, the last but one at the tail end of the Peninsular river system is short of adequate water resource to meet its present and future demands, and the problem of sharing of waters between the two major basin states, Karnataka and Tamilnadu, involving intra basin water transfers has been the subject of a long-standing dispute. The National Water Development Agency (NWDA), the society under the Ministry of Water Resources, Government of India, and The National Commission for Integrated Water Resources Development (NCIWRD) under Ministry of Water Resources, Government of India have carried the studies on the water balance, i.e., the study comprising of the sub-basins/basin wise assessment of, the water yields, the existing uses, the reasonable requirements of the basin states in the foreseeable future and the determination of the order of surpluses/deficits of Cauvery river basin on an annual basis. The NWDA studies have not considered ground water and the environmental water requirements while NCIWRD has considered 2/3 of the estimated ground water potential and the environmental water requirements. For accurate assessment of the water resources, the water balance studies should be carried out on a monthly basis, considering the environmental requirements and ground water availability. In this study the water balance studies are carried out on a monthly basis, considering the environmental requirements and ground water availability. This study is also directed to develop a methodology to test the spatial variations with respect to

project sites and storage effect on the water balance studies of the system. The approach and appropriate technique will naturally vary from problem to problem as the configuration, state of development of the system and stage of decision making vary over a vast range. (Maass et al., 1962; Hufschmids and Fiering, 1966; Hall and Dracup, 1970; Haimes, 1977; Loucks et al., 1981; Stedinger et al., 1983; Goodman, 1984; Vedula, 1985; Srivastava, 1976; Chaturvedi, 1987; Simonomic, 1992; Srivastava and Patel, 1993; Wurbs, 1993; Boney 1993; Sadeghian, 1995; Kohistanti, 1995; Sunita Devi, 1997; Waikar, 1998; Dahe, 2000; Dahe and Srivastava, 2002; Kamal-Ali Abd Al-Mohseen (2002); Jena, 2004; Deepti Rani, 2004). A large number of the studies on river basin planning for large river systems generally have considered basic problem constraints only. Very few such studies in the Indian context have incorporated the interest of co-basin states in terms of sharing of the river waters with intra basin water transfers and limiting its use under numerous techno-economic and management constraints pertaining to treaties/agreements/tribunal awards.

Keeping the above facts in view this study is directed to develop a methodology using linear programming optimization model to test the functioning of the transboundary Cauvery river basin system.

#### 1.6 THE OBJECTIVES OF THE STUDY

Keeping the above facts in view this study is directed to develop a methodology using linear programming optimization (LP) model to test the functioning of the transboundary Cauvery river basin system, which is an inter state river originating in Karnataka and flowing through the sates of Karnataka, Kerala, Tamilnadu and Pondicherry.

The main objectives of this study are as follows:

- (i) To evaluate the utilizable surface and ground water resources on monthly basis for all 16 sub-basins and Cauvery river basin as a whole,
- (ii) To estimate the water demands for the year 2050 AD for different uses and to make the water balance studies on monthly basis for all the 16 sub-basins and the Cauvery basin as a whole,
- (iii) To develop a linear programming optimization model for a river basin, planning and development for conjunctive water use, with the aim to maximize the water utilization including intra-basin water transfers, and to determine optimal and sustainable cropping pattern in terms of irrigation intensity and productivity per unit of water, and apply it to the Cauvery river,
- (iv) To study and analyze in detail the interim award given by the CWDT for sharing of the Cauvery waters by the co-basin states in respect of the present study objective at Sl. No. (iii), and (v) To draw suitable conclusions from the above study.

#### 1.7 THE METHODOLOGY

The methodology adopted to achieve the objectives is outlined below:

#### 1.7.1 Water Balance Studies

The monthly water balance studies were made to know the surplus and deficits to find out whether the monthly water requirements are met or not and whether the monthly intra-basin water transfers within the Cauvery basin are possible. The monthly and annual water balances for each sub-basin are calculated and the monthly and annual surplus and deficit are worked out.

### 1.7.1.1 Estimation of surface water and ground water potential

The 75% water year dependable surface water yields on monthly basis for each sub-basins are calculated by distributing the annual 75% water year dependable yields in the proportion of actual average monthly inflows/yields observed at the nearest gauge and discharge (G&D) sites within or outside of the sub-basins. The sub-basin wise ground water potential and the existing uses are calculated on the area basis from districtwise ground water statistics, the data collected from the Water Resources of India, a publication of Central Ground Board, under the Ministry of water Resources, Government of India, Faridabad. The same procedure is adopted for 50%, 90% and 100% water year dependable flows.

### 1.7.1.2 Assessment of the water requirements/needs

### Domestic requirements/needs

The rural, urban and livestock population has been computed by projecting the 1981 census human population and 1982/83 census livestock population To 2050 AD by using suitable compound annual growth rates for human and one percent for livestock. The domestic water requirements are calculated considering the per capita water requirements of 70 liters, 200 liters and 50 liters per day respectively. The urban population by 2050 AD is taken 60.70% of the total projected population by 2050 AD. The entire water requirement for the urban population and the 50% of the rural population is proposed to be met from surface water. The entire water requirement for live stock population and 50% of the requirement for the rural population is proposed to be met from ground water resources.

#### Irrigation requirements/needs

The irrigation needs are calculated by keeping the utilization of existing and

ongoing major, medium and minor projects undisturbed while the net and gross crop water requirements for future major medium and minor projects have been worked out by climatological approach. It is considered that at least 30% of the maximum culturable area for each sub-basin should be under irrigation for the year 2050 AD and in case of sub-basins having less than 30% of irrigation area the additional area to be brought under irrigation is computed and 50% of this is proposed to be irrigated from future medium projects and the remaining 50% from future minor projects. The ultimate irrigation needs for the future projects are calculated and are used for the water balance studies.

### Industrial requirements/needs

For the industrial requirements, in the absence of relevant data, it has been assumed to be same order as that of domestic water requirements by 2050 AD.

### Hydropower requirements/needs

The total evaporation losses of all Hydropower projects in the catchment area of each sub-basin are considered, as hydropower needs.

### Environmental requirements/needs

The environmental needs to each month are taken equal to 1% of the inflows of those months.

The intra-basin water transfer quantities are taken from the data collected. The regeneration from irrigation, domestic and industrial is taken 10%, 80%, and 80%, respectively of net utilization. The monthly and annual water balances for each month in each sub-basin are calculated and the monthly and annual surplus and deficits are worked out.

### 1.7.2 The Mathematical Modeling Approach

The following is carried out:

- (i) An optimization model for planning and management is considered suitable for this study in view of the large size of problem to be addressed. In accordance with the reported findings, regarding the modeling approaches, and the nature and scope of the present study, and huge number of variables to be handled the linear programming model is found to be promising.
- (ii) To study the effects of the spatial variations with respect to project sites and reservoir storage on the water balance of the system, a project-by-project analysis, and sub-basin wise analysis are carried out.
- (iii) The optimization model was run for 75%, 50%, 90%, and 100% water year dependable flows by using LINDO software package for solution. Irrigation was considered as lumped. The monthly diversions from reservoirs and ground water are obtained.
- (iv) The cropping pattern is studied for each reservoir. The water availability is taken from step (iii) above. The cropping patterns are analyzed keeping in mind:

  (a) The number of paddy crops to be grown, (b) Reducing the area for water extensive crops and (c) Opting for high revenue crops.
- (v) To see the effect of the water surplus and the water deficit years on the water utilization and on intra basin water transfers, the step (iii) is repeated.
- (vi) The minimum food requirement with respect to calorific value of crops is also studied.
- (vii) The above studies also include the consideration of the interim Cauvery Water

  Dispute Tribunal (CWDTIA) award.

Initially, the LP model has been applied to the existing, ongoing and proposed individual reservoir sites (major projects) in the Cauvery river basin and again the above models were used to study and analyze the combined developmental strategies of the river sub-basins and the Cauvery river system as a whole. The approach and the characteristics of the type of the models used are a methodological framework for optimal water utilization of the Cauvery river basin planning. And this thesis is an attempt to combine the major advances of systems analysis by optimization (LP) models, which can be used for multi-reservoir, multi-purpose and multi-irrigation areas water resources systems.

# 1.8 THE MAIN FINDINGS OF THIS STUDY

The main findings of this study are as follows:

- (1) The water balance study showed that, with ground water availability considerations, the Upper Cauvery, Kabini, Tirumanimuttar and Ponnanai Ar sub-basins become water surplus from water deficits, during normal and good water years,
- All the sixteen sub-basins in the Cauvery river system except Middle Cauvery sub-basin, are found short of water during normal and bad water years as determined from the linear programming model, whereas the Noyil and Arkavathi sub-basins suffer the most from water deficit, and the Chinnar sub-basin the least,
- (3) The Kabini sub-basin is not able to fulfill its intra-basin water exports requirements completely during normal and bad water years, as determined from linear programming model,

- (4) As per the LP model results, it is found that the maximum intra-basin water exports (reservoir releases) possible from the Mettur reservoir to the other sub-basins below Mettur for 75%, 50%, 90% and 100% water year dependable flows are 7200 MCM, 7800 MCM, 6900 MCM and 6700 MCM, respectively, while in the water balance studies of the NWDA the maximum proposed exports from Mettur is shown as 12712 MCM for a normal year,
- (5) As per LP model results for 5800 MCM exports from Mettur reservoir to the sub-basins below Mettur it is found that the water share ratios for above and below Mettur for a normal year, and other water years, i.e., a water surplus year, a water deficit year, and a critical water year are in the ratios of 0.98, 1.07, 0.79, and 0.72, respectively,
- from outside the Cauvery basin during a normal and other water years, i.e., a water surplus year, a water deficit year, and a critical water year are in the ratios of 1.00:93:1.26:1.67, respectively,
- Outside the Cauvery basin, during a normal and other water years, i.e., a water surplus year, water deficit year, and a critical water years are in the ratios of 10.92:1.18:1.40, respectively,
- (8) From the linear programming results, during a normal water year, the water extensive crops would not completely acquire their respective crop areas at six reservoirs. The high benefit crops would acquire very little crop areas at two reservoirs. Two reservoirs would require import of Sugarcane. Upper Nugu reservoir is the most affected reservoir in terms of the crop area occupation. Out

of sixteen sub-basins nine sub-basins would spill in all the months during a normal water year. Generally, a maximum monthly water utilization factor of 1 would be achieved in different months at all the sub-basins, except two sub-basins. Similarly, a minimum of about 0.25 monthly water utilization factors would be achieved, with and without ground water considerations. From the LP model result, the maximum annual water utilization factor of 1 at Chinnar sub-basin and the minimum annual water utilization factor 0.19 at Noyil sub-basin would be achieved.

#### 1.9 CHAPTERWISE PLANNING OF THE THESIS REPORT

With respect to the said objectives, this research work is reported in 9 chapters.

Chapter 1

This chapter is introductory in nature, it emphasizes the need for planning and management of limited water resources together with problem identification and objectives of the study.

Chapter 2

This is related to literature review. This chapter deals with the review of literature on the topics of surface water resources, planning of surface water reservoirs, cropping pattern and conjunctive water use within the framework of multi-purpose, multi-receivers and multi-irrigation areas.

Chapter 3

The characteristics of the Cauvery river system, undertaken for this study and the data required for this purpose are given in Chapter 3. This includes data such as inflow at dams, gauging and discharge measurement, capacities of canals and dams, monthly water requirement and time period for each crop, subbasin wise and projectwise culturable command area (CCA),

project wise irrigation and annual utilization, availability of subbasin wise surface and ground water.

Chapter 4 The water balance studies for all the 16 sub-basins of the Cauvery river are made and the detailed methodology is described in Chapter 4.

Chapter 5 A general linear programming model for a complex river basin for surface and ground water utilization is developed in Chapter 5. The model developed in this chapter can be used for the planning and development of any river basin by changing the specific design constraints. The objective function of the model is to maximize the annual water utilisation from irrigation and water supply; to maximize the area to be irrigated; and to maximize the annual food production for self-sufficiency.

Chapter 6

Certain data has to be computed from the available information.

The same has been done in Chapter 6. It includes the computation of land use coefficients, computations of irrigation and water supply diversion coefficients and computations of flows for different water year dependable flows.

Chapter 7 The results of the LP model developed and applied to Cauvery river system are presented in Chapter 7. This model has 3600 constraints based on continuity equation, total release from the reservoir, state wise annual irrigation, water supply, land use, crop water requirement, hydroelectric energy, and some designs constraints according to CWDTIA. Out of these 3570 constraints are equalities and 30 are, less than or equal to type. The decision variables include crop areas; reservoir storage, release and spill;

monthly diversions for irrigation and water supply; capacities of reservoirs and canals; upstream and downstream total annual irrigation and water supply.

The entire analysis of LP model was carried out using LINDO package.

Chapter 8 The analysis and discussion in respect of the model developed and applied to Cauvery river basin is carried out in Chapter 8.

The model has been analyzed over one year interval with monthly time periods. The various graphs drawn are presented in this chapter.

Chapter 9 The conclusions drawn on the basis of the present study and scope for further work are finally given in Chapter 9.

## LITERATURE REVIEW

#### 2.1 GENERAL

The history of Water Resources Development Planning shows a long series of evolutionary changes in analytical methodologies. Water resources systems are very complex in nature. These serve the basic demands of humanity and face numerous social, political, economical, environmental, and engineering problems. Reservoirs are the most important elements of complex water resources system.

As the water resources and river basin planning has become more complex, corresponding analytical techniques have evolved the wide spread use of systems analysis. For optimal utilization of irrigation potential, selection of a suitable cropping pattern, adoption of intensive farming techniques and application of desirable amount of water at proper timing are very important.

Mathematical modeling provides a way, perhaps the principal way of predicting the future behavior of existing or proposed water resources system. A mathematical model is a set of equations that describes and represents the real life water resources system. Application of the systems approach and use of systems analysis techniques and models to the real life systems have improved our understanding of such systems, and contributed to continuous process of developing the methodologies for improving the system planning, management, and operation. Over the last 50 years, we have witnessed advances in our abilities to model the engineering, economic, ecologic, hydrologic, environmental, and sometimes even the institutional or practical aspects of

large complex multipurpose water resources systems. Evaluating the applications of numerous types of models has taught us how limited our modeling skills remain (Loucks, 1992).

Water resources system analysis has now been generally accepted to provide an efficient way of answering the numerous questions regarding planning of a large-scale real life water resources system for which the conventional methods of analysis will be inadequate. The approach and appropriate technique varies from problem to problem depending up on state of development of the system and range of decision-making (Maass et al., 1962; Hufschmidt and Fiering, 1966; Hall and Dracup, 1970; Srivastava, 1976 and 1987; Haimes, 1977; Loucks et al., 1981; Stendinger et al., 1983; Marino and Mohammadi, 1983; Goodman, 1984; Vedula, 1985; Helweg, 1985; Chaturvedi, 1987; Sadeghian, 1991; Afshar et al., 1991; Chavez-Morales et al., 1992; Simonovic, 1992; Srivastava and Patel, 1992; Wurbs, 1993; Wurbs et al. 1993; Boney, 1993; Sadeghian, 1995; Sunita Devi, 1997; Waikar, 1998; Dahe, 2001; Dahe and Srivastava, 2002; Kamal-Ali Abd Al-Mohseen (2002); Jena, 2004; Deepti Rani, 2004).

Good work started around in 1955 with the system analysis application. A system may be optimized with the objective of getting maximum benefit out of a given volume of water or minimizing water losses through flood run off, evaporation or seepage etc. This helped in the planning and management of complex river basins, operation of single reservoir, single and multiobjective reservoirs, and multi reservoirs with multi objective, and cropping pattern, conjunctive use of surface and ground waters, etc.

For a large water resources system the difficulty in the system analysis is primarily due to large number of possible alternative development strategies, and hence the vast computational effort required establishing an optimal development plan. However, the huge costs involved in the construction and operation of such a large scale system and the great potential for cost reduction through improved system design necessitate a planning programme that will determine such an optimal development strategy. Therefore, in a large and complex system, one of the major challenges is to reduce the large set of alternative configurations that need to be examined in detail to a reasonable number without mistakenly eliminating an attractive option. The most commonly suggested approach has been to screen all alternating configurations with mathematical programming techniques to determine the most attractive alternatives.

A critical review related to the problems of multiple reservoirs planning and management and inter sub-basin (intra-basin) and inter-basin water transfers, available in literature of water resources planning and management have been presented in two parts as follows:

# 2.2 REVIEW OF STUDIES IN SYSTEMS ANALYSIS OF COMPLEX WATER RESOURCES SYSTEM

A river basin water resource planning has become an increasingly important concept in comprehensive planning of a complex water resources system. Comprehensive river basin water resources planning are a complex and difficult task, posing numerous social, economic, environmental, and engineering problems. One of most difficult engineering aspects of such a planning effort is the development of optimum expansion policies for timing, sizing and sequencing of surface water storage and conveyance facilities. For large-scale water resources systems the difficulty of this task is primarily due to a large number of possible alternative development strategies. The term optimization means the achievement of best results and may be interpreted in

different ways depending on the relative importance of the specific objectives.

A most widely used and popular approach for studying water resources planning problem is based upon mathematical programming or optimization techniques. The advent of high-speed, high-capacity personal computers and the growing requirement of the society for the optimal use of available water resources have further increased the importance of this subject. Although optimization concept has been used during last four decades, the introduction of modern computing facilities and availability of interacting software has greatly accelerated the solution of optimization problems of complex river basin planning.

This approach consists of solving a set of mathematical equations using digital computers to get an optimal solution. Different types of programming problems have been formulated and solved for carrying out the planning and management of water resources river basin planning. A brief description of the reported research works on water resources systems analysis is presented here.

Maass et al. (1962) reported the results of research on system design conducted over several years by Harvard Water program of the Graduate School of Public Administration. This comprehensive treatment emphasizes the systematic research on the methodology of systems design.

Hall et al. (1968) used deterministic dynamic programming for reservoir operation. Their loss function depends on state as well as control variables. It presented in detail, the operational analysis of a component reservoir-river system and procedure to be used to combine optimally a number of such system into a coordinated, mutually reinforcing, and multiple river system.

Stephenson (1970) illustrates the optimum design of multi-interlinked river

basins using linear programming and the principle of decomposition of linear programming.

Bargur (1972) presented a multisector planning and management approach to water resources that is based on a general equilibrium analysis employing input-output model and linear programming techniques.

Nayak and Arora (1973) considered a chance-constrained formulation of a multireservoir system. Some of the other applications in multi-reservoir analytic models are Simonovic and Marino (1982), Marino and Loaiciga (1985a, 1985b), Pereira and Pinto (1985), Gunaa et al. (1990) and Benedito et al. (1991).

A study (Srivastava, 1976; and Chaturvedi and Srivastava, 1981) dealt with the first stage preliminary screening design model in the context of a sequential system analysis iterative modeling of a complex water resources system. The models were developed in the context of river Narmada, a large river basin in India. Two types of analytical optimization models were used to find a reasonably small set of possible optimal design alternatives. These were linear programming deterministic continuous (LPDC) model and linear programming deterministic discontinuous (LPDD) model. The simulation continued screening on the basis of the information obtained from linear programming model. The LPDC model results may be assumed to be nearly optimum in terms of the objective function and could serve as an input for further screening by simulation. The LPDC model was helpful in selecting the ranges of variables for simulation by random sampling.

Decomposing the problem into simulation and optimization components derives a compact, non-linear optimization formulation for selecting among and sizing potential reservoirs. Reservoir storage capacities needed are determined using a modified sequent peak algorithm to simulate monthly reservoir operation (Lall and

Miller, 1988). Simulation is also employed to determine optimal sizes for hydropower generators at each site.

A simulation model in conjunction with an optimization model was developed for water-development planning and policy-issue analysis on Platte River in Nebraska (Razavian et al., 1990). The general model consisted of three components: simulation, screening and optimization. The focus of this paper was on the economic simulation component, which consisted of water-use and economic sub models. The economic simulation model simulated water uses and losses and calculated associated system costs and economic benefits for a large number of alternative water-development options. The out put was used to analyze the physical and economic efficiencies of each alternative, to select preferred alternatives for further analysis, and to generate data for direct input to a subsequent multi-objective optimization model. The technique was found to be a very efficient and cost effective method of evaluating development opportunities for a complex, multipurpose, multi-reservoir river basin.

Grygier and Stendinger (1985) have examined successive LP, optimal control, and LP-DP algorithms to optimize the operation of a single reservoir, two reservoirs in series, and three reservoirs in parallel. The successive linear programming algorithm was found to be easier to implement and appeared to find a global optimum. For simple system the optimal control algorithm is faster but harder to implement. The solutions obtained by LP-DP algorithm were not found optimal.

Vedula and Mohan (1990) developed a real time operational methodology for the Bhadra reservoir in the state of Karnataka (India). The algorithm has three phases of operation. The first phase determines the optimal release policy for a given initial storage and inflow using SDP. Second phase constituted the flow forecasting using ARIMA model and in the last phase a real time simulation model was developed. In the SDP model, the inflows were assumed to follow a discrete Markov process.

Braga et al. (1991) proposed a methodology to identify the parameters in identifying drought, which include onset, termination and severity, from the available historic data on stream flow and rainfall having seasonal pattern. This modified methodology is applied to the stream flow series of the Bhadra river and the mean a real rainfall series for the catchment of the Bhadra reservoir in Karnataka State, India. The droughts identified by the proposed methodology are concurrent with the historically realized droughts, thus providing the viability and applicability of the methodology in the identification of drought conditions.

Loucks (1992) discussed the role of water resources system models in planning. The major challenge facing water resources system planners and managers, the information they need to meet these challenges, and the role analysis in helping to provide this information, have been discussed. He has reviewed some criteria for evaluating the success of any modeling activity designed to help planners and managers to solve real life problems.

Afzal et al. (1992) developed a linear programming model of different quality water by alternative irrigation. The model described provides a methodology of allocating land and water to different crops wherever low rainfall, limited quantity, and different quality waters are the basic parameters governing the irrigation system.

Mohan and Raipure (1992) developed a linear multi-objective programming model and used the constraint technique to derive the optimal releases for various purposes from a system of five reservoirs in India. Trade-off analysis between conflicting objectives of irrigation and hydropower was carried out.

In the study by Karamouz et al. (1992), a multivariate hydrological time-series analysis and a deterministic optimization technique for determining reservoir-operating rules for multiple reservoirs were investigated. This comprised a three-step cyclic procedure that attempts to improve the initial operating rules for the system. The system required two sets of synthetically generated stream flow series to be used in simulation model. The three step cycle begins with an optimization of reservoir operations for a given set of stream flows. The optimal operations from the solution are then analyzed in a regression procedure to obtain a set of operating rules. These rules are evaluated in a simulation model using a different set data. Based on the simulation results bounds are placed on operations and cycle returns to the optimization model. This continues until one of the stopping rules is satisfied.

In the study by Srivastava and Patel (1992), optimization-simulation models were used for the systems analysis of Karjan irrigation project in India. Two types of optimization models, i.e., linear programming and dynamic programming (continuous and discontinuous) were used for preliminary design purposes. The simulation technique was used for further screening. The linear programming model is most suitable for finding reservoir capacity. Dynamic programming (continuous and discontinuous models) are used for further refining the output targets and finding the possible reservoir carryover storages, respectively.

Crawely and Dandy (1993) used the linear programming thehnique for identification of optimum monthly operation policies for the Adelaide headwork's system in Australia. They developed model with the objective function to minimize the pumping costs while ensuring system reliability by maintaining minimum-target levels in the reservoirs.

Loucks (1995) reviewed the needs and opportunities in developing and implementing decision support system (DSS). The focus of the paper is on the process of the successful DSS development and implementation. An approach and some guidelines are outlined for the development of DSSs. The approach emphasizes and requires considerable iterations. The feedback is required throughout the DSS building, testing and evaluation (debugging), and implementation process. The paper concludes by identifying some research needs and opportunities affecting DSS development and its effective use.

Wurbs (1996) presented a computer-based methodology for optimally sizing flood damage reduction system. The decision variables are the size of each structural component of the system, such as storage capacity for reservoirs and flow capacity for channel improvements, and the choice of which non-structural plan to implement in various regions of the floodplain. The decision criteria are to minimize total system cost, which is the sum of the discounted annual cost of implementing and maintaining each measure and the residual expected annual flood damages. A hydrologic and economic simulation model is combined with a search algorithm. The simulation model incorporates procedures for determining the total economic cost for a specified plan. The optimization algorithm iteratively executes the simulation model in an automated search for the optimum plan.

Wurbs (1997) conducted a simulation study of the Brazos river basin and identified issues and concerns that illustrate the practical complexities of administering and modeling a water allocation system. The key considerations involve sharing of limited supplies by numerous water quality constraints, return flows, hydrologic data compilations, and reliability assessment. He states that the issues affecting evaluation of water availability within the Texas water rights system are representative of other

states as well. The study is useful in highlighting the major concerns, issues and constraints, which are to be handled while managing such systems.

Dandy et al. (1997) made a comparison of simulation, network linear programming, full optimization LP model and the LP yield model for estimating the safe yield of the Canberra water supply system consisting of four reservoirs. They pointed out that, although a simulation model will accurately assess the system yield for an assumed set of operating rules, it will not assess the maximum yield that can be achieved by adopting the best possible set of operating rules for the system. The optimization models can be said to use the optimal operating rules for the system in order to obtain the maximum models. They however pointed out that, if the system yield with a specified reliability needs to be determined, there is considerably more difficulty in using the optimization and yield models.

Srinivasan et al. (1999) presented a mixed-integer linear programming model for reservoir performance optimization. They improved the mixed-integer formulation of Moy et al. (1986) for a more complete representation of the resiliency criteria. The improvements achieved with the modified model is demonstrated using the same example as presented with the original model.

Loucks et al. (2000) presented a discussion on sustainable water resources management in an editorial. As defined in the Brundtland Commission's report "Our Common Future (WCED 1987), a development is sustainable if: it meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable water resources system are those designed and managed to fully contribute to the objectives of society, now and in future, while maintaining their ecological, environmental, and hydrological integrity (ASCE, 1998). They must be

planned, designed, and managed in such a way that the life-support system at all biological levels remains functional and that the water and related land resources are not irreversibly degraded over time.

Mariam and Srivastava (2000) adopted implicit stochastic Yield model based on linear programming for planning optimal yield of proposed Morand reservoir in Narmada basin in India, and work out optimal allocations of land and water resources, using crop planning model, to develop cropping pattern for annual reservoir yields that can be obtained from the reservoir for different degree of annual project dependability. They opined that the yield model provides a reasonably acceptable estimate of the annual reservoir yield for planning of the project.

Dahe and Srivastava (2000) have demonstrated the use of yield model for assessment of annual yield of Upper Narmada irrigation reservoir with specified reliability and the extent of availability of irrigation supply failure years. Such an assessment can assist the planners to decide upon the irrigation polices regarding the area to be brought under irrigation with sustainable cropping pattern and to reduce the damage due to the likely shortages in supply during failure years.

Dahe and Srivastava (2001) have worked on effect of reliability and extent of supply during failure years on the annual yield of irrigation reservoir. The paper demonstrates adoption of yield model for the analysis of Halon irrigation reservoir. The effect of reliability as well as the extent availability of annual supply during the failure years on the annual yield irrigation project is studied.

Dahe (2001) has made an optimization approach employing the implicit stochastic yield model based on linear programming address issue of assessment and optimal utilization of annual yield for system of reservoirs. Basic yield is extended to develop multiple yield model for multi-reservoir system to achieve the desired annual

reliabilities target. The study carried out for 25 major irrigation reservoirs in Narmada river basin in India for optimal planning of the river basin projects.

Dahe and Srivastava (2002) have further extended the basic yield model and presented a multi-yield model for multi-reservoir system consisting of single purpose and multipurpose reservoirs with an objective to achieve pre-specified reliabilities for irrigation and energy generation and to incorporate an allowable deficit in annual irrigation target. The yield model is applied to a system of eight reservoirs in the upper basin of the Narmada River in India. They have opined that model can act as a better screening tool in planning by providing output that can be very useful in improving the efficiency and accuracy of detailed analysis methods such as simulation.

# 2.3 APPLICATION OF LINEAR PROGRAMMING IN IRRIGATION

Linear programming (LP) is capable of handling complex water resources problem. Where a large number of decision variables and constraints are involved. The constraints may be on social needs, limitation of resources and other physical and technological, environmental requirements propelling in region.

# 2.3.1 Irrigation Planning Using Linear Programming

The linear programming approach has now become regular exercises in different phases of irrigation project in general and the cropping pattern planning in particular. Simple linear programming models can be formulated to handle water resources system related to a single time period. But in reality the irrigation situations are usually much more complex. The fact remains that the supply of irrigation water from a river or a reservoir depends on rainfall and varies during the same period from year to year. The quantity of water required by a crop at a particular time depends on

two factors, namely the moisture available in the soil and the evapotranspiration rate at that time. Again these factors in turn depend on two other factors, firstly the previous irrigation and secondly the prevailing weather conditions which include rainfall, humidity and temperature etc.

Apart from these considerations the quantity of irrigation water and its time of application also influence the crop returns significantly.

Thus an irrigation system actually involves lot of periodic uncertainties.

Therefore attempts have also been made by some researchers to introduce dynamic and stochastic elements in the linear programming models to overcome the drawbacks of simple deterministic models.

The pioneering applications of linear programming were by Heady (1961), Dorfman (1961) and Guise and Flinn (1970) for the river basin planning and development. Windsor and Chow (1972) developed multi crop and multi soil mathematical model to maximize the net returns from crops grown in a season using various methods of irrigation by using LP technique subject to resource availability. Heady and Micol (1975) formulated a LP model of land and water allocations to improve environment and water quality through soil loss controls. Sarkar and Maji (1976) attempted to develop an optimal drainage program and a cropping pattern for an existing canal irrigation system consistent with most efficient use of available resources through linear programming technique under the availability of unlimited and restricted funds, respectively. Matanga and Marino (1979) developed a linear programming model to obtain optimal cropping pattern. The objective was to maximize yield from the crop under constraints of availability of irrigation water and labour. Kumar and Singh (1980) studied the effect of interaction of irrigation and labour on

cropping pattern. The study revealed that labour played a dominating role in decision making process. There are several important case studies of linear programming application in various phases of irrigation. For example Hiramath (1973) applied multiperiod linear programming for temporal and spatial allocation of irrigation water in Krishnarajasagar project of Mysore State, India.

Heady et al. (1973) developed a linear programming model for the optimal land and water allocation to estimate whether there was enough water to meet the food needs of United States of American by the year 2000 AD. Badenhop and Cashloller (1974) employed linear programming technique to choose most profitable crop combination using alternate set of land and water combination in Tungbhadra irrigation project area in India. Singh et al. (1976) formulated a linear programming model for the optimal allocation of land and water for different winter crops in Hissar district. The objective was to maximize the net profit over a given command area and canal discharge.

Agrawal and Agrawal (1982) used linear programming for water budgeting to maximize agricultural production. The study was based on an area under major irrigated winter crops, their yields per hectare, and the total irrigation water actually applied by canals in district Hissar.

# 2.3.2 Conjunctive Use Management Using Linear Programming

The conjunctive use can be defined as the combined and integrated management of surface water and ground water for optimal utilization of available water resources. In other works it is complementary use of surface and ground water resources to provide enhanced and assured water supplies at minimum cost. The concept of conjunctive use of surface and ground waters is simple in that it tries to take advantage of large free evaporation loss and transportation of water from one point to another

based on the head difference at no cost. Thus when excess surface water is available it can be diverted for irrigation purposes which includes recharge of ground water to build up ground water storage so that the same can be utilized in place and time when surface water is in short supply. By maintaining the ground water level at the reasonable depth one can maintain the ecological balance in the region, minimizing the cost of pumping, avail excessive build up of ground water table and minimize the resulting problems of water logging and salinity. Sometimes the shortage of surface water can be made up by mining of ground water temporally; thus this type of conjunctive water supply system offers flexibility in operation and results in water conservation. It increased the total yield reliability of supply and general efficiency of water system. A comprehensive study of the conjunctive water use is given in Todd (1980) and Coe (1990).

Various research workers have extensively used Linear programming (LP) technique. Rogers and Smith (1970) used LP model to arrive at the optimal allocation of ground water and canal water for conjunctive use planning of irrigation. The optimization was constrained by capacities of river, canal wells and drainage and pumping facilities and cropping pattern. The model was deterministic and emphasized on interaction of surface and ground water system.

Lakshminarayana and Rajgopalan (1977) has applied LP model to Buri Doab in Punjab, India. The model determines the extent of allocation of irrigated area to alternative crops and the amount of seasonal water releases from the two sources. Canal and tubewells necessary for seasonal water crop requirements during a one year crop period of operation are determined such that the benefits from the system is maximized. This is a deterministic model in which the response of the ground water was not considered for withdrawals.

Singh and Sirohi (1977) applied linear programming techniques to workout a plan for optimal water distribution among the various crops available from tubewells and upper Ganga Canal in Western UP, India. Sinha and Charyula (1979) developed a linear programming model for the existing irrigation system of Gomati Kalyani Doab, India. Surface water and ground water were planned to be used conjunctively. Various alternative crops were allocated in cultivated areas to determine the optimal cropping pattern.

Yoganarashimhan and Chand (1979) have applied a linear programming model to Gomti Kalayani Doab for maximizing the benefits from irrigation works, subject to a set of constraints. The model select is the cropping pattern from the thirteen crops and gives the allocations of surface and ground waters.

Duggal (1979) suggested an optimization approach for conjunctive use of surface and ground water. Multi period, multi level analysis was carried out by Singh (1981) to optimize land, water, and fertilizer resources for future development.

Both surface and ground water resources were used in LP model for each of the individual river basins and an optimal policy was determined for each of 20 rivers basins and for the country as a whole by Chachadi and Sinha (1988). They have formulated a conjunctive use model based on LP for optimal agricultural production in the sub basin of the Ghataprabha command area in Karanataka State, India. This model has been used to allocate the optimal areas to different crops subject to the water availability constraints from surface and ground water sources.

Vedula (1985) presented a water allocation model for the Upper Cauvery river basin in India. Linear programming is used to determine the reservoir releases, ground water pumping targets, and cropping patterns. The multi objective-planning model maximizes the net benefits and the irrigated areas.

# 2.4 THE HISTORICAL REVIEW OF INTRA-BASIN/INTER-BASIN WATER TRANSFERS

There are large disparities in rainfall and river flows in different parts of India. In this situation, it was natural for engineers and planners to think in terms of water transfer from better endowed to deficient basins. The concept of intra-basin/inter-basin, i.e., inter-linking of Indian rivers is thus not entirely new and was first thought of in the last century. A historical review of existing inter basin links proposals is given below.

# 2.4.1 Lt. Cotton's Comprehensive Navigation Plan

Lt. General Sir Arthur Cotton who was the pioneer of water resources development in India, way back in 1839, stated that water in India is more valuable than gold (Cotton, 1885). He considered that besides irrigation, development of water resources for navigation was of utmost importance as this would contribute to increase of production and economic development through improved transportation (Cotton, 1984 and 1985; Rao, 1975). Lt. Cotton accordingly developed a plan to inter link the rivers in India. The aim was to link Karachi to Calcutta via Kanpur and Cuttak to Bhattkal, Mangalore and Madras. But all that then were able to achieve was series of disconnected water ways, like Midnapure Canal, the Orissa High Level Canal and Kurnool-Cudappah Canal. The venture ended in a failure and had to be taken over by the Government (GOI, 1972).

#### 2.4.2 National Water Grid

Dr. K. L. Rao, one of the most eminent engineers of Independent India, and the Union Minister of Irrigation, proposed a National Water Grid for providing navigation and to remove the spatial disparities in the availability of water in different river basins.

It was based on work done earlier in the Central Water and Power Commission, India. It was noted that the general location of regions of surplus water and deficit is such that trans-basin transfer will be necessary from north and east towards west and south.

Accordingly, Ganga-Cauvery link, off taking near Patna, after it has been joined by its major tributaries Ghagra, Gandak and Sone, passing enroute through the basins of the Sone, Narmada, Tapi, Godavari, Krishna and Pennar, was to connect Ganga and Cauvery as shown in Figure 2.1. Other minor links were also proposed. The 2640 Km long Ganga-Cauvery link essentially envisaged the withdrawal of 1680 cumecs (60,000 cusecs) of flood flows near Patna for about 150 days in a year and pumping about 1400 cumecs (50,000 cusecs) of this water over a head of 449 m for transfer to the peninsular region and utilizing the remaining 2800 cumecs (10,000 cusecs) in the Ganga basin itself. The proposal envisaged utilization of 2.59 million-hectare meters of Ganga waters to bring under irrigation an additional area of 4 million hectares. Dr. Rao had also proposed a few additional links like, (a) Brahmaputra-Ganga link to transfer 1800 to 3000 cumecs with a lift of 12 to 15 m, (b) Link transferring 300 cumecs of Mahanadi waters southwards, (c) Canal from Narmada to Gujrat and Western Rajasthan with lift of 275 m and (d) Links from rivers of Western ghats towards east. The National Water Grid was also considered a network for inland navigation. Dr. Rao had estimated his proposals to cost Rs. 12,500 Crores (NWDA, 1998). A UNDP team was invited to study the proposal and it was endorsed (Rao, 1975). However, that study of the National Water Grid by the Central Water Commission, found that the Ganga-Cauvery link alone will cost about Rs. 70,000 crores at 1995 prices. The annual cost including cost of power would be around Rs. 30,000 per hectare, while the NWDA proposal for inter linking rivers between Ganga and Cauvery at 1996 prices has been

estimated to cost only around Rs. 15, 000 per hectare annually (NWDA, 1998). Then the scheme has not been pursued.

#### 2.4.3 Garland Canal

Captain Dastur, an air pilot, proposed an impressionistic idea to interconnect the rivers of India. His idea was a form of a Garland around the peninsula and a long canal at the foothills of the Himalayas. The two were proposed to be joined by pipes. The Himalayan canal was to be a 4200 km long, 300m wide at constant bed level between 335m and 457m above mean sea level aligned along the southern slopes of the Himalayas running from Ravi in the west to Brahmaputra and beyond in the east. It was visualized to be fed by the Himalayan river waters stored in 50 integrated lakes to be created by cutting the hills slopes of the Himalayas to the same level as the bed of the canal, with another 40 lakes beyond Brahmaputra. The proposal envisaged a storage capacity of 247 BMC to control and distribute 617 BMC of water. The Central and Southern Garland canal was proposed at a constant elevation of between 244m and 305m above the mean sea level, with about 200 lakes having a storage capacity of about 497 BMC to control and distribute 864 BMC of water. The Himalayan and Garland canals were proposed to be inter connected at two points, Delhi and Patna, by five 3.7m diameter pipes to transfer the water (Figure 2.2). Captain Dastur claimed that all the surplus water in the country will be utilized to irrigate 219 million hectares. About 16.8 million volunteers were expected to complete the work in 3 to 4 years. The proposal was estimated to cost of Rs. 24,095 crores at 1974 prices (NWDA, 1998). The proposal was technologically preposterous and should have been summarily rejected. It is, however, being mentioned to bring out the institutional aspects of scientific policy making. The proposals had the full support of the then Prime Minister and apparently

the Ministry could not give sound opinion on its own. Committees were therefore, set up, the proposal was detailed and then estimating that it will cost about Rs.12 million Crores, and the proposal was dropped.

### 2.4.4 National Perspective

The idea to interlink the rivers in India, to overcome the spatial imbalance persisted. The Ministry of Water Resources, Government of India, framed a National Perspective for Water Resources Development in August 1980. It was discussed at various government levels and a National Water Development Agency (NWDA) was set up as an autonomous society to promote scientific development for optimum utilization of water resources of the country and in particular to carry out detailed studies in the context of the National Perspective.

The development, conservation and use of waters thus form one of the main elements in the country's developmental planning to achieve the total production goals in addition to meeting the industrial and other needs of far projected population for 2050 AD (NWDA, 1998).

On this basis it is imperative that it was proposed to link the Brahmaputra and other rivers with national grid to meet the shortages in the various parts of the country (Mohile et al., 1996).

The broad approach adopted in the National Perspective is as follows: (NWDA, 1998).

- (i) Existing uses have been kept undisturbed.
- (ii) Normally water development under the existing legal and constitutional framework is assumed to take place fully by the turn of the century.
- (iii) The development envisaged is within the framework of all the existing agreements among various co-basin states involved.

- (iv) While planning inter-basin and inter-state transfer of water, reasonable needs of the basin states for the foreseeable future have been kept in view and provided for.
- (v) Most efficient use of land and water in the existing irrigation and hydropower station has been kept as a principal objective to be achieved.

## 2.4.5 National Perspective Plan

The National Perspective Plan comprises of two components, namely,

- (i) Himalayan River Development, and
- (ii) Peninsular Rivers Development.

# 2.4.5.1 Himalayan river development

The Himalayan River Component envisage construction of storages on the main Ganga and Brahmaputra rivers and their principal tributaries in India and Nepal so as to conserve monsoon flows for flood control, hydro-power generation and irrigation.

Inter-linking canal systems will be provided to transfer surplus flows of the Kosi, Gandak and Ghagra to the west. In addition, Brahmaputra- Ganga link will be constructed for augmenting dry weather flows of the Ganga (Figure 2.3). Surplus flow available on account of inter-linking of Ganga and Yamuna are proposed to be transferred to the drought prone areas of Haryana, Rajasthan and Gujrat. The scheme will also enable large areas in south Uttar Pradesh and South Bihar to obtain irrigation benefits from the Ganga, with a moderate lift at less than 30m. Further, all land in Tarai area of Nepal would also get irrigation apart from generation of about 30 million KW of hydro-power in Nepal and India. It will also provide flood moderation in the Ganga, Brahmaputra system with this proposal, about 140 BCM of additional water would be

available from these river systems for irrigation on estimated 22 million hectares in the Ganga, Brahmaputra basin apart from Haryana, Punjab, Rajasthan and Gujarat. It would also provide 1120 cumecs (40,000 cusecs) to Calcutta port and would provide navigation facilities across the country. The scheme will benefit not only parts of India but also neighbours Nepal and Bangladesh (NWDA, 1998).

## 2.4.5.2 Peninsular river development

Amongst the Peninsular rivers, the Mahanadi and Godavari are considered to have sizable surpluses after meeting the existing and projected needs of the states within these basins. It is therefore, proposed to provide terminal storages on Mahanadi and Godavari rivers to divert surplus flows of Mahanadi and Godavari system and to further transfer surplus flows of Mahanadi to the Godavari system to water short rivers namely, Krishna, Pennar and Cauvery. The link from Mahanadi to Godavari will be along the east coast and will not involve any lift. The link between Godavari and Krishna will be partly by gravity and partly in the ultimate stage, by lifts of the order of 120m (maximum). The transfer of water would enable irrigation in drought prone areas of Maharashtra, Karnataka, Andhra Pradesh and Tamilnadu by successive exchange. The component is shown in Figure 2.4.

The second component of this proposal is to divert a part of the waters of the west flowing rivers of Kerala to the east for irrigating the drought prone areas of Tamilnadu, apart from bringing new areas under irrigation in Kerala.

The third component is to construct storages and inter-link small rivers, flowing along the west coast, north of Mumbai and south of Tapi. This will enable partial release of waters from Tapi and Narmada which will enable extension of irrigation to Saurashtra and Kutch areas. It will also enable provision of extra water to meet the

growing needs of metropolitan area of Mumbai as well as providing irrigation to the coastal areas in Maharashtra.

The fourth component envisages inter-linking of the southern tributaries of the Yamuna, the Ken and the Chambal in addition to construction of small storages on intermediate tributaries and a dam on the Yamuna at Panchnad. This will enable irrigation in Ujjan and Indore areas of Madhya Pradesh as well as upper areas in Rajasthan.

The proposal of Peninsular River Development will enable additional use of about 84 BCM of water to benefit the States of Orissa, Andhra Pradesh, Maharashtra, Karnataka, Tamilnadu and Madhya Pradesh etc. This will provide additional irrigation benefit of 13 million hectares. The distinctive feature of the National Perspective is that the transfer of water is essentially by gravity and only in small reaches by lift not exceeding 120 m.

# 2.4.6 Examples of Some Intra-basin /Inter-basin Transfers Scheme Implemented in India

The Shenbagavalli Anicut built around two centuries ago in the Sivangiri Zamin in the head reaches of Vaippar basin which is a minor river south of Vaigai. A small weir called the Sherbagavalli anicut was built on a small tributary of Periyar river flowing towards the west. A short canal cutting across the ridge was excavated to divert the water to a tributary of Vaippar river flowing eastwards. This scheme serves 4423 hectare under 40 minor irrigation tanks.

The Periyar project is the most notable endeavour of the last century in transbasin diversion. A masonry gravity dam 47.28 m high has been constructed across a gorge on west flowing Periyar River. A 170 m long tunnel with discharging capacity of 40.75 cumecs has been driven across the mountain barrier to convey the waters eastwards to Vaigai basin. The project was commissioned in 1895 and provided irrigation to 57,923 ha initially which has since been extended to 81,069 ha. Having a power station of 140 MW capacity.

Parambikulam Aliyar project is a complex multi-basin multi-purpose project. Seven streams, five flowing towards the west and two towards the east, have been dammed and their reservoirs inter-linked by tunnels. The water is ultimately delivered to drought prone areas in Coimbatore district of Tamilnadu and the Chittur area of Kerala state. The command area for irrigation is presently 1.62 lakh hectares. There is a total 185 MW power generation capacity at four power houses. This project was built during the second and third five year plans.

Kurnool Cudappa Canal scheme was started by a private company in 1863. A 8.23 m high anicut was built on river Tungbhadra upstream of Kurnool town. A 304 km long canal with a capacity of 84.9 cumecs at its head extends from Krishna to Pennar and irrigates 52.746 ha. The scheme was taken by Government of India in 1982.

The Telgu-Ganga project has been recently implemented primarily to meet the pressing needs of water supply to Chennai metropolitan area. It brings Krishna waters from Srisailam reservoir through an open canal, first to Somasila reservoir in Pennar valley. This involves rock cuts upon 35m deep. From Somasila water is taken through a 45 km canal to Kandaleru and thence to Poondi reservoir in Tamilnadu through another 200km long canal. By mutual agreement 12 TCM or 0.34 BCM of water will be delivered to Tamilnadu at the border from Krishna basin. This will greatly augment the water supply for Chennai city. The canal also irrigates 2.33lakh ha in Andhra Pradesh enroute. The project was made possible by the state of Maharashtra, Karnataka and

Andhra Pradesh voluntarily, foregoing 5TCM each from their entitlement. This project is a fine example of not only of hydraulic engineering but also of inter-state co-operation.

Intra-basin/inter-basin transfers in the Indus basin under the Indus Water Treaty. waters of three eastern rivers, viz. Sutlui, Beas and Ravi were allocated to India. As land to be benefited in India lies mostly to the east and south of these rivers, the rivers had to be inter-linked and waters conveyed to canal systems serving vast tracts in India. The main storage on Sutlaj is at Bhakra, while that on Beas is at Pong. Bhakra system provides irrigation to 26,30,000 ha of new area besides stabilization of existing irrigation on 9 lakh ha. The aggregate generation capacity of Bhakra project is 1354 MW. Direct benefits of Pong include 16 lakh ha irrigation and 360 MW power. A diversion dam at Pandoh, 140 km upstream of Pong on Beas, enables diversion of water from Beas to Bhakra reservoir, and generates 165MW of power on the way. The Beas-Satluj link is 37.25 km long, of which 25.45km is tunnel through difficult rock formations. The capacity of tunnel is 254.7 cumecs. Ranjit Sagar reservoir on Ravi will provide additional water to Beas, and also generate a large block of power. It is no exaggeration to say that the Indus valley water resources development has transformed the entire economy of Punjab, Haryana and Rajasthan. So for as power benefits are concerned, the entire Northern grid shares these.

The projects cited above have been highly benefited and have not resulted in any noticeable environmental damage. The major reservoirs at Bhakra, Pong and Ranjit Sagar dams, did involve considerable rehabilitation problems, which have been largely satisfactorily resolved.

#### 2.4.7 Water Transfers in Other Countries

Many schemes of intra-basin/inter-basin water transfers have been planned, and some of them implemented in other countries.

Sixteen major inter-basin water transfer schemes have been implemented in Canada, mainly for hydropower. In USA the longest and best known schemes implemented so far is California State Water Project.

In United States, The California's State Water Project which diverts 4 cubic km of water from northern California to the drier central and southern parts of the state was completed in 1973. The conveyance system comprises of 869 km California Aqueduct, a complex system of lined and unlined canals, pumping stations, siphons and tunnels involving a lift of 1220m.

The Texas Water Plan envisages redistribution of water in Texas and New Mexico to meet the needs of the year 2020.

The waters of Colorado river which is the international river between USA and Mexico are being supplied outside the basin to the Imperial Valley in the California.

In Canada, the major existing inter-basin transfer projects are Kemano, Churchill, Diversion, Welland Canal, James Bay, Churchill falls and Bayd' Espoir etc. Proposed inter-basin water transfers in Canada are North America Water and Power Alliance (NAWAPA), Canadian Water Magnum Plan, Central North American Water Project (CNAWP), Smith Plan etc. for transfer from Canada to U.S.A.

In Mexico, for the Mexico city water supply, transfer from ground waters from the Lerma basin was completed in 1958. The water plan for the North Western Region (PLHINO) conceived a set of inter basin transfers within the Noroeste region.

In Sri Lanka, the Mahaveli-Ganga project includes several inter basin transfer links.

In USSR the notable scheme executed is the Irtysh Karganda scheme in the Central Kazakhstan.

In China the Lingua canal was completed in 214 BC and Grand Canal was completed in 605 AD. Recently completed project in China is Billuna-Dalian interbasin water supply system. Trans-basin transfer of Luhana river to Tiajian and Tengshan, inter-basin diversion of Guang Long province and inter-basin diversions in Fujian province. Diversion of Quiantang river water, diversion of Yellow river surpluses and south to north transfer projects with the West route, Middle route and East route are other proposed projects in China.

These schemes give us confidence in planning and executing schemes in our country. At the same time lesson have to be learnt from their actual performance, economical and environmental point of view. The decision and implementations of the intra-basin and inter-basin water transfers in India as per the directives given by the Supreme Court of India should be taken for execution taking into consideration of fast growing population for 2050AD.

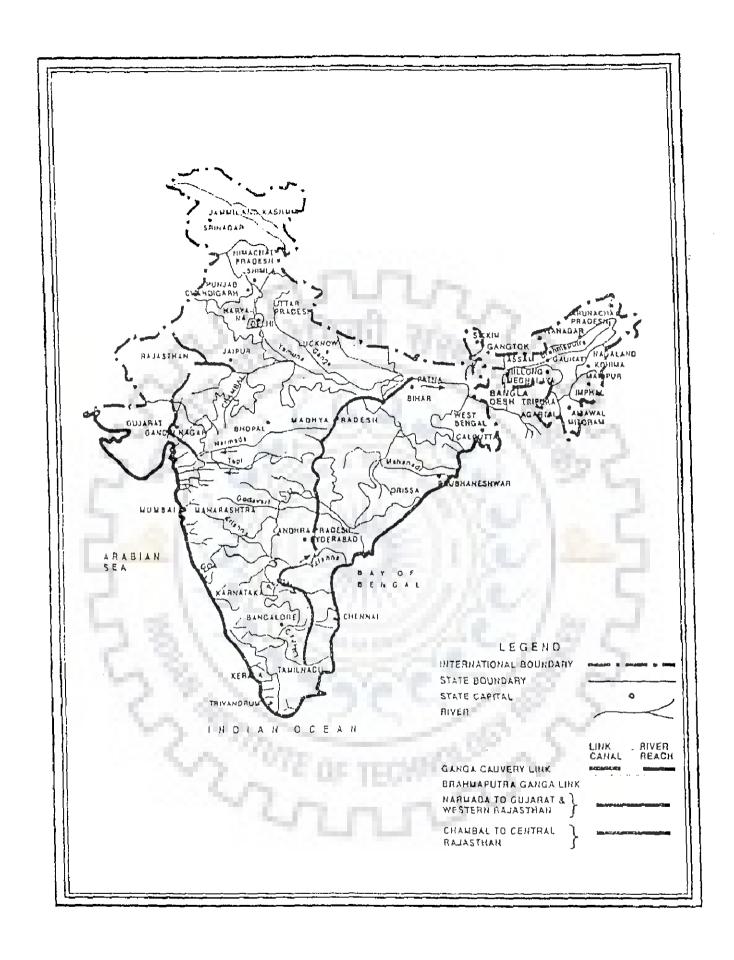


Figure 2.1: Dr. K. L. Rao's Proposal

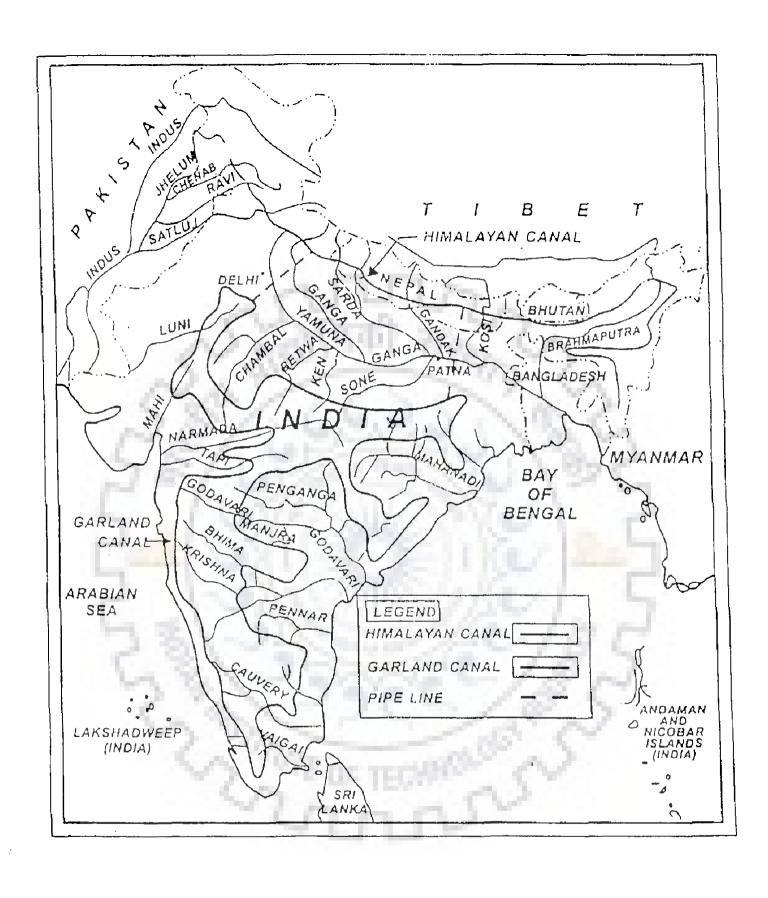


Figure 2.2: Captain Dastur's Proposal

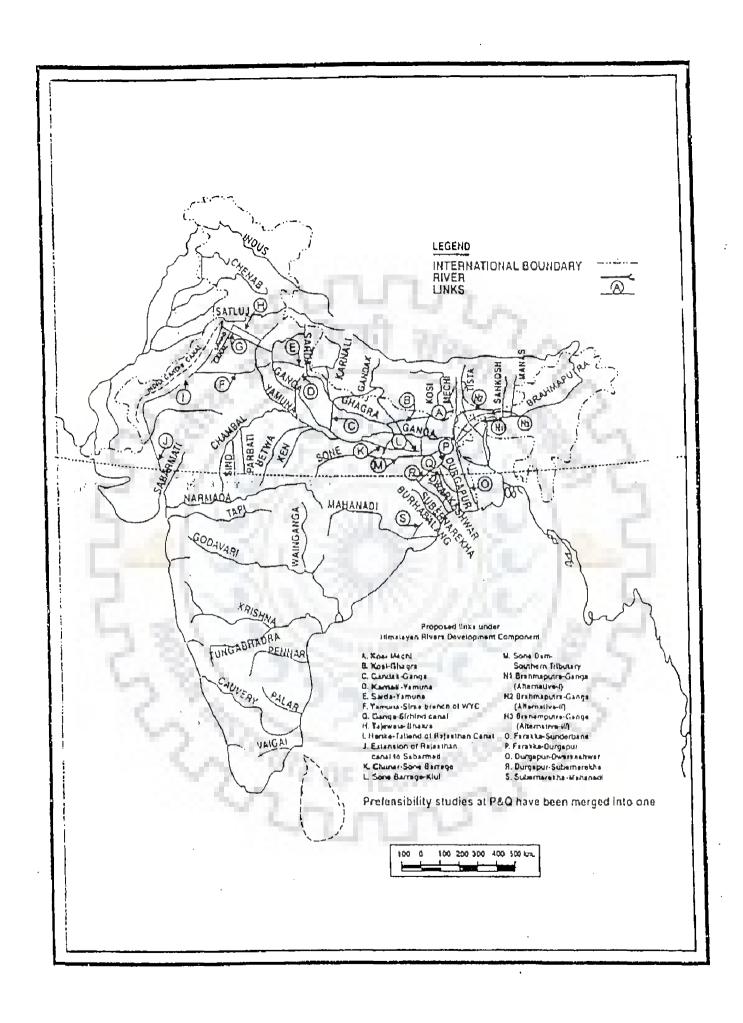


Figure 2.3: Himalayan Rivers Development Component

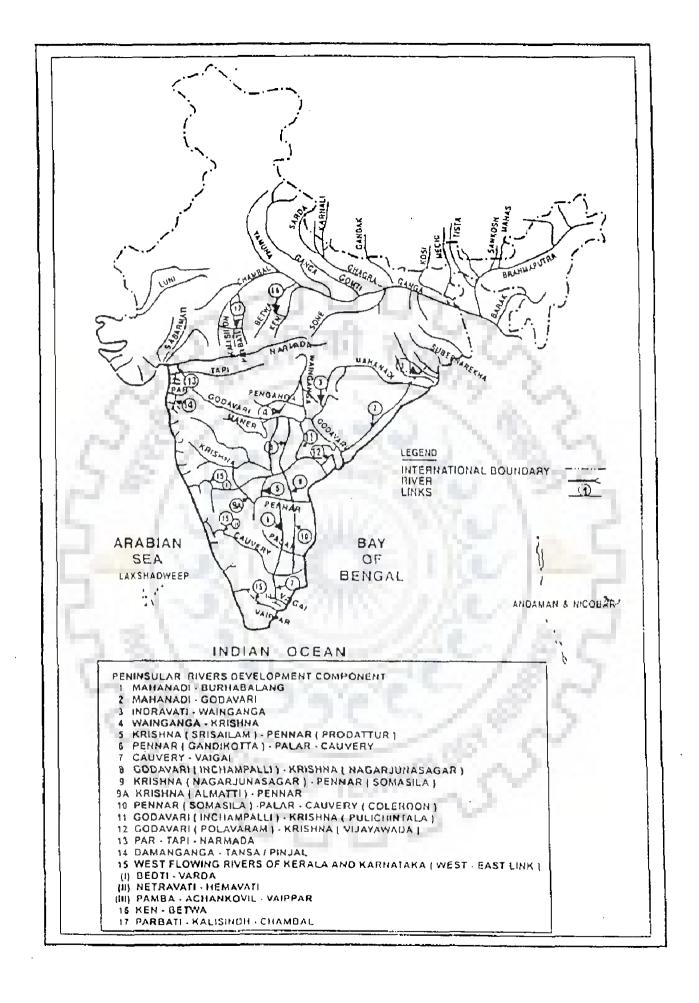


Figure 2.4: The Peninsular Rivers Development Component

# TRANSBOUNDARY CAUVERY RIVER SYSTEM

### 3.1 CAUVERY RIVER BASIN

The Cauvery River is also known as Dakshin Ganga, or 'Ganga of South' in India. The Cauvery is one of the major interstate rivers of South India and is the fourth largest river in the Indian peninsula next only to Godavari, Mahanadi, and Krishna. It rises in the Western Ghats in the Kodagu district of Karnataka at an altitude of about 1341 m above mean sea level (m.s.l) and flows in eastwardly direction passing through the states of Karnataka, Tamilnadu, Kerala and Pondicherry before it drains into Bay of Bengal. The total length of river from source to its out-fall into Bay of Bengal is about 800 km of which 320 km is in Karnataka, 416 km in Tamilnadu and 64 km fall on the common boundaries between Karnataka, Tamilnadu and Pondicherry. The principal tributaries of river Cauvery are the Lakshmanthirtha, Hemavathi, Harangi, Shimsha, Kabini, (which originates in Kerala), Arkavathi, Suvarnavathi in Karnataka, Bhavani (origin in Kerala), Amaravathi (origin in Kerala), Noyil and Ponnanai Ar in Tamilnadu.

The entire Cauvery basin catchment has been divided into 16 sub-basins, viz., (1) The Upper Cauvery (from the source to the Krishnarajsagar dam, i.e., KRS dam, (2) the Kabini, (3) the Shimsha, (4) the Arkavathi, (5) the Middle Cauvery (from the catchment of main river Cauvery from KRS dam at the upstream end to just below the confluence of Arkavathi river with main river Cauvery), (6) the Suvarnavathi, (7) the Palar, (8) the Chinnar, (9) the Bhavani, (10) the Noyil, (12) the Tirumanimuttar, (11) the Amaravathi, (13) the Ponnanai Ar, (14) the Upper Coleroon, (15) the Lower

Coleroon and (16) the Cauvery Delta. The sub-basin wise drainage area, rainfall, runoff and groundwater potential is given in Table 3.1.

Table 3.1: Sub-basinwise Area, Rainfall, Runoff at 75% Water Year Dependable Flow and Ground Water Potential

| Sl. | Name of        | Area              | Rainfall | Runoff* | Ground Water |
|-----|----------------|-------------------|----------|---------|--------------|
| No. | Sub-basin      | (Km <sup>2)</sup> | (mm)     | (MCM)   | (MCM)        |
| (1) | (2)            | (3)               | (4)      | (5)     | (6)          |
| 1   | Upper Cauvery  | 10619             | 1025     | 5394    | 578.5        |
| 2   | Kabini         | 6810              | 1097     | 3641    | 386.4        |
| 3   | Shimsha        | 8469              | 656      | 619     | 506.0        |
| 4   | Arkavathi      | 4351              | 451      | 287     | 103.5        |
| 5   | Middle Cauvery | 2676              | 424      | 330     | 205.6        |
| 6   | Suvarnavathi   | 1787              | 38       | 38      | 63.9         |
| 7   | Palar          | 3214              | 469      | 105     | 139.7        |
| 8 . | Chinnar        | 4061              | 653      | 312     | 177.6        |
| 9   | Bhavani        | 6154              | 908      | 1917    | 187.7        |
| 10  | Noyil          | 2999              | 504      | 225     | 54.2         |
| 11  | Amaravathi     | 8280              | 572      | 898     | 308.0        |
| 12  | Tirumanimuttar | 8429              | 536      | 649     | 350.1        |
| 13  | Ponnanai Ar    | 2050              | 542      | 191     | 207.4        |
| 14  | Upper Coleroon | 3082              | 656      | 589     | 252.6        |
| 15  | Lower Coleroon | 1378              | 815      | 224     | 120.6        |
| 16  | Cauvery Delta  | 6566              | 810.5    | 1051    | 224.6        |

<sup>\* 75%</sup> water year dependable flows.

The Cauvery basin lies between 10° and 13° N latitudes and 75° and 80° E longitudes, bounded by the Western ghats at the west, the Bay of Bengal on the east and the river Krishna, Pennar and the basin area covered by the streams between Palar and Cauvery on the north and the area covered by the streams between Cauvery and

Vaigai on the south.

The catchment area of the Cauvery River is 81155 km<sup>2</sup>, which is nearly 8% of total geographical area of the country. The statewise drainage area of Cauvery basin is given in Table 3.2.

Table 3.2: Statewise Drainage Area of Cauvery Basin

| State       | Drainage Area      | Total Area of the Basin |
|-------------|--------------------|-------------------------|
| State       | (Km <sup>2</sup> ) | (%)                     |
| (1)         | (2)                | (3)                     |
| Karnataka   | 34273              | 42.2                    |
| Kerala      | 2866               | 3.5                     |
| Tamilnadu   | 43867              | 54.1                    |
| Pondicherry | 149                | 0.2                     |
| Total       | 81155              | 100.0                   |

In Karnataka, the basin includes the entire districts of Mysore and Mandya, about three quarters of Hassan district, about two-thirds each of Bangalore and Coorg districts and a part of Tumkur and Chikmagalur districts. In Kerala, the Cauvery basin covers small parts of four districts, i.e., Cannanore, Kozhikode, Iddikki and Palghat. In Tamilnadu, the basin extends over about three-quarters each of the three districts, i.e., Coty, Coimbatore and Tanjavur, about two-thirds of Tiruchirapalli and small parts of Madurai, Salem, Dharmapuri and South Arcot districts.

# 3.2 SUB-BASINS

The basin has been divided into 16 sub-basins for planning purposes by National Water Development Agency (NWDA). Refer various reports in the list of References and Bibliography. The list of sub-basins is shown in Figure 3.1.1 and the tributaries of Cauvery river-basin are shown in Figure 3.1.2 (a) and Figure 3.1.2 (b).

# 3.2.1 Upper Cauvery Sub-basin

The Upper Cauvery Sub-basin lies between latitudes 10<sup>o</sup> 54' and 13<sup>o</sup> 21' N and longitudes 75<sup>o</sup> 30' and 76<sup>o</sup> 36' E comprising the catchment of the Hemavathi, the Laxmanthirtha and the main river Cauvery up to Krishnarajsagar (KRS) dam.

Cauvery rises at Talakaveri on the Brahmagiri ranges in the Western Ghats in the Kodagu district of Karnataka at an elevation of about 1341m above mean sea level. The river flows down from hills in a series of rapids and cascades and is joined at the foot of hills by the Kannike stream at Bhagamandala. The banks are high and steep formed of rich clay. At the border of Kodgu and Mysore districts, the river Harangi joins the Cauvery. The river then flows eastward in the Mysore district where the Hemavathi and the Lakshmanthirtha join on the left bank and right bank, respectively, some distance upstream of the KRS dam. The total length of the Cauvery river in the Upper Cauvery sub-basin up to the Krishnarajsagar dam is about 224 km. The length of the Harangi, Hemavathi and Lakshmanthirtha, all tributaries of Cauvery river in the Upper Cauvery sub-basin is 48 km, 245 km, and 131 km, respectively, from their origin to their confluence with the Cauvery.

The Upper Cauvery sub-basin drains an area of 10619 Km<sup>2</sup> which is about 13% of the total catchment area of the Cauvery basin. The catchment of the Upper Cauvery sub-basin lies wholly in Karnataka covering parts of the Chickmaglur, Kodgu, Hassan, Mandya and Mysore districts. The district wise breakup of the catchment area of the sub-basin is given in Table I.1 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.1. The line diagram showing the irrigation projects in the sub-basin is shown in Figure 3.3.1.

### 3.2.2 Kabini Sub-basin

The Kabini river is one of the tributaries of the river Cauvery in its upperreach. The Kabini sub-basin lies between latitudes 11° 29' N and 12° 20' N and longitudes 75<sup>0</sup> 48' E and 75<sup>0</sup> 54' E.

The Kabini river rises in the Western Ghats at an elevation of about 2140 m above mean sea level in the Wyand district of Kerala state. The districtwise breakup of the catchment area of the sub-basin is given in Table I.2 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.2. The line diagram showing the irrigation projects in the sub-basin is shown in Figure 3.3.2.

# 3.2.3 Shimsha Sub-basin

The Shimsha sub-basin lies between the latitudes  $12^0$  18' N and  $13^0$  30' N and the longitudes  $76^0$  15' E and  $77^0$  19' E.

The river Shimsha, one of the important tributaries of Cauvery, rises in the south of Devarayanadurga hill in Tumkur district. After flowing southwest in the initial reach, it turns to southwards and then to east. Thereafter pursuing a southerly course, the river enters the Mandya district. Further, it finally takes southeasterly course and joins the Cauvery, a few kilometers below the Shivasmudram falls. The total length of the river Shimsha is about 200 km from its origin to confluence with Cauvery.

The Shimsha sub-basin has a catchment area of 8469 km<sup>2</sup>, which constitutes 10.4 percent of the Cauvery basin area. The entire catchment area of the sub-basin lies in the Karnataka State. The district wise breakup of the catchment area of the sub-basin is given in Table I.3 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.3. The line diagram showing the irrigation projects in the sub-basin is shown in Figure 3.3.3.

## 3.2.4 Arkavathi Sub-basin

The Arkavathi sub-basin lies between the latitudes 12

longitudes 77<sup>0</sup> 11' E to 77<sup>0</sup> 42' E.

The river Arkavathi is one of the important tributaries of the river Cauvery. It rises at Nandidurga hills in Chikballpur taluk of Kolar district. After flowing in the southwest direction at the initial stage, it receives along its course, the drainage waters of Kumudvathi river. From this point, the river Arkavathi flows in a southerly direction up to Ramanagaram and turns towards southeast and flows in the same direction up to the confluence of its tributary Suvarnamukhi on the left bank. Thereafter, it flows southerly direction and receives the water of Kuttlehole from the left near Kanakapura town. Further, it flows down and receives the waters of Doddahalla from the left and then finally joins Cauvery at Kungedoddi. The total length of the river Arkavathi is about 150 km from its origin to its confluence with Cauvery.

The Arkavathi sub-basin has a catchment area of 4651 km<sup>2</sup> that constitutes 5.4 percent of the Cauvery basin area. The major portion, i.e., 4184 km<sup>2</sup> (96%) of the catchment area of the sub-basin lies in Karnataka state and the rest 167 km<sup>2</sup> in Tamilnadu (Dharmapuri district). The district wise breakup of the catchment area of the sub-basin is given in Table I.4 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.4. The line diagram showing the irrigation projects in the sub-basin is shown in Figure 3.3.4.

# 3.2.5 Middle Cauvery Sub-basin

The Middle Cauvery sub-basin lies between the latitude 11° 52′ N to 12° 48′ N and longitude 76° 30′ E to 77° 29′ E comprising the catchment of main Cauvery from Krishnarajasagar dam to the state boundary just below Mekedatu gorge on river Cauvery.

The river Cauvery below the Krishnarajasagar dam continues to flow

eastwards for 15 km up to Srirangapatnam and then changes its course south-east wards. It receives an important tributary, viz., the Kabini on its right bank at Triumakudal Narasipur and another tributary, viz., the Suvarnavathi joins the Cauvery from the right at Talakad about 25 km downstream. The river then takes a north-east direction and receives the Shimsha from the left, below Sivasmudram. It is here that the river starts cutting through the Eastern Ghats, and from a width of one kilometer, narrows considerably and flows in cascades through a gorge. At Sivasmudram, the river divides into two branches and falls through a height of more than 91 m in a series of falls and rapids. The two major falls are the Ganga Chukki and Bhara Chukki. The fall of river at this point is being utilized for the generation of hydroelectricity power. The Sivasmudram power station built here as early as 1902 is one of the earliest of the hydroelectric power stations set up in Asia. The two branches of the river join after the falls and flow through a gorge, almost too narrow to accommodate the fury of the river. At one point, known as Mekedatu (the goat's leap) the channel is so narrow that it is said that a goat could leap across it. After flowing through a gorge, the Cauvery continues its eastward journey and forms the boundary between Karnataka and Tamilnadu states for a distance of about 64 km. Another left bank tributary, viz., the Arkavathi joins the river just before it enters into Tamilnadu state. The total length of river Cauvery is about 130 km from Krishnarajasagar dam to the state boundary below Mekedatu gorge.

Middle Cauvery sub-basin has catchment area of 2676 km<sup>2</sup>, which constitutes 3.03 % of the Cauvery basin area. The entire catchment area of the sub-basin lies in Karnataka State. The district wise breakup of the catchment area of the sub-basin is given in Table I.5 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.5.

## 3.2.6 Suvarnavathi Sub-basin

The Suvarnavathi river is one of the southern tributaries of the Cauvery in its upper reaches. It is the second tributary joining on right bank. The Suvarnavathi subbasin lies between latitudes 11° 35′ N to 12° 10′ N and longitudes 76° 46′ E to 77° 12′E.

The Suvarnavathi river rises in the Nasurghat range of hills situated in the south eastern portion of Mysore district near Gajjala hatti valley and flows northwards through Chamrajasagar and Yelandur taluks. Two streams, viz., Niredurgihalla originating at Attikene estate and Araikaduhalla originating at Dimbum join together near Badibadga to form the river Suvarnavathi or Honhole. This river after flowing for a further distance of 11 km is joined by a tributary, the Chikkahole. After flowing for some more distance about 15 km it is joined by another tributary the Yenehole from left side. The Suvarnavathi river finally joins the Cauvery on its right side at Talakad in the Kollegal taluk. The total length of Suvarnavathi river is about 88 km from its origin to its confluence with the Cauvery. The average bed fall of the river is 6.5 m per kilometer.

The Suvarnavathi sub-basin covers an area of 1787 km<sup>2</sup> in the states of Karnataka and Tamilnadu. It forms 2.2% of the area of the Cauvery basin. The district wise breakup of the catchment area of the sub-basin is given in Table I.6 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.6.

### 3.2.7 Palar Sub-basin

The Palar river is one of the southern tributaries of the Cauvery. The Palar sub-basin lies between the latitudes 11° 35' N and 12° 14' N and longitudes 77° 10' E and 77° 50' E.

The Palar rises in the hill ranges of Satyamangalam taluk of Periyar district and flows northwards till it receives a small tributary, namely Moranur Halla from west where river turns perpendicularly to the east and finally joins the Cauvery on right side near the upstream and of Mettur reservoir. The river Palar forms the common boundary between Karnataka and Tamilnadu in Mysore and Periyar districts, respectively, for about 45 km.

The Palar sub-basin comprises, the entire catchments of the Uduthorehalla, the Palar and its tributaries plus the direct catchment of the Cauvery on the right bank, east of the Palar catchment up to Mettur dam. The sub-basin covers an area of 3214 km² in the states of Karnataka and Tamilnadu. It forms 4.0% of the Cauvery basin. The district wise breakup of the catchment area of the sub-basin is given in Table I.7 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.7. The line diagram showing the irrigation projects in the sub-basin is shown in Figure 3.3.6.

#### 3.2.8 Chinnar Sub-basin

The Chinnar sub-basin covers the catchment area of the Cauvery basin, on the left bank between the beginning of the common border between Karnataka and Tamilnadu along the Cauvery and Mettur dam, on main Cauvery river. It lies between the latitudes 11° 45' N to 12° 45' N and longitudes 77° 25' E to 78° 20' E. The sub-basin comprises the catchments of four independent streams, namely Chinnar, Doddahalla, Nagavathi and Thoppaiar, the main among them being the Chinnar. The catchment area of the sub-basin as a whole is 4061 km², which constitutes 5% of the total catchment of the Cauvery basin. Most of the sub-basin area lies in Dharmapuri district in Tamilnadu at an elevation ranging from 300 to 900 m. above MSL; only small parts of sub-basin lie in Salem district of Tamilnadu and in Bangalore district of

Karnataka. The district wise breakup of the catchment area of the sub-basin is given in Table I.8 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.8. The line diagram showing the irrigation projects in the sub-basin is shown in Figure 3.3.7.

### 3.2.9 Bhavani Sub-basin

The Bhavani river is one of the tributaries of river Cauvery in its mid-reach. The Bhavani sub-basin lies between latitudes 10<sup>o</sup> 56' 3" N and 11<sup>o</sup> 46' 14" N and longitudes 76<sup>o</sup> 24' 41" E and 77<sup>o</sup> 41' 11" E.

The Bhavani river rises at an altitude of about 2634 m in the Billimala range of Nilgiri hills in the Nilgiris district of Tamilnadu. The river flows in the southeast direction up to Makkaliyur and then in the northeast direction up to confluence of the Moyar tributary with the Bhavani. It then runs in the eastward direction up to its confluence with Cauvery.

The length of the river is about 216 km. The Bhavani sub-basin has a catchment area of 6154 km<sup>2</sup>, which constitute 7.58% of the Cauvery basin. The district wise breakup of the catchment area of the sub-basin is given in Table I.9 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.9. The line diagram showing the irrigation projects in the sub-basin is shown in Figure 3.3.8.

# 3.2.10 Noyil Sub-basin

This sub-basin comprises the catchment of Noyil river, which includes the catchment of its small tributaries, viz., Sanganurpallam, Vannattangarai, Nallar and Chinnakarai. The Noyil sub-basin lies between latitudes 10° 54' N and 11° 19' N and longitudes 76° 39' E and 77° 56' E. The sub-basin area includes a part of the command

area of Lower Bhavani project canal, Kalingarayan channel and Perimbikulam main canal. The Noyil sub-basin is bounded on the north by Bhavani sub-basin, on the south by Amaravathi sub-basin, on the east by Cauvery river and Western Ghats on the west. The river flows entirely in Tamilnadu and the basin is spread over the districts of Coimbatore, Periyar and Tiruchirapalli. It has a catchment of 2999 km², which constitutes 3.7% of the Cauvery basin. The district wise breakup of the catchment area of the sub-basin is given in Table I.10 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.10.

## 3.2.11 Amaravathi Sub-basin

The Amaravathi sub-basin lies between latitudes 10<sup>0</sup> 6' N and 11<sup>0</sup> 2' N and longitudes 77<sup>0</sup> 3' E and 78<sup>0</sup> 6' E and is bounded by Noyil sub-basin in the north, Vaigai basin in south, the southern part of the Western Ghat in the west and the Cauvery river in the east. Except that part of the upper hilly catchment of the sub-basin, which lies in Kerala, the rest of the sub-basin is spread over Tamilnadu.

The river Amaravathi is one among the main tributaries of the river Cauvery in its mid reach. It is the right bank tributary next to Noyil, downstream of Mettur dam in Tamilnadu. Rising from Naimakad at an elevation of 2300 m in the Southern Ghat (Annamalai) in Devikulam taluk of Iddukki district of Kerala State, named as Pampar, flows northeastwards. A number of streams join the river in Kerala before its entry into Tamilnadu. Amaravathi river flows in the same direction in Tamilnadu till its confluence with the river Cauvery on the right bank. Throughout its course of 256 km, the Amaravathi receives a number of small streams. It has a catchment area of 8280 km² which constitutes 10.2% of the Cauvery basin. The district wise breakup of the catchment area of the sub-basin is given in Table I.11 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.11.

### 3.2.12 Tirumanimuttar Sub-basin

Tirumanimuttar sub-basin comprises the catchment of Cauvery river below Mettur dam on both sides up to Upper Anicut including the sub-catchment of Sarabhanga Nadi, Tirumanimuttar, Pungar and Ayyar, but excluding the catchments of Bhavani, Noyil and Amaravathi rivers.

The Tirumanimuttar sub-basin lies between latitudes 10° 36' N and 11° 55' N and 77° 27" E and 78° 41' E.

Leaving the Mettur dam, the river Cauvery enters the Tirumanimuttar sub-basin and flows in the southwestern direction along the boundary of Tiruchengode and Bhavani taluka. It receives a small tributary, Chittar river on its right and then the Sarabhanga Nadhi near Kaveripatti on its left. After receiving the Bhavani river on the right at Bhavani opposite to Kumarapalaiyamit, sharply turns south-eastwards and flows along the boundary of the Tiruchengode taluk with the Erode taluk. After Sedarpalaivam bed regulator, it receives the Kurangupallam stream, a small tributary of main Cauvery and then the Novil river on its right. By changing its course in the easterly direction for a short distance, again it continues to flow southeastwards upto the Cattalo bed regulator. In this part of its course, it receives the Tirumanimuttar in Namakkal taluk near Velur on its left and the Amaravathi in Karur taluk on its right. The river then continues to flow in the same direction and leaves this sub-basin at Upper anicut. Below Kattalai head regulator, it receives the Pungar on its right near Kulittalai and the Ayyar river on its left near Upper anicut. Throughout its course of about 185 km length from Mettur to Upper anicut, the river Cauvery receives a number of small streams.

The Tirumanimuttar sub-basin has a catchment area of 8429 Km<sup>2</sup>, which

constitutes 10.39% of the total catchment of Cauvery basin. The sub-basin lies mostly in Salem and Tiruchirapalli districts with only small parts in Periyar and Dindigul Anna districts of Tamilnadu. The district wise breakup of the catchment area of the sub-basin is given in Table I.12 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.12.

# 3.1.13 Ponnanai Ar Sub-basin

The Ponnanai Ar sub-basin comprises the catchment of the Ponnanai Ar and its tributary on the right side of the river Cauvery between Upper Anicut and Grand Anicut.

The sub-basin area includes the catchment of the Kodingal Ar which also joins river Cauvery along with the Ponnanai Ar (Kodamuruttri-Ar) upstream of Tiruchirapalli town. The sub-basin also covers a part of the command area of Kattalai canal scheme and New Kattalai high-level canal scheme.

The Ponnanai Ar sub-basin is bounded on the north by Upper Coleroon sub-basin, on the west by Tirumanimuttar sub-basin, on east by Cauvery Delta and on the south by the basin covering the area between the Cauvery and Vaigai river basins. The sub-basin lies between North latitudes 10° 25' 50" and 10° 53' 25" and East longitudes 78° 08' 00" and 78° 50' 00".

The Ponnanai Ar has its origin in the scattered hills near Kadavur in Kulittalai taluk of Tiruchirapalli district and flows in a northeast direction through Kultittala, Manapparai and Tiruchirapalli taluks. It empties into the Cauvery river just above Tiruchirapalli town. Along the course of its travel, it receives the Kuraray River on its right near its confluence with Cauvery. The river Ponnanai Ar is also known as Ariyar in the middle reach and Kodamurutti Ar in the lower reach.

The Ponnanai Ar sub-basin has a catchment area of 2050 km<sup>2</sup>, which constitutes 2.53% of the total catchment area of the Cauvery basin. The sub-basin lies mostly in Tiruchirapalli and Pudukkottai districts with only small parts in Madurai and Thanjavur districts of Tamilnadu. The district wise breakup of the catchment area of the sub-basin is given in Table I.13 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.13.

# 3.2.14 Upper Coleroon Sub-basin

The Upper Coleroon sub-basin covers the direct catchment of the Coleroon river, between the Upper Anicut. It lies between the latitudes 10° 50′ N and 11° 15′ N and longitudes 78° 35′ E and 79° 27′ E. The sub-basin also comprises the catchment of a few independent streams such as Upper, Marudaiyar, Nandiyar, Nari Odai, Andi Odai etc. The catchment area of the sub-basin as a whole is 8082 km², which constitutes 3.8% of the total catchment of the Cauvery basin. Most of the sub-basin area lies in Tiruchirapalli district and a small part of sub-basin lies in Thanjavur district of Tamilnadu. The district wise breakup of the catchment area of the sub-basin is given in Table 1.14 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.14.

# 3.2.15 Lower Coleroon Sub-basin

The Lower Coleroon sub-basin with a catchment area of 1378 km<sup>2</sup> covers the catchment of the Coleroon river below the lower Coleroon Anicut and extends up to its confluence with the sea. This sub-basin includes the ayacut of the Lower Coleroon Anicut system as well as the catchment of the Veeranam tank situated in the north side of the Coleroon river and its ayacut area. This sub-basin area lies entirely in Tamilnadu

state between latitudes 11° 08' N and 11° 25' and longitudes 79° 13' E and 79° 48' E. The area of this sub-basin constitutes 1.7% of the total catchment of the Cauvery basin. Most of the sub-basin area lies in South Arcot and Tiruchchirappalli districts and a small part of the sub-basin lies in Thanjavur district. The district wise breakup of the catchment area of the sub-basin is given in Table I.15 in Appendix-I. The irrigation projects in the sub-basin are shown in Figure 3.2.15.

# 3.2.16 Cauvery Delta Sub-basin

The Cauvery delta sub-basin comprises the command area of the Vennar branch, Cauvery branch and part of the Grand Anicut canal irrigation system. The sub-basin also covers a part of the command area of Kattalai canal scheme and New Kattalai high-level canal scheme.

Upper Coleroon and Lower Coleroon bound the Cauvery Delta sub-basin on the north, on the west by Tirumanimuttar sub-basin and Ponnanai Ar Sub-basin, on the south by Palk Strait and the basin area covered by the streams between Cauvery and Vaigai and on the east by the Bay of Bengal. The sub-basin lies between North Latitudes 10° 17' and 11° 22' and East Longitudes 78° 48' and 79° 53'.

The Cauvery at Grand Anicut (Upper end of Cauvery Delta sub-basin) subdivides itself into two main branches, viz., Cauvery and Vennar System which get further sub-divided into 36 rivers to feet the delta through a network of main channels and numerous branches, distributaries and sub-distributaries.

The Cauvery delta sub-basin covers a catchment area of 6566 km<sup>2</sup>, which constitutes 8.09% of the total catchment of the Cauvery basin. The sub-basin lies mostly in Thanjavur and Nagappattinam Quaid-E-Millad districts with small parts in Tiruchchirappalli and Pudukkottai districts of Tamilnadu and entire Karaikal area of

Pondicherry state. The district wise breakup of the catchment area of the sub-basin is given in Table I.16 in Appendix-I.

The principal features of the irrigation projects in the Cauvery basin are given in Table 3.3. The irrigation projects in the sub-basin are shown in Figure 3.2.16.

# 3.3 CROPPING PATTERN AND LAND USE COEFFICIENTS

The cropping pattern adopted in the present study, and the cropping pattern used in preliminary water balance studies for the sixteen sub-basins of Cauvery basin is the same as adopted by NWDA. The crop calendar as defined by the time period from preparation and planting the crops up to harvesting the crop was also adopted as per the NWDA reports. The land use coefficients for sixteen sub-basins in Cauvery river basin are computed and presented in Tables 3.4.1(a) to 3.4.16(a).

# 3.4 CROP WATER REQUIREMENT

The crop water requirement is defined as "The depth of water needed to meet the water loss through evapotranspiration of a disease free crop, growing in large field, under non restricting soil conditions including soil water and fertility and achieving full production potential under given growing environment". The assessment of water requirement for various crops is an important factor in choice of crops and one of the basic necessities for crop planning in a command area. The monthwise crop water requirements at reservoir level are obtained from the various reports of NWDA for various sub-basins in Cauvery river basin and are presented in Tables 3.4.1(b) to 3.4.16(b).

# 3.5 CLIMATES, RAINFALL AND STREAM FLOW

The catchment area of Cauvery basin experiences tropical climate. The

maximum and minimum temperatures, observed are 44°C and 18°C respectively. The basin experiences four distinct seasons. They are:

- (i) South west monsoon June to September
- (ii) North east monsoon October to December
- (iii) Cool, dry weather (winter) January to February
- (iv) Hot, dry weather March to May

Maximum rainfall is received along the western border of the basin from the southwest monsoon. Eastern side of the basin gets most of the rain during the northeast monsoon. Depressions in the Bay of Bengal affect the basin in the monsoon causing cyclones and widespread heavy rains. There are 352 raingauge stations in and around the basin. There are 11 Indian Metrological Department (IMD) observatories situated within the basin. The maximum and minimum temperatures, relative humidity, wind velocity, sunshine, and evapotranspiration (Eto) data is computed and published by IMD titled "Potential Evapotranspiration (PE) over India (Scientific report No. 136, 1971) for different IMD observatories. The normal rainfall in the Cauvery basin varies from sub-basin to sub-basin as shown in Table 3.1. The monthly-observed stream flow data in the Cauvery river basin for all the 16 sub-basins are collected from various reports of NWDA, and is presented in Table 3.5.

# 3.6 THE GROUND WATER POTENTIAL

The data required for computation of the sub-basinwise ground water potential available in the Cauvery river basin was collected from Central Ground Water Board Faridabad, under the Ministry of Water Resources, Government of India, from the publication Ground Water Resources of India are (1995). The districtwise ground water resources available in the Cauvery river basin are given in the publication. The ground water potential available in each sub-basin is computed in the proportion of the

districtwise area lying in the sub-basins. The summation of sub-basinwise ground water of all the 16 sub-basin gives the total ground water potential available in the Cauvery river basin.

The sub-basinwise ground water potential is presented in Tables 3.6(a) to 3.6(d).

## 3.7 CAUVERY WATER DISPUTES

The important features of the order of the Cauvery Water Disputes Tribunal are presented below:

The state of Tamilnadu filed a civil miscellaneous petition before Cauvery water disputes Tribunal praying that the state of Karnataka be directed not to impound or utilize water of Cauvery river beyond the extent impounded or used by them as on 31.5.1972, as agreed to by the Chief Ministers of Cauvery basin states and the Union Minister for Irrigation and Power. It further seeks passing of an order restraining the state of Karnataka from undertaking any new projects, dams, reservoirs, canals etc. and/or from proceeding further with the construction of projects, dams, reservoirs, canals etc. in the Cauvery basin. Another C.M.P. was subsequently filed by the state of Tamilnadu as an emergent petition to direct as an emergent measure, the state of Karnataka to release at least 20 T.M.C. of water as a first installment as the Samba crop cannot be maintained without additional supplies from Mettur reservoir.

During the year 1892, an agreement had made between the then Princely state of Mysore and the state of Madras regarding irrigation reservoirs over thirteen major rivers flowing through the then state of Mysore including the Cauvery and its five Tributaries, viz., Hemavathi, Laxman Thirtha, Kabini, Suvarnavathi and Yagachi. Another agreement had been made between the state of Mysore and the state of Madras governments during 1924 under which Mysore government became entitled to construct a dam and a reservoir across and over the river Cauvery at Kanambadi, now

known as Krishnarajasagar, according to the stipulated specifications. Mysore Government was at liberty to carry out future extensions of irrigation in Mysore under the Cauvery and its tributaries to an extent fixed at 1,10,000 acres in addition to the area of irrigation fixed under the Rules and Regulations. The Madras Government was at liberty to construct on the Bhavani, Amaravathi or Noyil rivers in Madras any new storage reservoir. The agreement also provided that the limitations and arrangements shall be open to reconsideration at the expiry of fifty years from the execution of the agreement. Before expiry of the above period, the Central Government constituted a fact-finding committee to collect all the connected data pertaining to Cauvery water and it had submitted its reports. But no final agreement was arrived at between the states regarding the allocation of waters for the respective states.

The Union Territory of Pondicherry sought an interim order from the Tribunal directing the states of Karnataka and Tamilnadu to release the water already agreed to, that is, 9.355 T.M.C. during the months from September to March.

Undisputedly, Cauvery river is an inter-state river. Therefore, the three states of Kerala, Tamilnadu and the Union Territory of Pondicherry being riparian to the said river are entitled to the release of water of Cauvery river in a reasonable and beneficial manner. In the "Law of International Drainage Basins" edited by A.H.Garreston, R.D.Hayton and C.J.Olmstead, at page 63 it has been pointed out that the equality of right does not give a co-riparian the right to an equal division of water. Rather, equality of right is the equal right of each co-riparian state to a division of water on the basis of its economic and social needs, consistent with the corresponding rights of its co-riparian states, and excluding from consideration factors unrelated to such needs.

The Tribunal made it clear that it will not be appropriate to fix the inflow of water into Mettur dam on the basis of the figures at the time of recording of consensus

arrived at the meeting of Chief Ministers of the state of the then Mysore, Tamilnadu and Kerala in the presence of Union Minister of Irrigation and Power, held on 29<sup>th</sup> May 1972 since more than eighteen years had elapsed as on 1990 and various subsequent events also, including construction of additional dams and reservoirs and other irrigation facilities have taken place. Hence, the Tribunal considered it justifiable to fix the annual releases into Mettur dam by making average of the same for a number of normal years in the immediate past. Besides releases from Krishnarajasagar and Kabini dams of Karnataka, some water from the intermediate catchment area also flows down into Mettur dam. But, the Tribunal decided to fix the releases of water by Karnataka by having regard to the realization made over a span or years in the proximate past after excluding abnormally good and abnormally bad years.

Tamilnadu had furnished before Cauvery Tribunal the following figures for the period of ten years, i.e., 1980-81 to 1989-90 of inflow of water into Mettur dam, as given below:

| Year    | Inflow to Mettur (TMC) |
|---------|------------------------|
| 1980-81 | 394.01                 |
| 1981-82 | 403.20                 |
| 1982-83 | 173.20                 |
| 1983-84 | 230.37                 |
| 1984-85 | 284.36                 |
| 1985-86 | 158.28                 |
| 1986-87 | 187.36                 |
| 1987-88 | 103.90                 |
| 1988-89 | 181.37                 |
| 1989-90 | 175.64                 |

In considering the above figures, Cauvery Tribunal decided to exclude the figures for the years, 1980-81 and 1981-82, which were described by parties as abnormally good years. Cauvery Tribunal also excluded from consideration the figures for the years 1985-86, 1987-88, which were classified to be bad years. The average flow of the remaining six years work out at 205.3 TMC, which was rounded of to 205 TMC.

Karaikal region of Union Territory of Pondicherry at the tail end of Cauvery delta suffered because of utter dearth of water. The Union Territory of Pondicherry had claimed before Cauvery Tribunal 9.355 TMC of water towards irrigation and water supply etc. Cauvery Tribunal directed to release 6 TMC of water by Tamilnadu for Union Territory of Pondicherry.

The grievance of Tamilnadu broadly was that not only the total volume of water from Karnataka for flowing down to Mettur dam was becoming less and less, but also the said releases were not being made timely to meet the needs of cultivation of crops, particularly in Cauvery delta of Tamilnadu. Cauvery Tribunal felt it fair to direct that annual releases be made in a regulated manner from week to week basis from June to May.

The State of Kerala had not applied for any interim order. Hence, the order of Cauvery Tribunal is without prejudice to the claims and contentions of the state of Kerala about the equitable distribution and release of water of river Cauvery and its tributaries.

Cauvery Tribunal directed the state of Karnataka to releases water from its reservoirs in Karnataka so as to ensure that 205 TMC of water is available in Tamilnadu's Mettur reservoir in a year from June to May with effect from 1st of July

1991. The Tribunal also directed that the state of Karnataka should regulate the releases of water in the following manner:

| Month | Releases from Mettur (TMC) |
|-------|----------------------------|
| Jun   | 10.16                      |
| Jul   | 42.76                      |
| Aug   | 54.72                      |
| Sep   | 29.36                      |
| Oct   | 30.17                      |
| Nov   | 16.05                      |
| Dec   | 10.37                      |
| Jan   | 2.51                       |
| Feb   | 2.17                       |
| Mar   | 2.40                       |
| Apr   | 2.32                       |
| May . | 2.01                       |
|       | 205.00 £ 5800 MC           |

In respect of a particular month, releases are to be made in four weeks in four equal instalments. If in a particular week, it is not possible to release the required quantum of water, the said deficit shall be made good in the subsequent week. An amount of 6 TMC of water for Karaikal region of the Union Territory of Pondicherry will be delivered by the state of Tamilnadu in a regulated manner.

Cauvery Tribunal also directed the state of Karnataka not to increase its area under irrigation by water of river Cauvery beyond existing 11.2 lakh acres.

The above order of the Tribunal will remain operative till the final adjudication of the dispute, referred to the Tribunal.

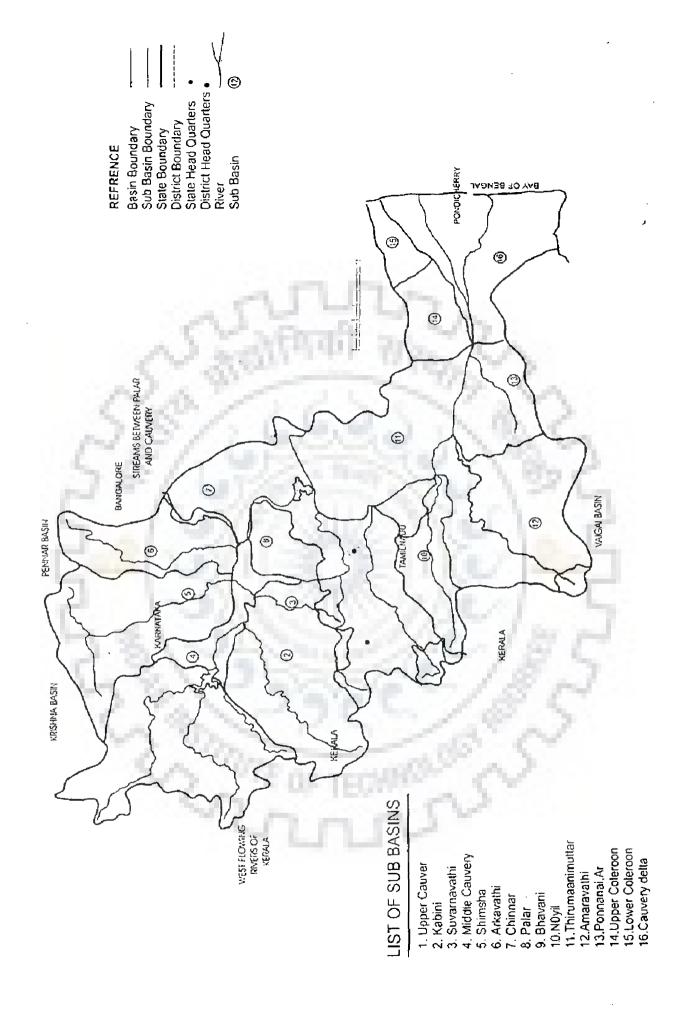


Figure 3.1.1: Map of Different Sub-basins in Cauvery River-basin

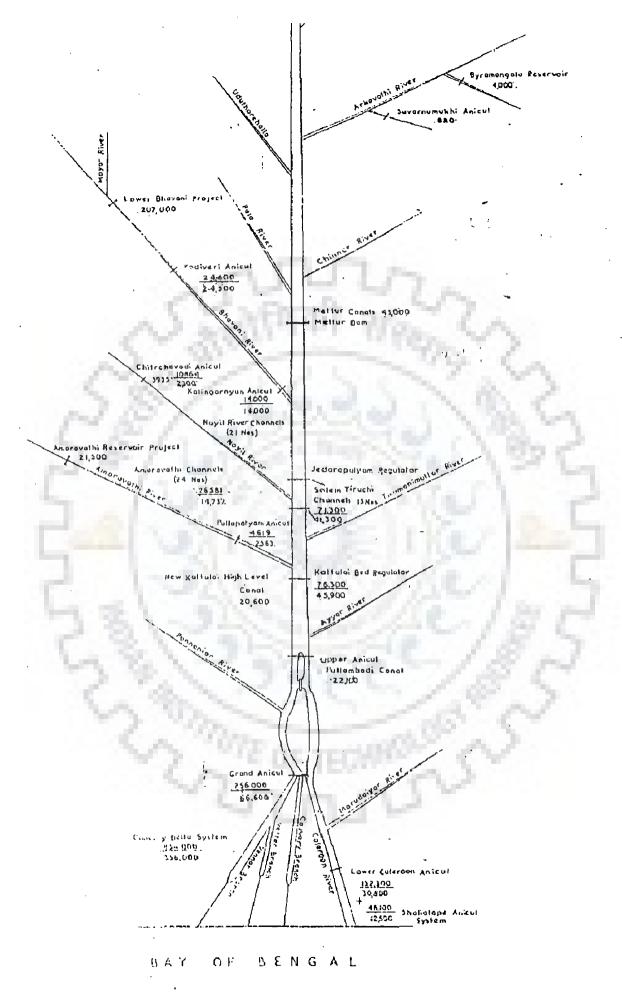


Figure 3.1.2 (a): Tributaries of Cauvery River-basin

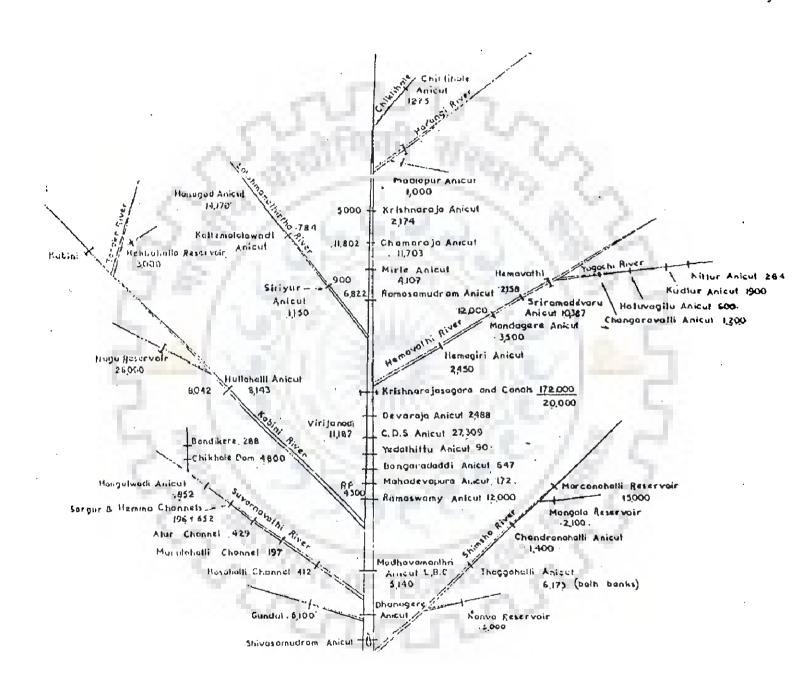


Figure 3.1.2 (b): Tributaries of Cauvery River-basin

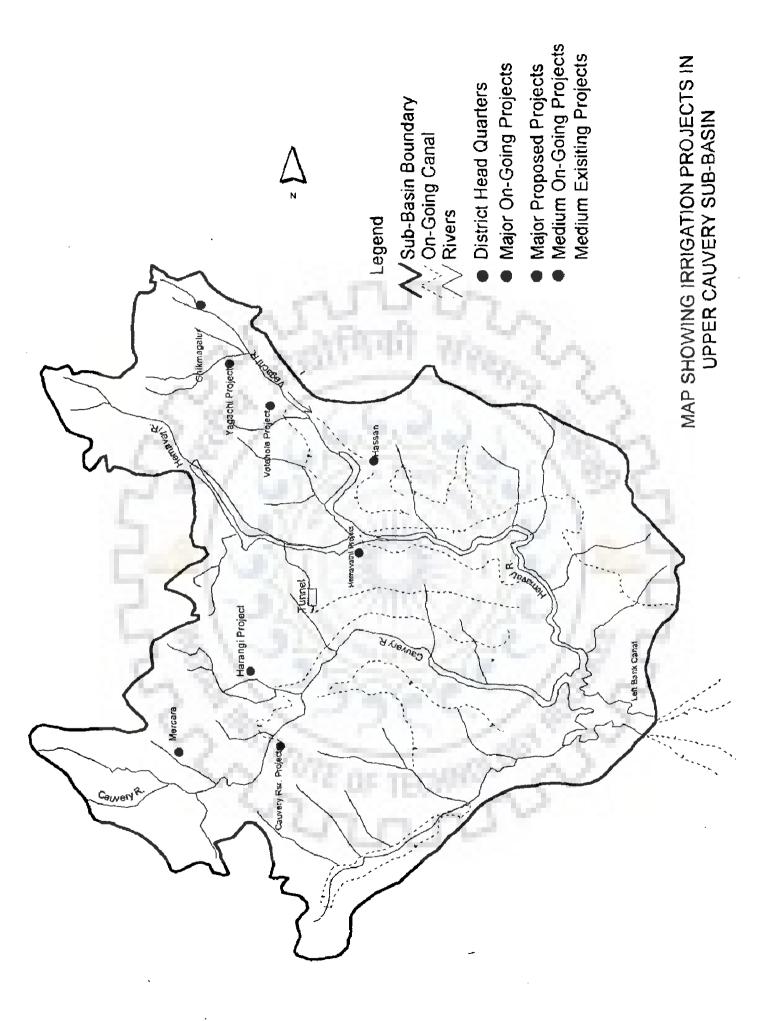


Figure 3.2.1: Map Showing Irrigation Projects in Upper Cauvery Sub-basin

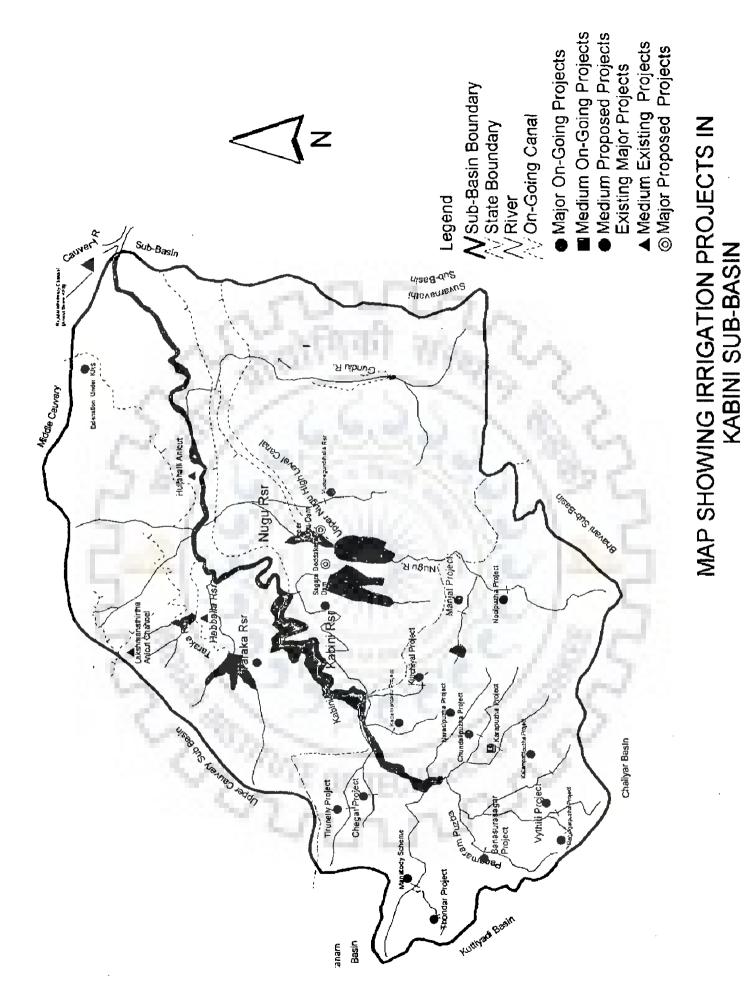


Figure 3.2.2: Map Showing Irrigation Projects in Kabini Sub-basin

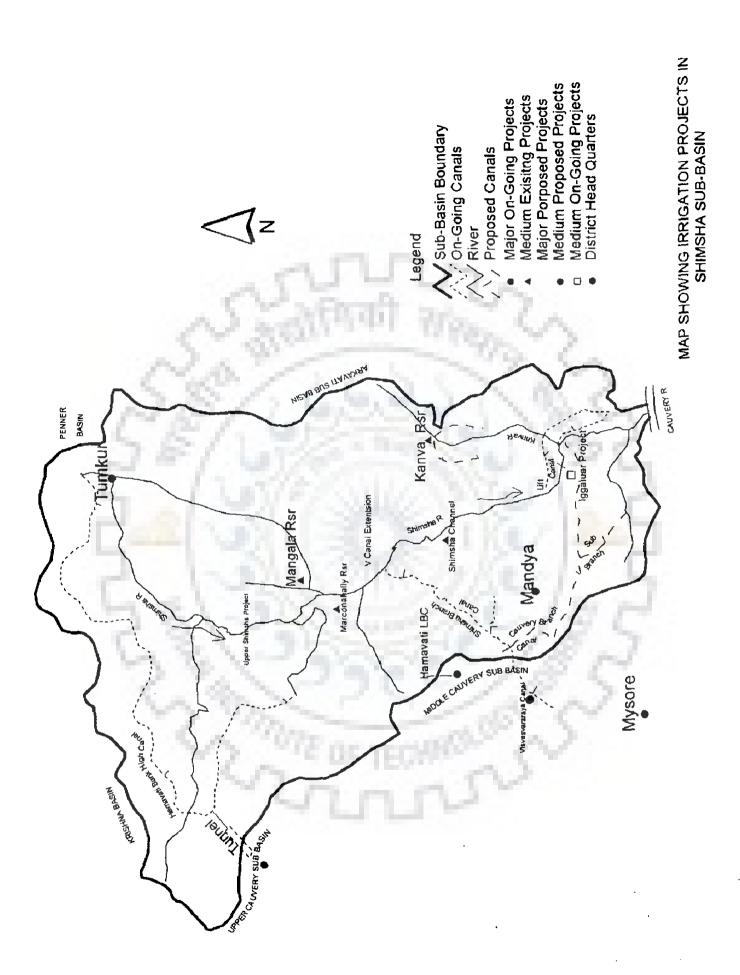


Figure 3.2.3: Map Showing Irrigation Projects in Shimsha Sub-basin



Figure 3.2.4: Map Showing Irrigation Projects in Arkavathi Sub-basin

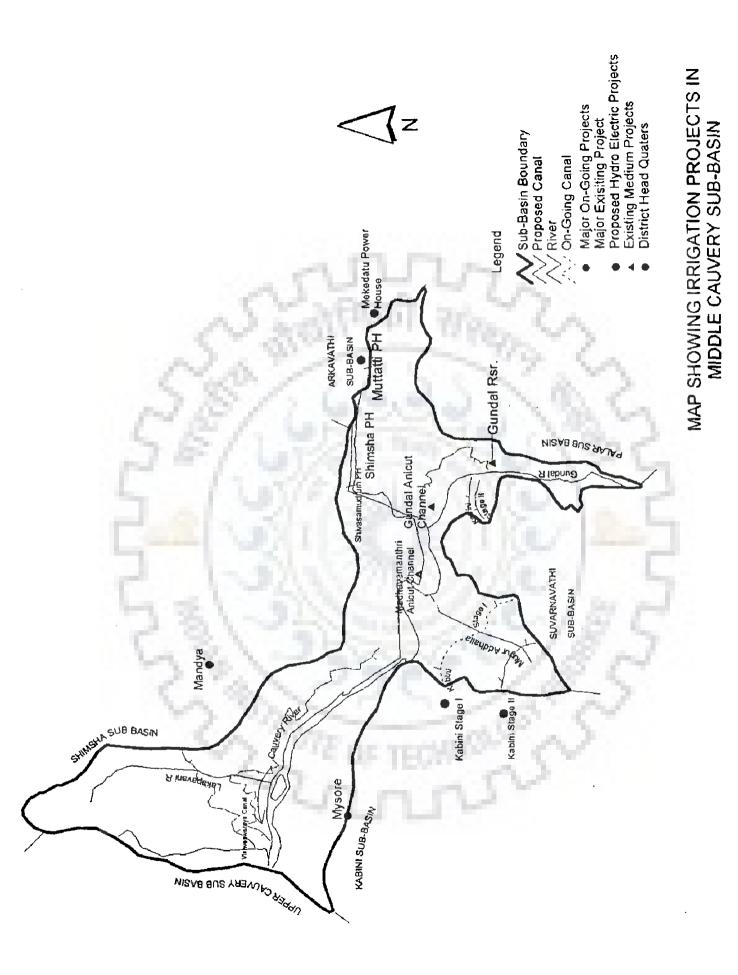


Figure 3.2.5: Map Showing Irrigation Projects in Middle Cauvery Sub-basin

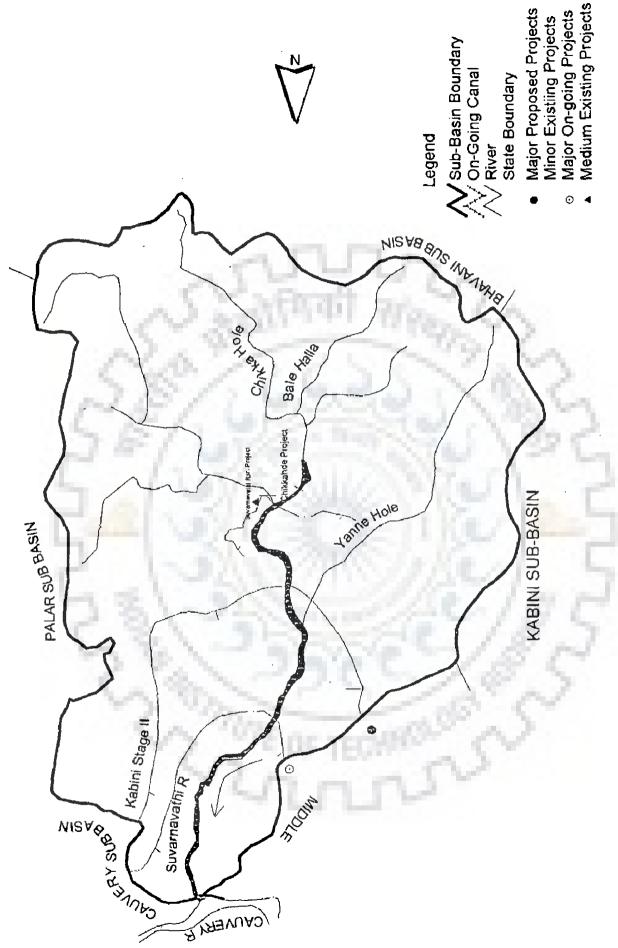


Figure 3.2.6: Map Showing Irrigation Projects in Suvarnavathi Sub-basin

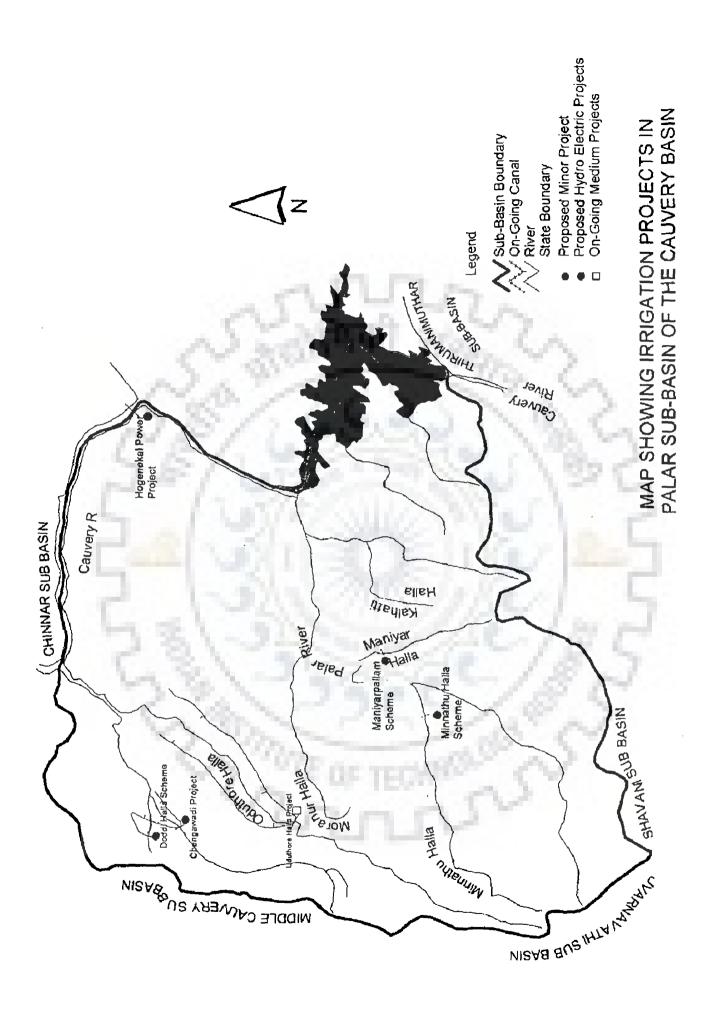


Figure 3.2.7: Map Showing Irrigation Projects in Palar Sub-basin

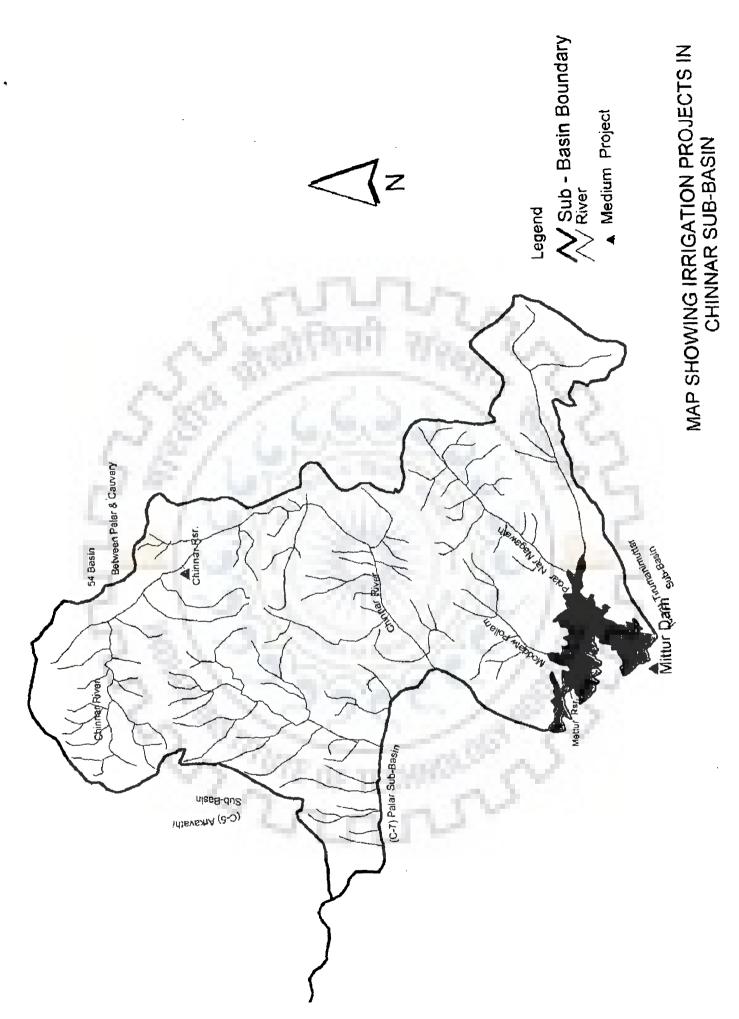


Figure 3.2.8: Map Showing Irrigation Projects in Chinnar Sub-basin

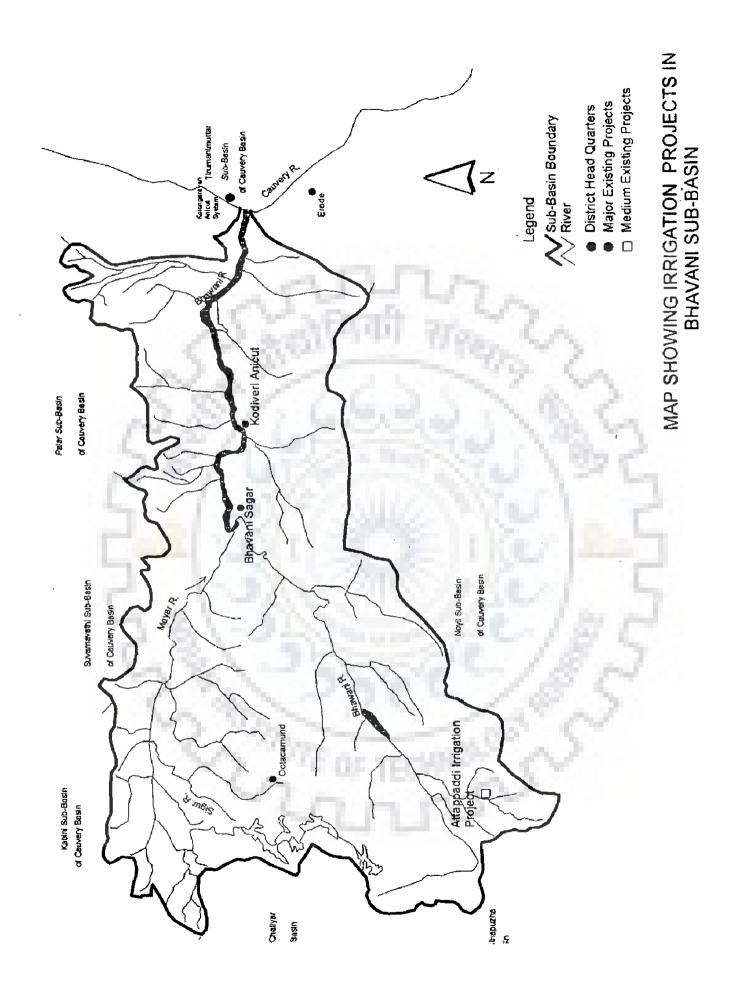


Figure 3.2.9: Map Showing Irrigation Projects in Bhavani Sub-basin

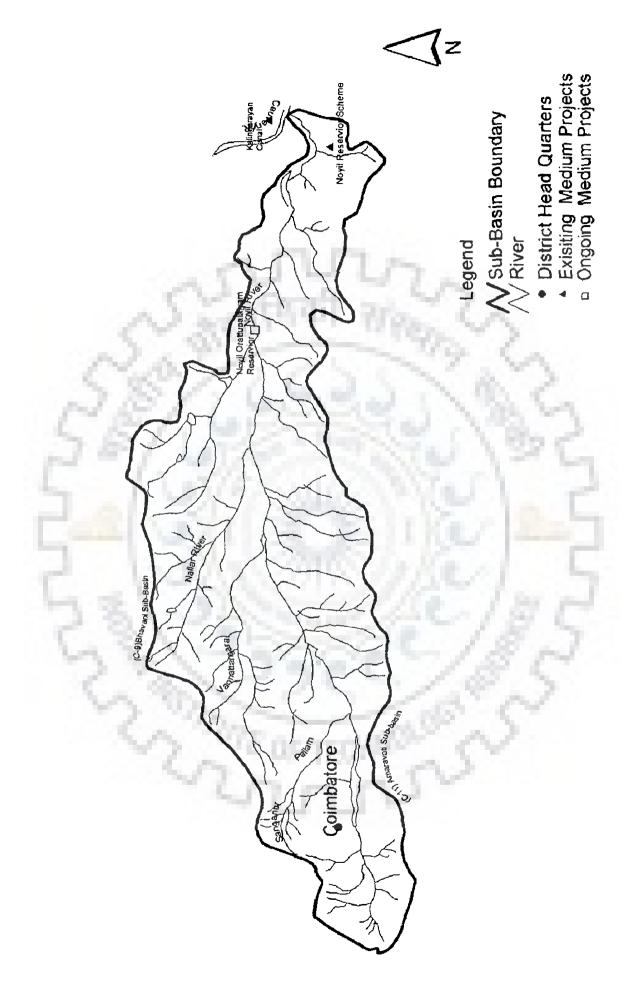


Figure 3.2.10: Map Showing Irrigation Projects in Noyil Sub-basin

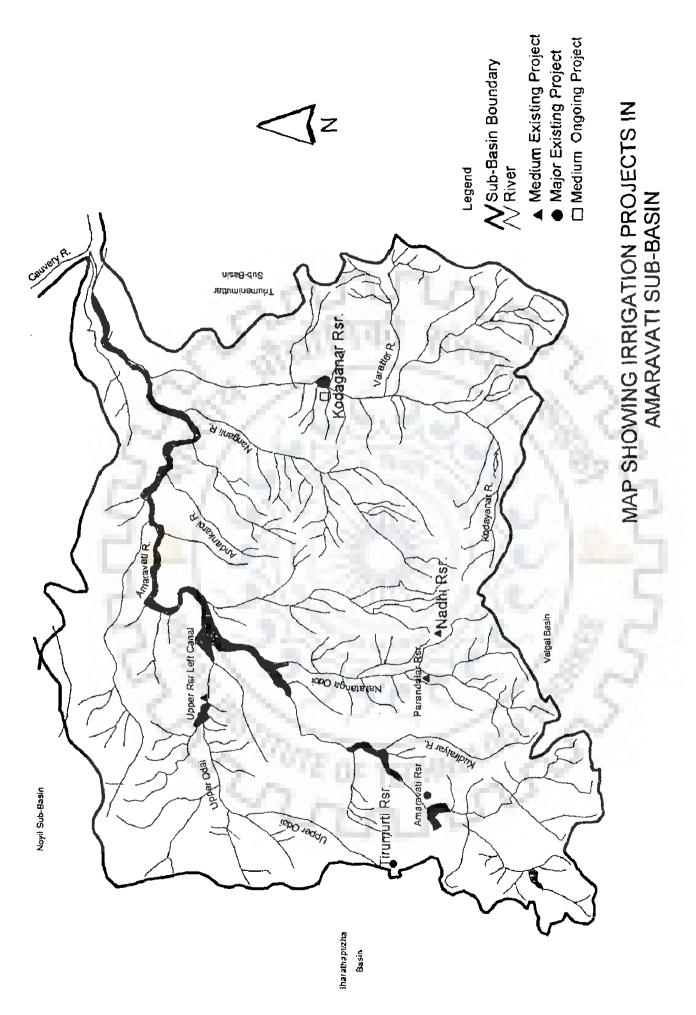


Figure 3.2.11: Map Showing Irrigation Projects in Amaravathi Sub-basin

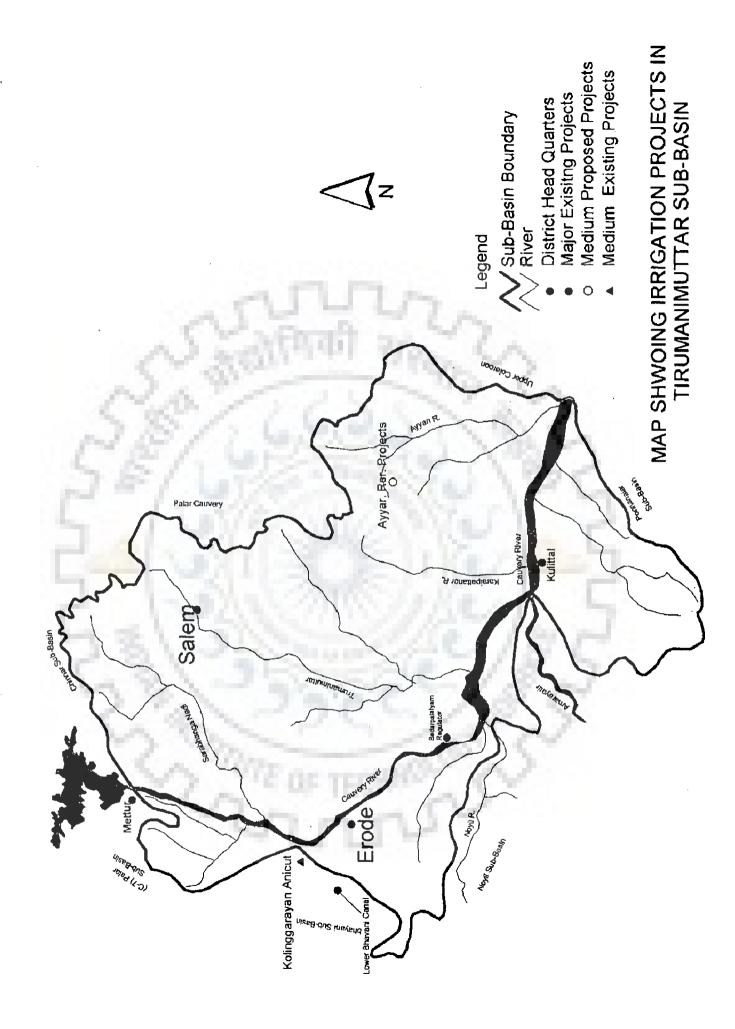


Figure 3.2.12: Map Showing Irrigation Projects in Tirumanimuttar Sub-basin

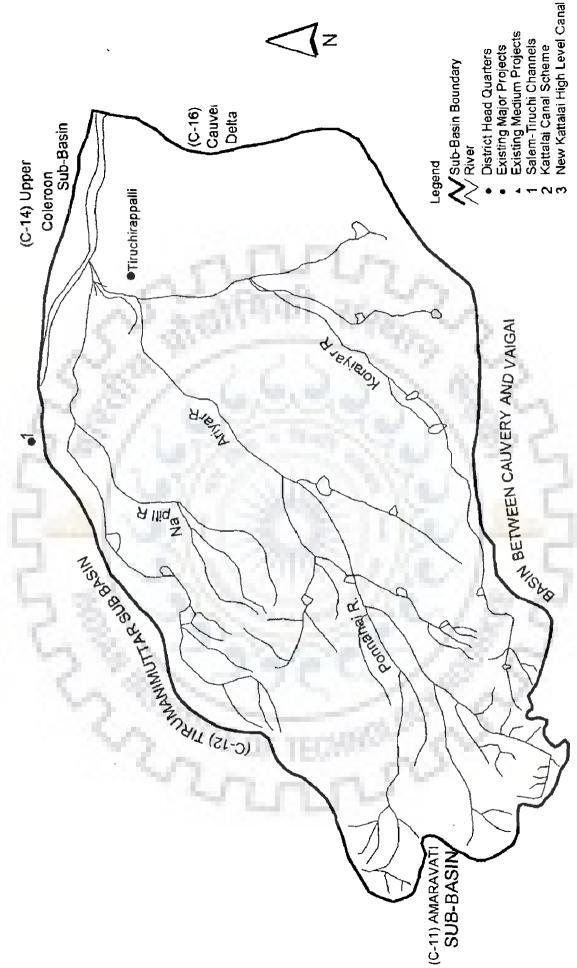


Figure 3.2.13: Map Showing Irrigation Projects in Ponnanai Ar Sub-basin

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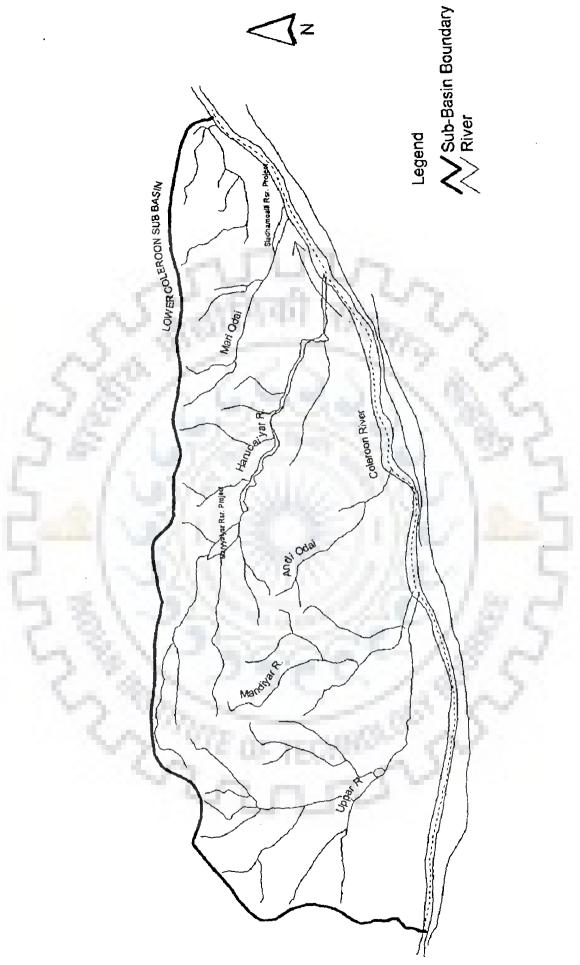


Figure 3.2.14: Map Showing Irrigation Projects in Upper Coleroon Sub-basin

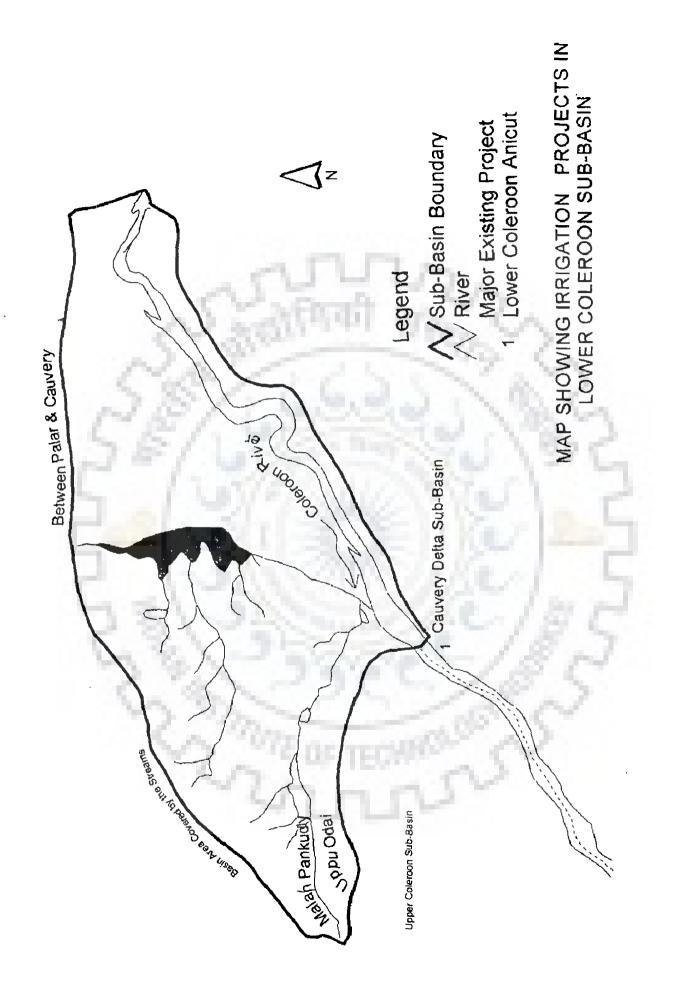


Figure 3.2.15: Map Showing Irrigation Projects in Lower Coleroon Sub-basin

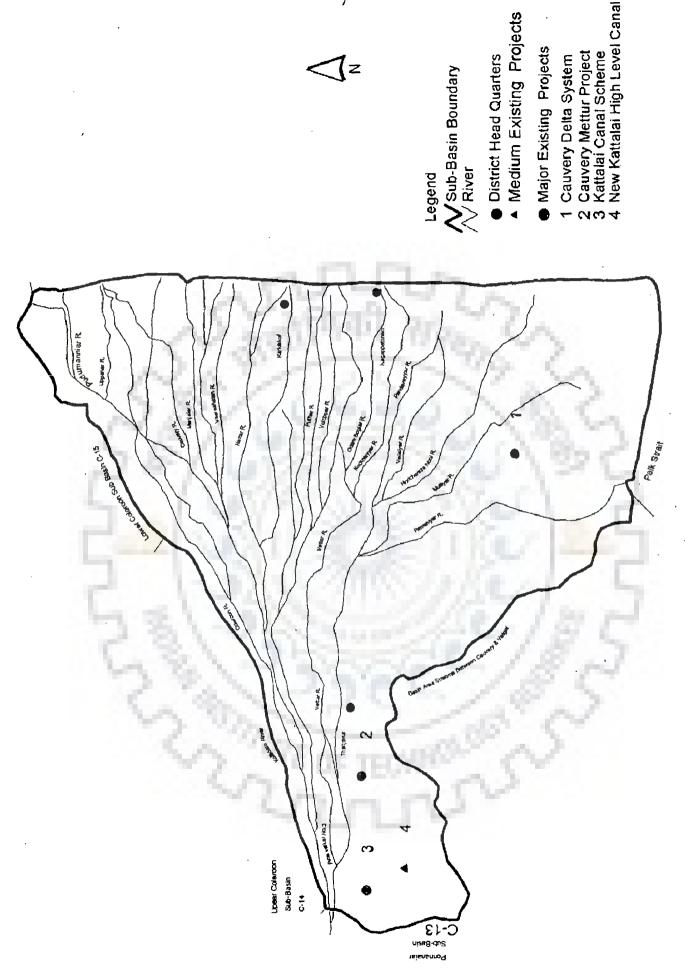


Figure 3.2.16: Map Showing Irrigation Projects in Cauvery Delta Sub-basin

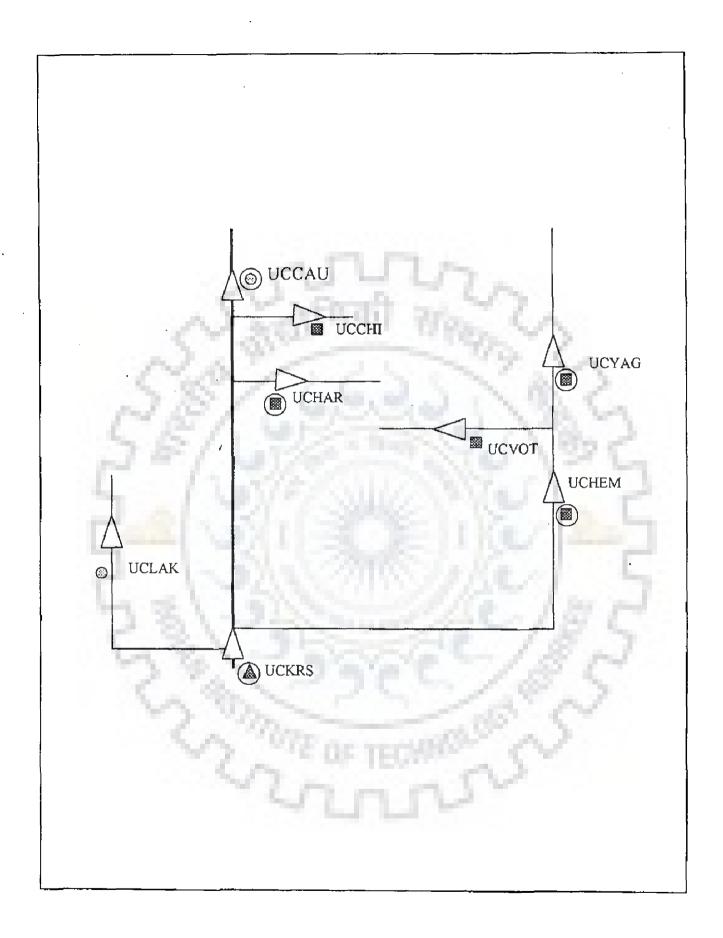


Figure 3.3.1: Line Diagram Showing Major And Medium Projects in Upper Cauvery Sub-basin

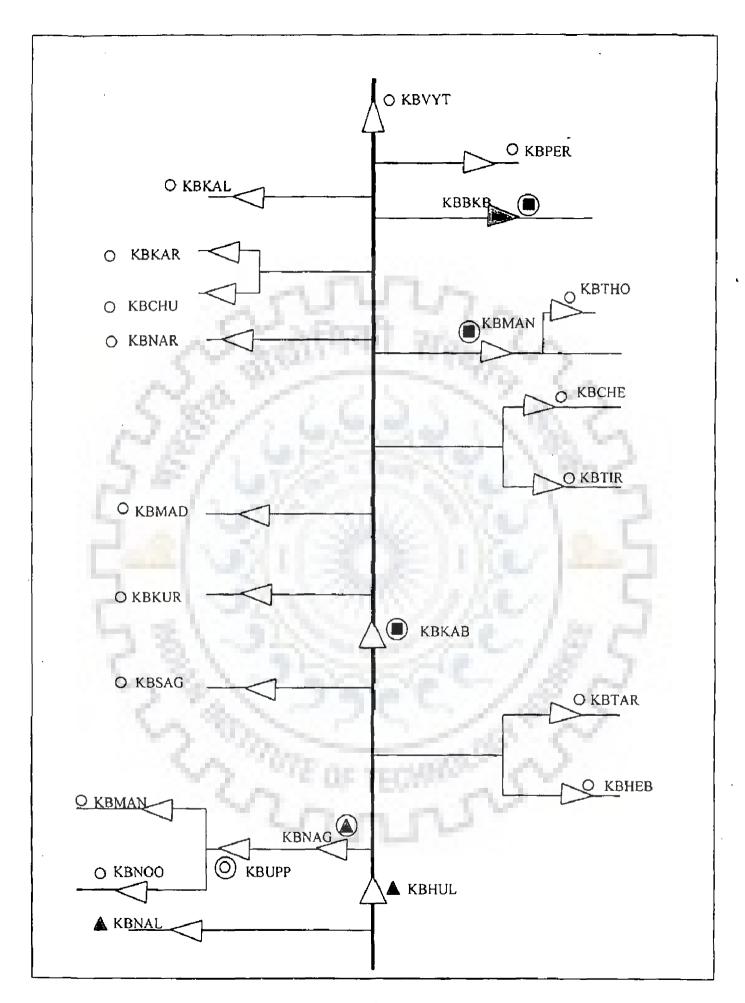


Figure 3.3.2: Line Diagram Showing Major and Medium Projects in Kabini Sub-basin

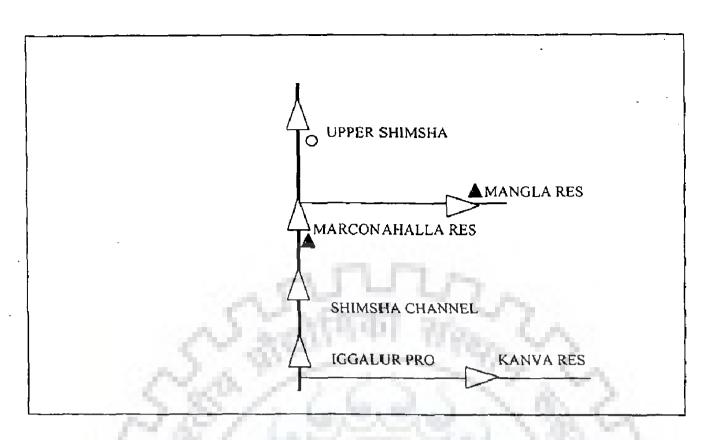


Figure 3.3.3: Line diagram Showing Major and Medium Projects in Shimsha Sub-basin

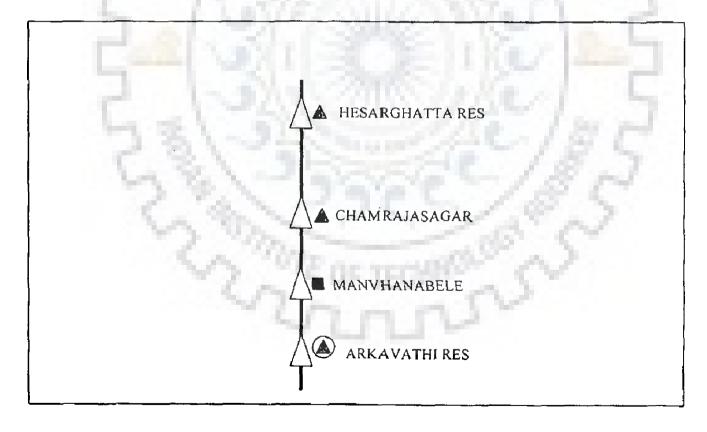


Figure 3.3.4: Line diagram Showing Major and Medium Projects in Arkavathi Sub-basin

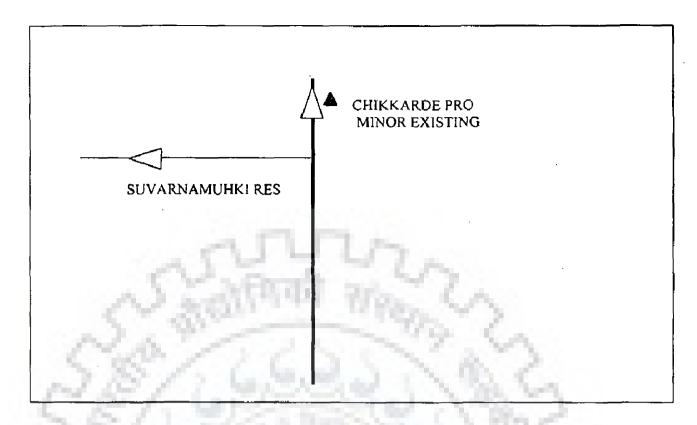


Figure 3.3.5: Line Diagram Showing Major and Medium Projects in Suvarnavathi Sub-basin

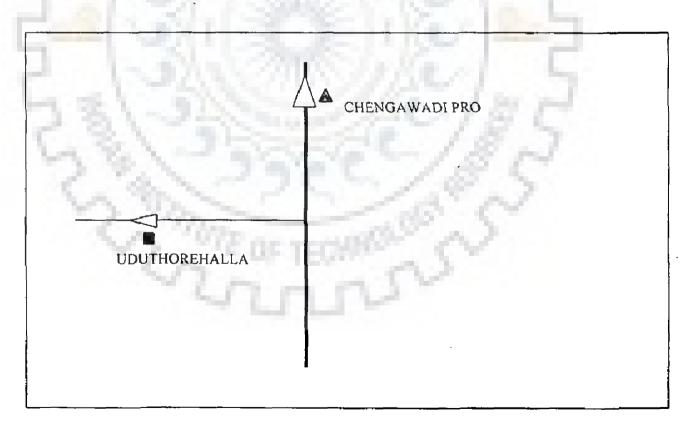


Figure 3.3.6: Line Diagram Showing Major and Medium Projects in Palar Sub-basin

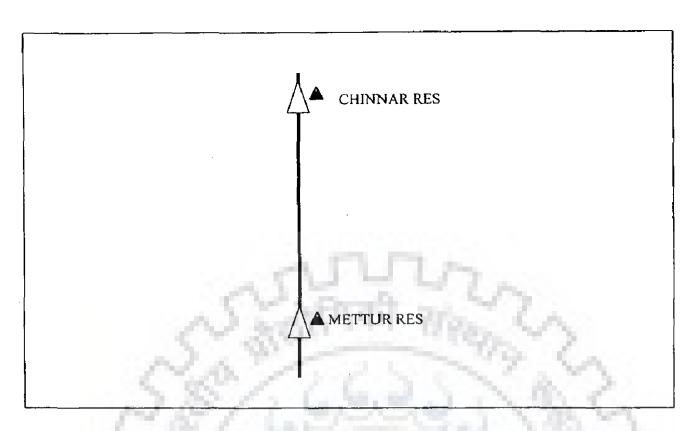


Figure 3.3.7: Line Diagram Showing Major and Medium Projects in Chinnar Sub-basin

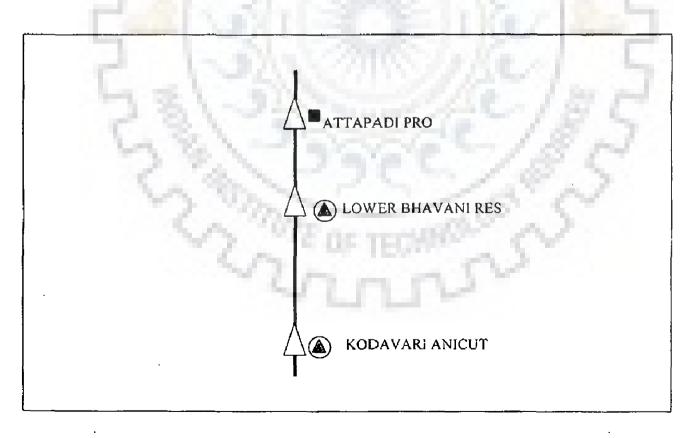


Figure 3.3.8: Line Diagram Showing Major and Medium Projects in Bhavani Sub-basin

Table 3.3: Principal Features of Major Projects/Sites in Cauvery River Basin

|   | Location         | ide Latitude     | (16) | E 13011'N     | E 12 <sup>0</sup> 45' N | E 12º 29'N    | N.            | E 12°25'N     | E 11º 40' N  | E 11047N    | E 11° 55'N | E 12° 02'N | Ä               | E 110 54'N | E 11° 58' N | E 11047'N  | E 11 <sup>0</sup> 28' N |  |
|---|------------------|------------------|------|---------------|-------------------------|---------------|---------------|---------------|--------------|-------------|------------|------------|-----------------|------------|-------------|------------|-------------------------|--|
| i |                  | Longitude        | (3)  | 750 111       | 76 03.                  | 75° 54"       | N<br>A        | 76 33         | 75°57        | 75° 54' E   | 76°21'E    | 76° 15'E   | A<br>A          | 76° 26'    | 76°27"      | 770 48'    | 11,021                  |  |
|   | Utilisation      | (MCM)            | (14) | 162           | 1536.1                  | 509           | 433.35        | 1483          | 277.5        | 495.5       | 852        | 193        | 24              | 677        | 217.91      | 275        | 395.4                   |  |
|   | CM)              | Gross            | (13) | 89.54         | 1047                    | 241           | 169.43        | 1408          | 166.86       | 607.78      | 552        | 112        | NA              | 280        | 153.95      | 2708.8     | 928.79                  |  |
|   | Storage (MCM)    | Dead             | (12) | 8.89          | 38                      | 12            | 25            | 125           | 23.75        | 156.15      | 66         | 30         | N<br>A          | NA<br>AA   | 24.1        | 62.02      | 21.1                    |  |
|   | Sto              | Live             | (11) | 70.58         | 915                     | 216           | 144.43        | 1172          | 143.11       | 451.63      | 453        | 82         | 310             | 280        | 129.85      | 2646.8     | 7.706                   |  |
|   | CCA              | (ha)             | (10) | 21,450        | 2,65,079                | 53,538        | 44,500        | 1,13,603      | 9,200        | 22,500      | 45,730     | 19,300     | 1,700           | 40,470     | 10,526      | 18212      | 95,175                  |  |
|   | Catchment        | area (km²)       | (6)  | 557           | 2810                    | 420           | 280           | 10619         | 61,44        | 155.4       | 2142       | 276.6      | 185             | 950        | 984         | 42217      | 4200                    |  |
|   | Dictrio          | DISTLE           | (8)  | Hassan        | Hassan                  | Kodagu        | Kodagu        | Mandya        | Wynad        | Wynad       | Mysore     | Mysore     | Mysore          | Mysore     | Mysorc      | Salem      | Periyar                 |  |
|   | Croto            | ાકાલ             | (7)  | Каплатака     | Kamataka                | Kamataka      | Kamataka      | Karnataka     | Kerala       | Kerala      | Kamataka   | Karnataka  | Karnataka       | Kamataka   | Kamataka    | Famil Nadu | Tamil Nadu              |  |
|   | Change           | Status           | (6)  | Existing      | Existing                | Existing      | Proposed      | Existing      | ongoing      | ongoing     | Existing   | Existing   | Proposed        | proposed   | Existing    | Existing   | Existing                |  |
|   | Authorise        | Duo-ousill       | (5)  | Upper Cauvery | Upper Cauvery           | Upper Cauvery | Upper Cauvery | Upper Cauvery | Kabini       | Kabini      | Kabini     | Kabini     | Kabini          | Kabini     | Kabini      | Chinnar    | Bhavani                 |  |
|   | Motation         | Notation         | (4)  | YCU           | HCU                     | CCU           | ccu           | KCU           | BKB          | MKB         | KKB        | TKB        | SKB             | UKN        | NKB         | МСН        | ВВН                     |  |
|   | Site Me Motation | ole No.          | (3)  | 1             | 2                       | 3             | 4             | Ş             | 9            | 7           | 8          | 6          | 01              | 11         | 12          | 13         | 14                      |  |
|   | Name of project  | าวอโดเส เก อแแหเ | (2)  | Yagachi       | Hemavathi               | Harangi       | Cauvery       | KRS           | Banasursagar | Mananthyady | Kabini     | Taraka     | Sagar doddakere | Upper Nugu | Nugu        | Mettur     | Lower Bhavani           |  |
|   | S S              | Si.140.          | (1)  | 1             | 2                       | 8             | 4             | 5             | 9            | 7           | 8          | 6          | 01              | 11         | 12          | 13         | 14                      |  |

Table 3.4.1 (a): Land Use Coefficients for Upper Cauvery Sub-basin

| SN  | Name of crop  | Jun   | Jul  | Aug  | Sep   | Oct  | Nov  | Dec   | Jan   | Feb   | Mar  | Apr  | May  |
|-----|---------------|-------|------|------|-------|------|------|-------|-------|-------|------|------|------|
| (1) | (2)           | (3)   | (4)  | (5)  | (9)   | 6    | (8)  | (6)   | (10)  | (11)  | (12) | (13) | (14) |
| 1   | kh.Paddy      | 0.50  | 1.00 | 1.00 | 00.1  | 1.00 | 0.50 | 0.00  | 00.0  | 00.00 | 0.00 | 0.00 | 0.00 |
| 2   | kh.Jowar      | 0.53  | 1.00 | 1.00 | 1.00  | 0.45 | 00.0 | 00.00 | 00.00 | 00.0  | 00.0 | 00.0 | 0.00 |
| 3   | kh.Ragi       | 1.00  | 1.00 | 0.32 | 00.0  | 0.00 | 0.00 | 00.00 | 00.0  | 00.0  | 0.00 | 00.0 | 0.84 |
| 4   | Fodder        | 0.53  | 1.00 | 1.00 | 1.00  | 0.45 | 00.0 | 00.0  | 00.0  | 00.0  | 0.00 | 00.0 | 00.0 |
| 5   | Tobacco       | 0.53  | 1.00 | 1.00 | 1.00  | 00.0 | 00.0 | 00.0  | 00.0  | 00.0  | 0.00 | 00.0 | 0.00 |
| 9   | Pulses        | 0.00  | 00.0 | 0.00 | 00.00 | 0.00 | 00.0 | 1.00  | 1.00  | 1.00  | 1.00 | 00.0 | 00.0 |
| 7   | Fruits & veg. | 0.00  | 00.0 | 0.00 | 00.0  | 1.00 | 1.00 | 1.00  | 1.00  | 00.0  | 0.00 | 0.00 | 0.00 |
| 8   | Ground nut    | 00.00 | 00.0 | 0.00 | 0.00  | 00.0 | 0.00 | 0.00  | 1.00  | 1.00  | 00.1 | 00'1 | 0.00 |
| 6   | Sugarcane     | 1.00  | 1.00 | 1.00 | 1.00  | 00.1 | 1.00 | 1.00  | 1.00  | 1.00  | 00.1 | 00.1 | 00.1 |

Table 3.4.1 (b): Crop Water Requirements for Upper Cauvery Sub-basin

Table 3.4.2(a): Land Use Coefficients for Kabini Sub-basin

| SI.No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Name of crop  | Jun  | Jul  | Aug      | Sep  | Oct  | Nov  | Dec  | Jan  | Feb  | Mar  | Apr  | May  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------|------|----------|------|------|------|------|------|------|------|------|------|
| E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | (2)           | 3    | (+)  | <b>②</b> | (9)  | 6    | (8)  | (6)  | (10) | (11) | (12) | (٤1) | (14) |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | kh Paddy      | 0.50 | 1.00 | 1.00     | 1.00 | 0.50 | 0.00 | 00.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | kh. Jowar     | 0.50 | 1.00 | 1.00     | 1.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | kh Ragi       | 0.50 | 1.00 | 1.00     | 1.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Fodder        | 0.50 | 1.00 | 1.00     | 1.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}\ext{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}}}}}} \sqit{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}}} \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}}} \sqrt{\sqrt{\sq}}}}}}} \sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sqrt{\sq}}}}}}}}}} \sqite\septite{\sign{\sqrt{\sq}}}}}}}} \sqrt{\s | Cotton        | 0.50 | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Rabi Paddy    | 0.00 | 0.00 | 0.00     | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Pulses        | 0.00 | 0.00 | 0.00     | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 00.0 |
| *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Fruits & veg. | 0.00 | 0.00 | 0.00     | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Ground nut    | 0.00 | 0.00 | 0.00     | 0.00 | 0.00 | 0.00 | 0.50 | 1.00 | 1.00 | 1.00 | S    | 0.00 |
| 91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Sugercane     | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 00.1 | 1.00 | 1.00 | 1.00 | 00.1 | 1.00 |
| Ξ                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Coconut       | 1.00 | 1.00 | 1.00     | 1.00 | 1.00 | 1.00 | 00.1 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |               |      |      |          |      |      |      |      |      |      |      |      |      |

Table 3.4.2 (b): Crop Water Requirements for Kabini Sub-basin

Unit: Meter

| SN | Name of crop  | Jun   | Jul  | Aug  | Sep   | Oct  | Nov   | Dec  | Jan  | Fcb  | Mar  | Apr   | May  | Total |
|----|---------------|-------|------|------|-------|------|-------|------|------|------|------|-------|------|-------|
| Ξ  | (2)           | (3)   | (4)  | (5)  | (9)   | 0    | (8)   | (6)  | (10) | (11) | (12) | (13)  | (14) | (15)  |
| -  | kh. Paddy     | 0.04  | 0.64 | 0.59 | 0.50  | 0.02 | 00.0  | 0.00 | 0.00 | 0.00 | 0.00 | 0.00  | 00.0 | 1.80  |
| 7  | kh. Jowar     | 0.01  | 0.09 | 0.15 | 90.0  | 0.01 | 00.0  | 0.00 | 00.0 | 00.0 | 0.00 | 0.00  | 00.0 | 0.32  |
| 3  | kh. Ragi      | 0.01  | 0.09 | 0.15 | 90.0  | 0.01 | 0.00  | 0.00 | 00.0 | 0.00 | 0.00 | 0.00  | 0.00 | 0.32  |
| 4  | Fodder        | 0.01  | 0.00 | 0.15 | 90.0  | 0.01 | 0.00  | 0.00 | 00.0 | 0.00 | 0.00 | 0.00  | 00.0 | 0.32  |
| ~  | Cotton        | 0.02  | 0.00 | 0.08 | 0.12  | 90:0 | 01.0  | 0.07 | 00.0 | 00.0 | 0.00 | 00.00 | 00.0 | 0.54  |
| 9  | Rabi Paddy    | 00.00 | 0.00 | 0.00 | 00.00 | 0.00 | 0.37  | 99.0 | 0.72 | 0.45 | 0.00 | 0.00  | 0.00 | 2.20  |
| 1  | Pulses        | 00.00 | 00.0 | 00.0 | 0.00  | 00.0 | 00.00 | 0.05 | 0.19 | 0.30 | 0.14 | 00.0  | 00.0 | 89'0  |
| ∞  | Fruits & veg. | 0.00  | 00'0 | 00.0 | 00.0  | 0.02 | 80.0  | 0.24 | 0.27 | 0.00 | 0.00 | 00.00 | 00.0 | 09.0  |
| 6  | Ground nut    | 0.00  | 0.00 | 00'0 | 00.0  | 00.0 | 00.0  | 0.04 | 0.19 | 0.27 | 0.25 | 0.03  | 0.00 | 11.0  |
| 2  | Sugercane     | 90,0  | 0.03 | 0.02 | 0.05  | 0.03 | 80.0  | 0.22 | 0.28 | 0.28 | 0.34 | 0.16  | 90.0 | 1.62  |
| 1  | Coconut       | 0.15  | 0.12 | 0.12 | 0.08  | 0.04 | 0.11  | 61.0 | 0.23 | 0.24 | 0.29 | 0.20  | 80.0 | 1.84  |

Table 3.4.3 (a): Land Use Coefficients for Shimsha Sub-basin

| May          | (14)              | 0.00      | 0.00      | 0.84    | 0.00   | 0.00    | 00.0   | 0.00          | 00.0       | 0.00      |
|--------------|-------------------|-----------|-----------|---------|--------|---------|--------|---------------|------------|-----------|
| Apr          | (13)              | 0.00      | 0.00      | 0.00    | 0.00   | 0.00    | 0.00   | 0.00          | 0.50       | 0.00      |
| Mar          | (12)              | 0.00      | 0.00      | 0.00    | 0.00   | 0.00    | 00.0   | 0.00          | 1.00       | 0.00      |
| Feb          | (11)              | 0.00      | 0.00      | 0.00    | 0.00   | 0.00    | 0.00   | 0.00          | 1.00       | 1.00      |
| Jan          | (10)              | 0.00      | 0.00      | 0.00    | 00.0   | 0.00    | 0.00   | 1.00          | 1.00       | 1.00      |
| Dec          | (6)               | 0.00      | 0.00      | 0.00    | 0.00   | 0.00    | 0.50   | 1.00          | 0.54       | 1.00      |
| Nov          | (8)               | 0.00      | 0.00      | 0.00    | 0.00   | 0.00    | 1.00   | 00.1          | 0.00       |           |
| Oct          | 6                 | 0.50      | 0.50      | 0.50    | 0.50   | 0.00    | 1.00   | 1.00          | 0.00       | 0.00      |
| Sep          | (9)               | 1.00      | 1.00      | 1.00    | 1.00   | 1.00    | 1.00   | 0.00          | 0.00       | 0.00      |
| Aug          | (5)               | 1.00      | 1.00      | 1.00    | 1.00   | 1.00    | 1.00   | 0.00          | 0.00       | 0.00      |
| Jul          | ( <del>\$</del> ) | 1.00      | 1.00      | 1.00    | 1.00   | 1.00    | 1.00   | 0.00          | 00.00      | 0.00      |
| Jun          | 3                 | 0.50      | 0.50      | 0.50    | 0.50   | 0.50    | 0.50   | 0.00          | 0.00       | 0.00      |
| Name of crop | (2)               | kh. Paddy | kh. Jowar | kh.Ragi | Fodder | Tobacco | Pulses | Fruits & veg. | Ground nut | Sugarcane |
| SN           | 3                 | -         | 2         | 6       | 4      | 'n      | 9      | 7             | 80         | 6         |

Table 3.4.3 (b): Crop Water Requirements for Shimsha Sub-basin

| Meter | iai          | (3)  | 8I       | 9         | 90      | 98     | 정       | 81     | 8             | <del>-</del> | 8         |
|-------|--------------|------|----------|-----------|---------|--------|---------|--------|---------------|--------------|-----------|
| ••[   | •            |      |          |           |         |        |         |        |               |              |           |
| 5     | May          | (14) | 0.00     | 0.00      | 0.02    | 0.00   | 0.00    | 0.00   | 0.00          | 0.00         | 0.00      |
|       | Арг          | (13) | 0.00     | 0.00      | 0.00    | 00.0   | 00'0    | 00'0   | 0.00          | 60'0         | 0.26      |
|       | Mar          | (12) | 0.00     | 0.00      | 0.00    | 0.00   | 0.00    | 0.24   | 0.00          | 0.49         | 0.42      |
|       | Feb          | (11) | 0.00     | 0.00      | 0.00    | 0.00   | 0.00    | 0.33   | 0.00          | 0.39         | 0.37      |
|       | Jan          | (10) | 0.00     | 0.00      | 0.00    | 0.00   | 0.00    | 0.19   | 0.11          | 0.17         | 0.26      |
|       | Dec          | (6)  | 0.00     | 0.00      | 0.00    | 0.00   | 0.00    | 0.05   | 0.26          | 0.00         | 0.36      |
|       | Nov          | (8)  | 00.0     | 00.00     | 00.00   | 0.00   | 00.0    | 00.0   | 0.13          | 00.0         | 0.20      |
|       | Oct          | (2)  | 0.44     | 00.00     | 00.00   | 0.00   | 0.00    | 00.0   | 0.01          | 00.0         | 0.03      |
|       | Sep          | (9)  | 0.40     | 0.02      | 00.00   | 0.05   | 0.01    | 00.0   | 00.0          | 00.0         | 0.02      |
|       | Aug          | (5)  | 0.40     | 0.03      | 0.00    | 0.02   | 0.02    | 00.0   | 00.0          | 0.00         | 0.01      |
|       | Jul          | (4)  | 0.40     | 0.02      | 0.02    | 0.02   | 0.01    | 0.00   | 0.00          | 0.00         | 0.01      |
|       | Jun          | (3)  | 0.17     | 00.0      | 0.02    | 00.00  | 00.00   | 00'0   | 00.0          | 00.00        | 0.01      |
|       | Name of crop | (2)  | kh.Paddy | kh. Jowar | kh.Ragi | Fodder | Tobacco | Pulses | Fruits & veg. | Ground nut   | Sugarcane |
|       | NS           | Ξ    | ı        | 2         | 3       | 4      | 5       | 9      | 7             | ∞            | 6         |

Table 3.4.4 (a): Land Use Coefficients for Arkavathi Sub-basin

| SN | Name of crop  | Jun  | Jul   | Aug   | Sep   | Oct  | Nov  | Dec  | Jan   | Feb  | Mar  | Apr   | May  |
|----|---------------|------|-------|-------|-------|------|------|------|-------|------|------|-------|------|
| Ξ  | (2)           | (3)  | (4)   | (S)   | (9)   | (2)  | (%)  | (6)  | (10)  | (11) | (12) | (13)  | (14) |
| 1  | kh.Paddy      | 0.50 | 1.00  | 1,00  | 1.00  | 0.50 | 00.0 | 0.00 | 0.00  | 0.00 | 00.0 | 0.00  | 0.00 |
| 2  | kh. Jowar     | 0.50 | 1.00  | 1,00  | 1.00  | 0.50 | 0.00 | 0.00 | 00.0  | 00.0 | 0.00 | 0.00  | 0.00 |
| ~  | kh. Ragi      | 0.50 | 1.00  | 1.00  | 1.00  | 0.50 | 00.0 | 0.00 | 0.00  | 0.00 | 0.00 | 00.0  | 0.84 |
| 4  | Fodder        | 0.50 | 1.00  | 1,00  | 1.00  | 0.50 | 00.0 | 00.0 | 0.00  | 0.00 | 0.00 | 00.0  | 00.0 |
| 5  | Tobacco       | 0.50 | 1.00  | 1.00  | 1.00  | 0.00 | 00.0 | 00.0 | 00.00 | 00.0 | 00.0 | 00.0  | 0.00 |
| 9  | Pulses        | 0.50 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00 | 0.50 | 0.00  | 0.00 | 00'0 | 00.0  | 0.00 |
| 7  | Fruits & veg. | 0.00 | 00.0  | 0.00  | 0.00  | 1.00 | 1.00 | 1.00 | 1.00  | 0.00 | 0.00 | 00.0  | 0.00 |
| ∞  | Ground nut    | 0.00 | 00.00 | 0.00  | 0.00  | 0.00 | 00.0 | 0.54 | 1.00  | 1.00 | 1.00 | 0.50  | 0.00 |
| 6  | Sugarcane     | 00.0 | 0.00  | 00.00 | 00.00 | 0.00 |      | 1.00 | 1.00  | 1.00 | 00'0 | 00.00 | 0.00 |
|    |               |      |       |       |       |      |      |      |       |      |      |       |      |

Table 3.4.4 (b): Crop Water Requirements for Arkavathi Sub-basin

| <u>.</u> 1 | ,            |      |           |           | <del></del> , |        | <del></del> , |        | , ,           |            |           |
|------------|--------------|------|-----------|-----------|---------------|--------|---------------|--------|---------------|------------|-----------|
| • •        | Total        | (15) | 1.808     | 0.059     | 0.055         | 0.059  | 0.037         | 0.811  | 0.498         | 1.144      | 1.960     |
| Unit       | May          | (14) | 0.000     | 0.000     | 0.015         | 0.000  | 0.000         | 0.000  | 0.000         | 0.000      | 0.000     |
|            | Apr          | (13) | 0.000     | 000.0     | 0.000         | 0.000  | 0.000         | 0.000  | 0.000         | 0.093      | 0.262     |
|            | Mar          | (12) | 0.000     | 0.000     | 0.000         | 0.000  | 0.000         | 0.240  | 0.000         | 0.489      | 0.421     |
|            | Feb          | (11) | 0.000     | 0.000     | 0.000         | 0.000  | 0.000         | 0.328  | 0.000         | 0.390      | 0.372     |
|            | Jan          | (10) | 0.000     | 0.000     | 0.000         | 0.000  | 0.000         | 0.194  | 0.106         | 0.172      | 0.263     |
|            | Dec          | (6)  | 0.000     | 0.000     | 0.000         | 0.000  | 0.000         | 0.049  | 0.255         | 0.000      | 0.355     |
|            | Nov          | (8)  | 0.000     | 0.000     | 0.000         | 0.000  | 0.000         | 0.000  | 0.127         | 0.000      | 0.201     |
|            | Oct          | (7)  | 0.440     | 0.000     | 0.000         | 0.000  | 0.000         | 0.000  | 0.010         | 0.000      | 0.027     |
|            | Scp          | (9)  | 0.399     | 0.021     | 0000          | 0.021  | 0.007         | 0.000  |               |            | 0.020     |
|            | Aug          | (5)  | 0.405     | 0.020     | 0.000         | 0.020  | 0.015         | 0.000  | 000.0         | 0.000      | 0.014     |
|            | Jul          | (4)  | 0.398     | 0.015     | 0.018         | 0.015  | 0.012         | 0.000  | 0.000         | 0.000      | 0.012     |
|            | nnſ          | (3)  | 0.169     | 0.003     | 0.022         | 0.003  | 0.003         | 0.000  | 0.000         | 0.000      | 0.013     |
|            | Name of crop | (2)  | kh. Paddy | kh. Jowar | kh.Ragi       | Fodder | Tobacco       | Pulses | Fruits & veg. | Ground nut | Sugarcane |
|            | SN           | Ξ    | 7         | 2         | 3             | 4      | \<br> <br> -  | 9      | 7             | ∞          | 6         |

Table 3.4.5 (a): Land Use Coefficients for Middle Cauvery Sub-basin

| (1)         (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)           1         kh.Paddy         0.50         1.00         1.00         1.00         0.50         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                   | S        | Name of crop  | Jun  | Jul  | Aug  | Sep  | Oct  | Nov   | Dec   | Jan  | Feb   | Mar  | Apr   | May   |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|------|------|------|------|------|-------|-------|------|-------|------|-------|-------|
| kh.Paddy         0.50         1.00         1.00         1.00         0.50         0.00         0.00         0.00           kh.Jowar         0.53         1.00         1.00         1.00         0.45         0.60         0.00         0.00         0.00           kh.Jowar         0.53         1.00         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                       | <b>E</b> | (2)           | (3)  | (4)  | (5)  | (9)  | (3)  | (8)   | 6)    | (10) | (11)  | (12) | (13)  | (14)  |
| kh. Jowar         0.53         1.00         1.00         1.00         0.45         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00        | 1        | kh.Paddy      | 0.50 | 1.00 | 1.00 | 1.00 | 00'1 | 0.50  | 00.0  | 0.00 | 00.0  | 0.00 | 0.00  | 00.0  |
| kh.Ragi         1.00         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00          | 2        | kh. Jowar     | 0.53 | 1.00 | 1.00 | 1.00 | 0.45 | 00.0  | 00.0  | 0.00 | 00.00 | 0.00 | 0.00  | 00.0  |
| Fodder         0.53         1.00         1.00         1.00         0.45         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         < | 3        | kh.Ragi       | 1.00 | 1.00 | 0.32 | 0.00 | 00.0 | 00.00 | 00.00 | 0.00 | 00.00 | 0.00 | 00.00 | 0.84  |
| kh. cotton         0.53         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00       | 4        | Fodder        | 0.53 | 1.00 | 1.00 | 1.00 | 0.45 | 00.0  | 00'0  | 0.00 | 00.0  | 0.00 | 0.00  | 00.0  |
| Paddy         Paddy         Color         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00          | 5        | kh. cotton    | 0.53 | 1.00 | 1.00 | 1.00 | 00.0 | 00.0  | 00.0  | 0.00 | 00.0  | 0.00 | 0.00  | 00.0  |
| Pulses         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         < | 9        | Paddy         |      |      |      |      |      |       |       |      |       |      |       |       |
| Fruits & veg.         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         0.00         0.00           Ground nut         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00           Sugarcane         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 7        | Pulses        | 0.00 | 00.0 | 0.00 | 00.0 | 0.00 | 0.00  | 1.00  | 1.00 | 1.00  | 1.00 | 00.0  | 0.00  |
| Ground nut         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00       | ∞        | Fruits & veg. | 0.00 | 0.00 | 0.00 | 00.0 | 1.00 | 1.00  | 1.00  | 1.00 | 00.0  | 0.00 | 00.00 | 00.0  |
| Sugarcane 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6        | Ground nut    | 0.00 | 00.0 | 0.00 | 00.0 | 00.0 | 00.0  | 00.0  | 1.00 | 1.00  | 1.00 | 00.1  | 00.00 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 01       | Sugarcane     | 1.00 | 1.00 | 1.00 | 1,00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00  |

Table 3.4.5 (b): Crop Water Requirements for Middle Cauvery Sub-basin

| Name of crop Jun Int Ang Sep     | Inl Ang | Ane | -   | Sep    |       | Oct   | Nov   | Dec   | [an   | Feb   | Mar   | Apr   | May   | Total |
|----------------------------------|---------|-----|-----|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| (3) (4)                          | (4)     |     |     | (5)    | (9)   | (6)   | (8)   | (6)   | (10)  | (11)  | (12)  | (13)  | (14)  | Į.    |
| kh.Paddy 0.169 0.398 0.          | 0.398   |     | 0   | 0.402  | 0.399 | 0.440 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 1.808 |
| kh.Jowar 0.003 0.015 0           | 0.015   |     | 0   | 0.020  | 0.021 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.059 |
| kh Ragi 0.022 0.018 0.           | 0.018   | -   | 0   | 0.000  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.015 | 0.055 |
| Fodder 0.003 0.015 0.0           | 0.015   |     | 0.0 | 0.020  | 0.021 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.059 |
| Tobacco 0.003 0.012 0.015        | 0.012   |     | 0.0 | 15     | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.037 |
| Pulses 0.000 0.000 0.00          | 0.000   |     | 0.0 | 0.000  | 0.000 | 0.000 | 0.000 | 0.049 | 0.194 | 0.328 | 0.240 | 0.000 | 0.000 | 0.811 |
| Fruits & veg. 0.000 0.000 0.00   | 0.000   |     | 0.0 | 0.00.0 | 0.000 | 0.010 | 0.127 | 0.255 | 0.106 | 0.000 | 0.000 | 0.000 | 0.000 | 0.498 |
| Ground nut 0.000 0.000 0.000 0.0 | 0.000   | _   | 0   | 0.00.0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.172 | 0.390 | 0.489 | 0.093 | 0.000 | 1.144 |
| Sugarcane 0.013 0.012 0          | 0.012   |     | 0   | 0.014  | 0.020 | 0.027 | 0.201 | 0.355 | 0.263 | 0.372 | 0.421 | 0.262 | 0.000 | 1.960 |
|                                  |         |     |     |        |       |       |       |       |       |       |       |       |       |       |

Table 3.4.6 (a): Land Use Coefficients for Suvarnavathi Sub-basin

| (1)<br>1 kh Paddy<br>2 kh Jowar |               | 2001 | Jul  | Aug  | Sep  | ĕ     | Nov   | Dec  | Jan  | Feb  | Mar  | Apr   | May  |
|---------------------------------|---------------|------|------|------|------|-------|-------|------|------|------|------|-------|------|
| 1 kh Pac                        | (2)           | (3)  | (4)  | (5)  | (9)  | (1)   | (8)   | (6)  | (10) | (11) | (12) | (13)  | (14) |
| 2 kh low                        | ddy           | 0.50 | 1.00 | 1.00 | 1.00 | 1.00  | 0.50  | 0.00 | 0.00 | 0.00 | 00.0 | 0.00  | 0.00 |
|                                 | war           | 0,53 | 1.00 | 1.00 | 1.00 | 0.45  | 00.0  | 0.00 | 0.00 | 0.00 | 00.0 | 0.00  | 0.00 |
| 3 kh.Ragi                       | gi            | 1.00 | 1.00 | 0.32 | 00.0 | 00.00 | 0.00  | 0.00 | 0.00 | 0.00 | 0.00 | 00'0  | 0.84 |
| # Fodder                        | 1             | 0.53 | 1.00 | 1.00 | 1.00 | 0.45  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00 | 00.00 | 0.00 |
| 5 Tobacco                       | 000           | 0.53 | 1.00 | 1.00 | 1.00 | 00.0  | 0.00  | 0.00 | 0.00 | 0.00 | 0.00 | 00.00 | 0.00 |
| 6 Pulses                        |               | 0.00 | 00.0 | 0.00 | 00.0 | 0.00  | 0.00  | 1.00 | 1.00 | 1.00 | 1.00 | 0.00  | 0.00 |
| 7 Fruits                        | Fruits & veg. | 0.00 | 0.00 | 0.00 | 00.0 | 1.00  | 1.00  | 1.00 | 00.1 | 0.00 | 0.00 | 0.00  | 0.00 |
| 8 Ground nut                    | rd nut        | 0.00 | 0.00 | 00.0 | 00.0 | 0.00  | 00.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00  | 0.00 |
| 9 Sugarcane                     | сапе          | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 |

Table 3.4.6 (b): Crop Water Requirements for Suvarnavathi Sub-basin

|              | (14) (15) | _        |           |         |        |         |        | 0.000 0.498   | -          | 0.000 1.960 |
|--------------|-----------|----------|-----------|---------|--------|---------|--------|---------------|------------|-------------|
| 2            | (13) (1   | _        | _         |         | _      |         |        |               | 0.093 0.0  | 0.262 0.0   |
| -            | (12)      |          |           |         |        |         | _      | -             |            | 0.421 0.    |
|              |           |          | -         |         |        |         |        | 0.000         |            | 0.372       |
| Jan          | (10)      | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.194  | 0.106         | 0.172      | 0.263       |
| Dec          | (6)       | 0.000    | 0.000     | 0.000   | 00000  | 0.000   | 0.049  | 0.255         | 0.000      | 0.355       |
| Nov          | (8)       | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.000  | 0.127         | 0.000      | 0.201       |
| Oct          | (2)       | 0.440    | 0.000     | 0.000   | 0.000  | 0.000   | 0000   | 0.010         | 0.000      | 0.027       |
| Sep          | (9)       | 0.399    | 0.021     | 0.000   | 0.021  | 0.007   | 0.000  | 0.000         | 0.000      | 0.020       |
| Ang          | (5)       | 0.405    | 0.020     | 0.000   | 0.020  | 0.015   | 0.000  | 0.000         | 0.000      | 0.014       |
| Jul          | (4)       | 0.398    | 0.015     | 0.018   | 0.015  | 0.012   | 0.000  | 0.000         | 0.000      | 0.012       |
| Jun          | (3)       | 0.169    | 0.003     | 0.022   | 0.003  | 0.003   | 0.000  | 0.000         | 0.000      | 0.013       |
| Name of crop | (2)       | kh.Paddy | kh. Jowar | kh.Ragi | Fodder | Tobacco | Pulses | Fruits & veg. | Ground nut | Sugarcane   |
| SN           | (1)       | -        | 2         | m       | 47     | S       | 9      | 7             | ∞          | 6           |

Table 3.4.7 (a): Land Use Coefficients for Palar Sub-basin

| (1) (2) (3) 1 kh.Paddy 0.5( 2 kh.Jowar 0.5( 3 kh.Ragi 1.00( 4 Fodder 0.5( 5 Tobacco 0.5( 6 Pulses 0.00( 7 Fruits & veg. 0.00( 8 Ground nut 0.00( |      | ]<br>In | Aug  | Sep  | Š    | Nov  | ည်   | Jan  | Feb   | Mar   | Apr   | May  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|------|---------|------|------|------|------|------|------|-------|-------|-------|------|
|                                                                                                                                                  | (3)  | (4)     | (5)  | (9)  | (7)  | (8)  | (6)  | (10) | (11)  | (12)  | (13)  | (14) |
|                                                                                                                                                  | 0.50 | 1.00    | 1.00 | 1.00 | 1.00 | 0.50 | 0.00 | 0.00 | 00.0  | 00.0  | 00'0  | 0.00 |
|                                                                                                                                                  | 0.53 | 1.00    | 1.00 | 1.00 | 0.45 | 0.00 | 0.00 | 00.0 | 00.00 | 00.0  | 00'0  | 0.00 |
|                                                                                                                                                  | 1.00 | 1.00    | 0.32 | 00.0 | 00.0 | 00.0 | 00.0 | 00.0 | 0.00  | 00'0  | 00.0  | 0.84 |
|                                                                                                                                                  | 0,53 | 1.00    | 1.00 | 1.00 | 0.45 | 00.0 | 0.00 | 0.00 | 00.0  | 0.00  | 00.00 | 0.00 |
|                                                                                                                                                  | 0.53 | 1,00    | 1.00 | 1.00 | 0.00 | 0.00 | 00.0 | 0.00 | 00.0  | 0.00  | 00.0  | 0.00 |
|                                                                                                                                                  | 00.0 | 0.00    | 0.00 | 00.0 | 0.00 | 00.0 | 1.00 | 1.00 | 1.00  | 1.00  | 0.00  | 0.00 |
|                                                                                                                                                  | 00.0 | 0.00    | 0.00 | 00.0 | 1.00 | 1.00 | 1.00 | 1.00 | 00'0  | 00.00 | 00.0  | 00'0 |
|                                                                                                                                                  | 0.00 | 0.00    | 0.00 | 00.0 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00  | 00.1  | 1.00  | 0.00 |
| 9 Sugarcane 1.00                                                                                                                                 | 1.00 | 1.00    | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1 00  | 1.00  | 1.00 |

Table 3.4.7 (b): Crop Water Requirements for Palar Sub-basin

|       | Mar Apr May  | (12) (13) (14) | 0.000 0.000 0.000 | 0000 0000 0000 | 200.0 | 0.000 0.000 0.015 | 0.000 0.000 0.000<br>0.000 0.000 0.000 | 0.000 0.000 0.000<br>0.000 0.000 0.000<br>0.000 0.000 0.000 | 0.000 0.000 0.000<br>0.000 0.000 0.000<br>0.000 0.000 0.000<br>0.240 0.000 0.000 | 0.000 0.000 0.000<br>0.000 0.000 0.000<br>0.000 0.000 0.000<br>0.240 0.000 0.000                                                            | 0.000 0.000 0.000<br>0.000 0.000 0.000<br>0.000 0.000 0.000<br>0.240 0.000 0.000<br>0.000 0.000 0.000<br>0.489 0.093 0.000 |
|-------|--------------|----------------|-------------------|----------------|-------|-------------------|----------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| Mar   |              | (12)           | 0.000             | 0.000          |       | 0.000             | 0.000                                  | 0.000                                                       | 0.000 0.000 0.000 0.240                                                          | 0.000<br>0.000<br>0.240<br>0.000                                                                                                            | 0.000<br>0.000<br>0.000<br>0.240<br>0.000                                                                                  |
| n Feb |              | (11)           | -                 |                |       | -                 |                                        | <del> -</del>  -                                            | <del> -</del>  - -                                                               | 00 0.000<br>00 0.000<br>00 0.000<br>04 0.328<br>06 0.000                                                                                    | <del>}-</del>  - - -                                                                                                       |
|       | Dec Jan      | (10)           | -                 |                |       | $\vdash$          |                                        |                                                             |                                                                                  | 0.000         0.000           0.000         0.000           0.000         0.000           0.049         0.194           0.255         0.106 | <del>                                      </del>                                                                          |
| -     | Nov De       | (6) (8)        |                   |                |       | ļ                 |                                        | 0.00 0.000                                                  | -                                                                                |                                                                                                                                             | <del>          </del>                                                                                                      |
| 1     |              |                |                   |                |       |                   |                                        | <del>                                     </del>            | <del>                                     </del>                                 | <del>                                     </del>                                                                                            | <del>                                      </del>                                                                          |
| -     | )<br> <br> - | (2)            | H                 | -              |       | -                 | -                                      | 0.000                                                       | <del>   </del>                                                                   |                                                                                                                                             |                                                                                                                            |
|       | Sep          | 9)             | 0.399             |                |       | 0.000             | 0.000                                  |                                                             |                                                                                  |                                                                                                                                             |                                                                                                                            |
|       | Aug          | (5)            | 0.402             | 0.020          |       | 0.000             |                                        |                                                             |                                                                                  |                                                                                                                                             | <del></del>                                                                                                                |
|       | Jul          | <del>(4)</del> | 0.398             | 0.015          | )     | 0.018             | 0.018                                  | 0.018                                                       | 0.018<br>0.015<br>0.012<br>0.000                                                 | 0.018<br>0.015<br>0.000<br>0.000<br>0.000                                                                                                   | 0.018<br>0.015<br>0.000<br>0.000<br>0.000                                                                                  |
|       | Jun          | (3)            | 0.169             | 0.003          |       | 0.022             | 0.022                                  | 0.003                                                       | 0.022<br>0.003<br>0.003<br>0.000                                                 | 0.022<br>0.003<br>0.000<br>0.000                                                                                                            | 0.022<br>0.003<br>0.000<br>0.000<br>0.000                                                                                  |
|       | Name of crop | (2)            | kh.Paddy          | kh. Jowar      |       | kh.Ragi           | kh.Ragi<br>Fodder                      | kh.Ragi<br>Fodder<br>Tobacco                                | kh.Ragi<br>Fodder<br>Tobacco<br>Pulses                                           | kh.Ragi<br>Fodder<br>Tobacco<br>Pulses<br>Fruits & veg.                                                                                     | kh.Ragi<br>Fodder<br>Tobacco<br>Pulses<br>Fruits & veg.                                                                    |
|       | S            | Ξ              |                   | 2              |       | m                 | w 4                                    | w 4 w                                                       | E 4 8                                                                            | w 4 8 0 C                                                                                                                                   | 8 7 8                                                                                                                      |

Table 3.4.8(a): Land Use Coefficients for Chinnar Sub-basin

| (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)           Paddy-I         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <th></th> <th>Name of crop</th> <th>Jun</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Oct</th> <th>Nov</th> <th>pec</th> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th>                                                 |                         | Name of crop | Jun   | Jul                       | Aug   | Sep   | Oct  | Nov   | pec  | Jan  | Feb  | Mar   | Apr   | May  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------|-------|---------------------------|-------|-------|------|-------|------|------|------|-------|-------|------|
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                         | (2)          | (3)   | <del>(</del> <del>†</del> | (5)   | (9)   | (2)  | (8)   | (6)  | (10) | (11) | (12)  | (13)  | (14) |
| II         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0                                                                                                                                                                                                                                  | <u>P</u>                | l-ddy-I      | 0.00  | 0.00                      | 0.45  | 1.00  | 1.00 | 1.00  | 1.00 | 0.45 | 0.00 | 0.00  | 0.00  | 0.00 |
| ar         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0                                                                                                                                                                                                                                  | $\frac{\mathbf{P}}{2}$  | iddy-II      | 0.00  | 0.00                      | 0.00  | 0.00  | 0.00 | 00.00 | 0.00 | 0.45 | 1.00 | 1.00  | 1.00  | 1.00 |
| i 1.00 1.00 0.13 0.00 0.00 0.00 0.00 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ×                       | . Jowar      | 00.0  | 00.0                      | 0.00  | 00'0  | 0.00 | 00.0  | 00'0 | 0.71 | 1.00 | 1.00  | 0.67  | 0.00 |
| 1.00 0.94 0.00 0.00 0.00 0.00 0.00 0.00 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 고                       | ı.Ragi       | 1.00  | 1.00                      | 0.13  | 0.00  | 0.00 | 0.00  | 00'0 | 0.00 | 0.00 | 0.00  | 0.50  | 1.00 |
| 1.00         0.94         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <th< td=""><td>ഥ</td><td>odder</td><td>1.00</td><td>0.94</td><td>00.0</td><td>00.00</td><td>00.0</td><td>00.00</td><td>00.0</td><td>0.00</td><td>00.0</td><td>00.00</td><td>19.0</td><td>1.00</td></th<>                                 | ഥ                       | odder        | 1.00  | 0.94                      | 00.0  | 00.00 | 00.0 | 00.00 | 00.0 | 0.00 | 00.0 | 00.00 | 19.0  | 1.00 |
| 1.00         1.00         0.57         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <th< td=""><td>E</td><td>lajra</td><td>1.00</td><td>0.94</td><td>00.0</td><td>00'0</td><td>0.00</td><td>00.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>0.00</td><td>19.0</td><td>1.00</td></th<>                                   | E                       | lajra        | 1.00  | 0.94                      | 00.0  | 00'0  | 0.00 | 00.00 | 0.00 | 0.00 | 0.00 | 0.00  | 19.0  | 1.00 |
| 1,00 1,00 48,00 0,00 0,00 0,00 0,00 0,00 0,00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 은                       | ulses        | 0.70  | 1.00                      | 1.00  | 0.57  | 0.00 | 0.00  | 0.00 | 0.00 | 0.00 | 00.00 | 00.00 | 0.00 |
| 0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00 <th< td=""><td><math>\overline{\mathbf{v}}</math></td><td>Cotton</td><td>00.7</td><td>1.00</td><td>48.00</td><td>00.0</td><td>0.00</td><td>00.0</td><td>0.00</td><td>0.00</td><td>0.54</td><td>1.00</td><td>1.00</td><td>1.00</td></th<> | $\overline{\mathbf{v}}$ | Cotton       | 00.7  | 1.00                      | 48.00 | 00.0  | 0.00 | 00.0  | 0.00 | 0.00 | 0.54 | 1.00  | 1.00  | 1.00 |
| 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | arphi                   | round nut    | 00.00 | 00.0                      | 00.0  | 0.00  | 0.00 | 0.00  | 0.55 | 1.00 | 1.00 | 1.00  | 0.67  | 0.00 |
| 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3                       | ugarcane     | 1.00  | 1.00                      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 0                       | oconut       | 1.00  | 1.00                      | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 |

Table 3.4.8 (b): Crop Water Requirements for Chinnar Sub-basin

| May Total    | (14) (15) |         | 0.437 2.729 |           | _       |        | 0.139 0.440 | 000 0.184 | 0.257 1.119 | 0.000 0.900 | 0.139 1.596 | 0.191 2.005 |
|--------------|-----------|---------|-------------|-----------|---------|--------|-------------|-----------|-------------|-------------|-------------|-------------|
| Apr          |           |         |             |           |         |        | _           | 0.000     | 0.194 0     | 0.092 0     | 0.193 0     | 0.246 0     |
| Mar          | (12)      | 0.000   | 0.841       | 0.200     | 000'0   | 000'0  | 0.000       | 0.000     | 0.263       | 0.283       | 0.263       | 0.325       |
| Feb          | (11)      | 0.000   | 0.719       | 0.210     | 0.000   | 0.000  | 0.000       | 0.000     | 0.060       | 0.293       | 0.111       | 0.260       |
| Jan          | (01)      | 0.123   | 0.051       | 0.054     | 0.000   | 0.000  | 0.000       | 0.000     | 0.000       | 0.197       | 0.106       | 0.242       |
| Dec          | (6)       | 0.616   | 0.000       | 0.000     | 0.000   | 0.000  | 0.000       | 0.000     | 0.000       | 0.035       | 680.0       | 0.178       |
| Nov          | (8)       | 0.549   | 0.000       | 0.000     | 0000    | 000.0  | 0.000       | 0.000     | 0.000       | 0.000       | 0.074       | 0.095       |
| Oct          | (7)       | 0.481   | 0.000       | 0.000     | 000'0   | 0.000  | 0.000       | 0.000     | 0.000       | 0.000       | 0.034       | 0.039       |
| Sep          | (9)       | 0.556   | 000'0       | 0.000     | 000'0   | 0000   | 000.0       | 200.0     | 0000        | 000.0       | 0.111       | 0.074       |
| Aug          | (5)       | 0.041   | 0.000       | 0.000     | 0.003   | 0.000  | 0.000       | 0.084     | 0.019       | 0.000       | 0.112       | 0.075       |
| Jul          | (4)       | 0.000   | 0.000       | 0.000     | 0.072   | 090'0  | 090.0       | 0.079     | 0.104       | 0000        | 0.156       | 0.117       |
| Jun          | (3)       | 0.000   | 0.000       | 000'0     | 0.208   | 0.208  | 0.208       | 0.014     | 0.222       | 0.000       | 0.208       | 0.163       |
| Name of crop | (2)       | Paddy-I | Paddy-II    | kh. Jowar | kh.Ragi | Fodder | Вајга       | Pulses    | Cotton      | Ground nut  | Sugarcane   | Coconut     |
| SN           | Ξ         | _       | 2           | 3         | 4       | 5      | 9           | 2         | <b>∞</b>    | 6           | 91          | 11          |

Table 3.4.9(a): Land Use Coefficients for Bhavani Sub-basin

|              | Name of crop | Jun  | Jul            | Aug  | Sep  | ರ<br>0 | Nov  | Dcc   | Jan   | Feb   | Mar  | Apr   | May  |
|--------------|--------------|------|----------------|------|------|--------|------|-------|-------|-------|------|-------|------|
| (E)          | (2)          | (3)  | <del>(4)</del> | (5)  | (9)  | (C)    | (8)  | (6)   | (01)  | (11)  | (12) | (13)  | (14) |
| l kh Paddy   | ldy          | 1.00 | 1.00           | 1.00 | 0.97 | 0.00   | 00.0 | 00.00 | 00.00 | 00.0  | 0.00 | 00.0  | 0.45 |
| 2 kh Jowar   | var          | 1.00 | 1.00           | 0.94 | 0.00 | 0.00   | 00.0 | 00.00 | 00.0  | 00.0  | 00.0 | 00.00 | 0.65 |
| 3 Fodder     | 1            | 06.0 | 1.00           | 1.00 | 0.00 | 0.00   | 00.0 | 00.00 | 00.0  | 00'0  | 0.00 | 0.00  | 0.00 |
| 4 Cotton     |              | 00.0 | 0.00           | 0.52 | 1.00 | 1.00   | 1.00 | 1.00  | 1.00  | 0.54  | 00.0 | 0.00  | 00'0 |
| 5 Maize      |              | 06.0 | 1.00           | 1.00 | 0.00 | 00.0   | 00.0 | 00.0  | 00.00 | 00'0  | 00.0 | 0.00  | 0.00 |
| 6 Pulses     |              | 0.70 | 1.00           | 1.00 | 0.57 | 00.00  | 00.0 | 00.0  | 00.00 | 00.00 | 0.00 | 0.00  | 0.00 |
| 7 Paddy(s)   | (s)          | 00.0 | 0.00           | 00.0 | 0.00 | 0.00   | 00.0 | 0.16  | 1.00  | 00.1  | 1.00 | 0.16  | 00.0 |
| 8 Jowar(s)   | (S)          | 00.0 | 0.00           | 00.0 | 0.00 | 0.00   | 0.00 | 00.00 | 00.00 | 1.00  | 1.00 | 1.00  | 1.00 |
| 9 Ground     | Groundnut(s) | 00.0 | 00.0           | 00.0 | 0.00 | 0.00   | 0.00 | 0.52  | 1.00  | 1.00  | 1.00 | 0.40  | 0.00 |
| 10 Sugercane | ane          | 1.00 | 1.00           | 1.00 | 1.00 | 1.00   | 1.00 | 1.00  | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 |
| 11 Coconut   | ut           | 1.00 | 1.00           | 00.1 | 1.00 | 1.00   | 1.00 | 1.00  | 1.00  | 00.1  | 1.00 | 1.00  | 1.00 |

Table 3.4.9(b): Crop Water Requirements for Bhavani Sub-basin

|    |              |       |        |        |       |       |       |       |       |       |       |       | Unit  | : Meter |
|----|--------------|-------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| SN | Name of crop | Jun   | Jul    | Aug    | Sep   | Oct   | Nov   | Dec   | Jan   | Feb   | Mar   | Apr   | May   | Total   |
| ε  | (2)          | (3)   | (4)    | (5)    | (9)   | (2)   | (8)   | (6)   | (10)  | (11)  | (12)  | (13)  | (14)  | (15)    |
| -  | kh Paddy     | 0.755 | 0.570  | 0.556  | 0,351 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.082 | 2.314   |
| 2  | kh Jowar     | 0.172 | 0.234  | 0.141  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.021 | 0.568   |
| 3  | Fodder       | 0.050 | 0.191  | 0.150  | 0.000 | 0.000 | 000.0 | 000'0 | 0.000 | 000.0 | 0.000 | 0.000 | 0.000 | 0.391   |
| 4  | Cotton       | 000'0 | 0.000  | 0.043  | 0.077 | 0.041 | 0.035 | 0.211 | 0.194 | 0.094 | 000'0 | 0.000 | 0.000 | 0.695   |
| 5  | Maize        | 0.050 | 0.198  | 0.165  | 0.000 | 0.000 | 000.0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.413   |
| 9  | Pulses       | 0.039 | 0.151  | 0.217  | 0.021 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 000'0 | 0.000 | 0.428   |
| 7  | Paddy(s)     | 0.000 | 0.000  | 0.000  | 0.000 | 0.000 | 0.000 | 0.064 | 0.605 | 0.573 | 0.511 | 0.034 | 0.000 | 1.787   |
| ∞  | Jowar(s)     | 0.000 | 0.000  | 0.000  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.074 | 0.245 | 0.259 | 0.132 | 0.710   |
| 6  | Groundnut(s) | 0.000 | 0.00.0 | 0.00.0 | 0,000 | 000.0 | 0.000 | 0.031 | 0.167 | 0.262 | 0.264 | 0.046 | 0.000 | 0.770   |
| 10 | Sugercane    | 0.260 | 0.234  | 0.259  | 0.251 | 0.045 | 0.040 | 0.088 | 0.087 | 0.103 | 0.245 | 0.164 | 0.155 | 1,931   |
|    | Coconut      | 0.217 | 0.193  | 0.216  | 0.208 | 0.054 | 0.057 | 0.164 | 0.207 | 0.233 | 0.301 | 0.212 | 0.204 | 2.266   |
|    |              |       |        |        |       |       |       |       |       |       |       |       |       |         |

Table 3.4.10 (a): Land Use Coefficients for Noyil Sub-basin

| 2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)           2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)           2)         (6)         (7)         (8)         (9)         (10)         (11)         (11)         (11)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10)         (10) <th>SN</th> <th>Name of crop</th> <th>nnſ</th> <th>Jul</th> <th>Aug</th> <th>Sep</th> <th>Oct</th> <th>Nov</th> <th>Dec</th> <th>Jan</th> <th>Feb</th> <th>Mar</th> <th>Apr</th> <th>May</th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SN       | Name of crop  | nnſ  | Jul  | Aug   | Sep   | Oct  | Nov   | Dec  | Jan  | Feb   | Mar  | Apr  | May  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|---------------|------|------|-------|-------|------|-------|------|------|-------|------|------|------|
| kh.Paddy         0.50         1.00         1.00         1.00         0.50         0.50         0.00         0.00           kh.Iowar         0.53         1.00         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ε        | (2)           | (3)  | (4)  | (5)   | (9)   | (7)  | (8)   | 6)   | (10) | (11)  | (12) | (13) | (14) |
| kh.Ragi         1.00         1.00         0.45         0.00         0.00         0.00         0.00           kh.Ragi         1.00         1.00         0.32         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | -        | kh.Paddy      | 0.50 | 1.00 | 1.00  | 1.00  | 1,00 | 0.50  | 0.00 | 00.0 | 00.00 | 00.0 | 0.00 | 00'0 |
| kh.Ragi         1.00         1.00         0.32         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2        | kh. Jowar     | 0.53 | 1.00 | 1.00  | 1.00  | 0.45 | 00.00 | 0.00 | 0.00 | 00'0  | 0.00 | 00.0 | 00.0 |
| Fodder         0.53         1.00         1.00         1.00         0.45         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 3        | kh.Ragi       | 1.00 | 1.00 | 0.32  | 00.00 | 0.00 | 00.00 | 0.00 | 0.00 | 00'0  | 0.00 | 00.0 | 0.84 |
| Tobacco         0.53         1.00         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4        | Fodder        | 0.53 | 1.00 | 1.00  | 1.00  | 0.45 | 0.00  | 00.0 | 0.00 | 00.00 | 0.00 | 0.00 | 00'0 |
| Pulses         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00           Fruits & veg.         0.00         0.00         0.00         0.00         1.00         1.00         1.00         0.00           Ground nut         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00           Sugarcane         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 5        | Tobacco       | 0.53 | 1.00 | 1.00  | 1.00  | 0.00 | 0.00  | 0.00 | 0.00 | 00'0  | 00.0 | 00.0 | 00.0 |
| Fruits & veg.         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         0.00           Ground nut         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00           Sugarcane         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 9        | Pulses        | 0.00 | 00.0 | 00.0  | 00.0  | 0.00 | 00:0  | 1.00 | 1.00 | 1.00  | 1.00 | 0.00 | 00'0 |
| Ground nut         0.00         0.00         0.00         0.00         0.00         0.00         1.00           Sugarcane         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 7        | Fruits & veg. | 0.00 | 0.00 | 00.00 | 00'0  | 1.00 | 1.00  | 1.00 | 1.00 | 0.00  | 0.00 | 0.00 | 00'0 |
| 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>∞</b> | Ground nut    | 0.00 | 00.0 | 00.00 | 00.00 | 00.0 | 0.00  | 0.00 | 1.00 | 1.00  | 1.00 | 1.00 | 00'0 |
| The state of the s | 6        | Sugarcane     | 1.00 | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |

Table 3.4.10 (b): Crop Water Requirements for Noyil Sub-basin

| Total        | (15)  | 1.808     | 0.059    | 0.055   | 0.059  | 0.037   | 0.811  | 0.498         | 1.144      | 1.960     |
|--------------|-------|-----------|----------|---------|--------|---------|--------|---------------|------------|-----------|
| Mav          | (14)  | 0.000     | 0.000    | 0.015   | 0.000  | 0.000   | 0.000  | 0.000         | 0.000      | 000'0     |
| Apr          | (13)  | 0.000     | 0.000    | 0.000   | 0.000  | 0.000   | 0.000  | 0.000         | 0.093      | 0.262     |
| Mar          | (12)  | 0.000     | 0.000    | 0.000   | 0.000  | 0.000   | 0.240  | 0.000         | 0.489      | 0.421     |
| Feb          | (11)  | 0000      | 0.000    | 0.000   | 0.000  | 0.000   | 0.328  | 0.000         | 0.390      | 0.372     |
| Ian          | (10)  | 0.000     | 0.000    | 0.000   | 000'0  | 0.000   | 0.194  | 901.0         | 0.172      | 0.263     |
| Dec          | (6)   | 0.000     | 0.000    | 0.000   | 0.000  | 0.000   | 0.049  | 0.255         | 0.000      | 0.355     |
| Nov          | (8)   | 0.000     | 0.000    | 0.000   | 0.000  | 0.000   | 0.000  | 0.127         | 0.000      | 0.201     |
| Oct          | (7)   | 0.440     | 0.000    | 0.000   | 0.000  | 0.000   | 0.000  | 0.010         | 0.000      | 0.027     |
| Sen          | (9)   | 0.399     | 0.021    | 0.000   | 0.021  | 0.007   | 0.000  | 0.000         | 0.000      | 0.020     |
| Aug          | (5)   | 0.402     | 0.020    | 0.000   | 0.020  | 0.015   | 0.000  | 0.000         | 0.000      | 0.014     |
| Į.           | (4)   | 0.398     | 0.015    | 0.018   | 0.015  | 0.012   | 0.000  | 0.000         | 0.000      | 0.012     |
| Jun          | (3)   | 0.169     | 0.003    | 0.022   | 0.003  | 0.003   | 0.000  | 0.000         | 0.000      | 0.013     |
| Name of crop | (2)   | kh. Paddy | kh.Jowar | kh.Ragi | Fodder | Tobacco | Pulses | Fruits & veg. | Ground mut | Sugarcane |
| 25           | $\Xi$ | _         | 2        | 3       | 4      | 5       | 9      | 7             | <b>∞</b>   | 6         |

Table 3.4.11(a): Land Use Coefficients for Amaravathi Sub-basin

| SN | Name of crop | Jun  | Jul   | Aug   | Sep  | Oct   | Nov   | Dec  | Jan   | Feb   | Mar  | Apr  | May   |
|----|--------------|------|-------|-------|------|-------|-------|------|-------|-------|------|------|-------|
| E  | (2)          | (3)  | (4)   | (5)   | (9)  | (7)   | (8)   | (6)  | (10)  | (11)  | (12) | (13) | (14)  |
| 1  | kh.Paddy     |      |       |       |      |       |       |      |       |       |      |      |       |
| 2  | kh.Jowar     | 1.00 | 1.94  | 1.00  | 00.0 | 00.00 | 00.0  | 00.0 | 00.0  | 00.00 | 00.0 | 00.0 | 65.00 |
| ٣  | Fodder       | 0.90 | 1.00  | 1.00  | 00.0 | 00.00 | 00.0  | 00'0 | 00.0  | 00.00 | 0.00 | 0.00 | 0.00  |
| 4  | Cotton       | 00.0 | 00.00 | 0.52  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 0.54  | 0.00 | 0.00 | 0.00  |
| 5  | Maize        | 06.0 | 1.00  | 1.00  | 00.0 | 00.0  | 00.0  | 00.0 | 00.00 | 00.00 | 0.00 | 0.00 | 0.00  |
| 9  | Pulses       | 0.70 | 1.00  | 1.00  | 0.57 | 0.00  | 00.0  | 0.00 | 00.0  | 00.0  | 00.0 | 0.00 | 0.00  |
| 7  | Paddy(s)     | 0.00 | 0.00  | 00.0  | 0.00 | 0.00  | 00.00 | 0.16 | 00.1  | I.00  | 1.00 | 0.17 | 0.00  |
| ∞  | Jowar(s)     | 0.00 | 00.0  | 00.0  | 0.00 | 00.0  | 00'0  | 0.00 | 00.00 | 1.00  | 1.00 | 00.1 | 1.00  |
| 6  | Groundnut(s) | 0.00 | 00.00 | 00.00 | 00.0 | 00.0  | 00'0  | 0.52 | 1.00  | 1.00  | 1.00 | 0.40 | 0.00  |
| 10 | Sugarcane    | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |
| 11 | Coconut      | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00  | 1.00 | 1.00 | 1.00  |

Table 3.4.11(b); Crop Water Requirements for Amaravathi Sub-basin

|              |         |       | H     |       |       |       |       |       |       |       | į     |       | Unit  | : Meter |
|--------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| Name of crop | of crop | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   | Jan   | Feb   | Mar   | Apr   | May   | Total   |
| )            | (2)     | (3)   | (4)   | (5)   | (9)   | (7)   | (8)   | (6)   | (10)  | (11)  | (12)  | (13)  | (14)  | (15)    |
| kh.Paddy     |         | 0.814 | 0.771 | 0.752 | 0.485 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 00000 | 0.000 | 0.050 | 2.872   |
| kh.Jowar     |         | 0.236 | 0.323 | 0.223 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.031 | 0.813   |
| Fodder       |         | 0.072 | 0.268 | 0.215 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.555   |
| Cotton       |         | 0.000 | 0.000 | 0.065 | 0.105 | 0.075 | 0.045 | 0.249 | 0.226 | 0.108 | 0.000 | 0.000 | 0.000 | 0.873   |
| Maize        |         | 0.072 | 0.276 | 0.234 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.582   |
| Pulses       |         | 0.056 | 0.216 | 0.303 | 0.030 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.605   |
| Paddy(s)     | (S      | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.016 | 0.586 | 0.718 | 0.656 | 0.047 | 0.000 | 2.023   |
| Jowar(s)     | (S)     | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.089 | 0.285 | 0.302 | 0.176 | 0.852   |
| Groundnut(s) | Inut(s) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.040 | 0.196 | 0.296 | 0.306 | 0.054 | 0.000 | 0.892   |
| Sugarcane    | ane     | 0.351 | 0.323 | 0.359 | 0.327 | 0.087 | 0.054 | 0.104 | 0.107 | 0.121 | 0.285 | 0.192 | 0.205 | 2.515   |
| Coconut      | ıı      | 0.293 | 0.269 | 0.301 | 0.271 | 0.112 | 0.072 | 0.197 | 0.241 | 0.265 | 0.348 | 0.247 | 0.264 | 2.880   |
|              |         |       |       |       |       |       |       |       |       |       |       |       |       |         |

Table 3.4.12 (a): Land Use Coefficients for Tirumanimuttar Sub-basin

| (1)         (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)           1         kh.Paddy         0.50         1.00         1.00         1.00         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                   | S  | Name of crop  | Jun  | Jul             | Aug  | Sep  | Oct   | Nov  | Dec  | Jan  | Feb  | Mar  | Apr   | May  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|---------------|------|-----------------|------|------|-------|------|------|------|------|------|-------|------|
| kh.Paddy         0.50         1.00         1.00         1.00         0.50         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         | €  | (2)           | (3)  | <del>(</del> 4) | (5)  | (9)  | (7)   | (8)  | (6)  | (10) | (11) | (12) | ([])  | (†1) |
| kh.Ragi         1.00         1.00         1.00         0.45         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00          | _  | kh. Paddy     | 0.50 | 1.00            | 1.00 | 1.00 | 1.00  | 0.50 | 00.0 | 0.00 | 0.00 | 0.00 | 00.00 | 00'0 |
| kh.Ragi         1.00         1.00         0.32         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00          | 2  | kh. Jowar     | 0.53 | 1.00            | 1.00 | 1.00 | 0.45  | 0.00 | 00'0 | 0.00 | 0.00 | 0.00 | 00'0  | 00.0 |
| Fodder         0.53         1.00         1.00         1.00         0.45         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         < | 3  | kh.Ragi       | 1.00 | 1.00            | 0.32 | 00.0 | 00.00 | 0.00 | 00.0 | 0.00 | 00.0 | 0.00 | 00.0  | 0.84 |
| Tobacco         0.53         1.00         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00          | 4  | Fodder        | 0.53 | 1.00            | 1.00 | 1.00 | 0.45  | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 00.0  | 00.0 |
| Pulses         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00           Fruits & veg.         0.00         0.00         0.00         0.00         1.00         1.00         1.00         0.00           Ground nut         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00           Sugarcane         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | S. | Tobacco       | 0.53 | 1.00            | 1.00 | 1.00 | 00.00 | 0.00 | 00.0 | 0.00 | 0.00 | 0.00 | 00.0  | 00.0 |
| Fruits & veg.         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         0.00         0.00           Ground nut         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         | 9  | Pulses        | 0.00 | 0.00            | 00.0 | 00.0 | 0.00  | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 00.0  | 00.0 |
| Ground nut 0.00 0.00 0.00 0.00 0.00 0.00 1.00 1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1  | Fruits & veg. | 00.0 | 0.00            | 0.00 | 0.00 | 1.00  | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 00.0  | 0.00 |
| 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ∞  | Ground nut    | 0.00 | 0.00            | 0.00 | 00.0 | 00.00 | 0.00 | 00.0 | 1.00 | 1.00 | 1.00 | 1.00  | 00.0 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6  | Sugarcane     | 1.00 | 1.00            | 1.00 | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 |

Table 3.4.12 (b): Crop Water Requirements for Tirumanimuttar Sub-basin

| اجا  |              |      |          |           |         |        | _       |        |               | _          |           |
|------|--------------|------|----------|-----------|---------|--------|---------|--------|---------------|------------|-----------|
| • •  | Total        | (15) | 1.808    | 0.059     | 0.055   | 0.059  | 0.037   | 0.811  | 0.498         | 1.144      | 096.1     |
| Onit | May          | (14) | 000'0    | 0.000     | 0.015   | 0.000  | 0.000   | 0.000  | 0.000         | 0.000      | 0.000     |
|      | Apr          | (13) | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.000  | 0.000         | 0.093      | 0.262     |
|      | Mar          | (12) | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.240  | 0.000         | 0.489      | 0.421     |
|      | Feb          | (11) | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.328  | 0.000         | 0.390      | 0.372     |
|      | Jan          | (10) | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.194  | 0.106         | 0.172      | 0.263     |
|      | Dec          | (6)  | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.049  | 0.255         | 0.000      | 0.355     |
|      | Nov          | (8)  | 0.000    | 0.000     | 0.000   | 0.000  | 0.000   | 0.000  | 0.127         | 0.000      | 0.201     |
|      | Oct          | (7)  | 0.440    | 000'0     | 0.000   | 0.000  | 0.000   | 0.000  | 0.010         | 0.000      | 0.027     |
|      | Sep          | (9)  | 0.399    | 0.021     | 0.000   | 0.021  | 0.007   | 0.000  | 0.000         | 0.000      | 0.020     |
|      | Aug          | (5)  | 0.402    | 0.020     | 0.000   | 0.020  | 0.015   | 0.000  | 0.000         | 0.000      | 0.014     |
|      | Jul          | (4)  | 0.398    | 0.015     | 810.0   | 0.015  | 0.012   | 0.000  | 000'0         | 0.000      | 0.012     |
|      | Jun          | (3)  | 0.169    | 0.003     | 0.022   | 0.003  | 0.003   | 0.000  | 0.000         | 000'0      | 0.013     |
|      | Name of crop | (2)  | kh Paddy | kh. Jowar | kh.Ragi | Fodder | Tobacco | Pulses | Fruits & veg. | Ground nut | Sugarcane |
|      | NS           | (E)  | 1        | 2         | m       | 4      | 5       | 9      | 7             | ∞          | 6         |

Table 3.4.13 (a): Land Use Coefficients for Ponnanai Ar Sub-basin

| 0.53 1.00 1.00 1.00 0.45 0.00 0.00 0.00                                  | 0.50 1.00 1.00 1.00 1.00 0.50 0.50 0.00                                                                                                                                                                                                                                                                                                                                                                                                                  | (7) (8) (9) (10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Oct Nov Dec Jan                                                                                                                                                                                                                                                                                                                             | (13) 000 000 000 000 000 000 000 000 000 0 | 100000000000000000000000000000000000000 |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|-----------------------------------------|
| a 1.00 1.00 0.32 0.00 0.00 0.00 0.00 0.00 0.00 0                         | ar         0.53         1.00         1.00         1.00         0.45         0.00           i         1.00         1.00         0.32         0.00         0.00         0.00           o         0.53         1.00         1.00         1.00         0.45         0.00           o         0.53         1.00         1.00         0.00         0.00         0.00           o         0.53         1.00         1.00         1.00         0.00         0.00 | dy         0.50         1.00         1.00         1.00         1.00         0.50           ar         0.53         1.00         1.00         1.00         0.45         0.00           i         1.00         1.00         0.32         0.00         0.00         0.00           a         0.53         1.00         1.00         1.00         0.45         0.00           a         0.53         1.00         1.00         1.00         0.00         0.00           a         0.53         1.00         1.00         0.00         0.00         0.00 | (2) (3) (4)<br>dy 0.50 1.00<br>ar 0.53 1.00<br>j 1.00 1.00<br>0.53 1.00<br>0.63 1.00                                                                                                                                                                                                                                                        | 0.00 0.00 1.00                             | 0.00 0.00 1.00                          |
| 1.00 1.00 0.32 0.00 0.00 0.00 0.00<br>0.53 1.00 1.00 1.00 0.45 0.00 0.00 | ar 0.53 1.00 1.00 1.00 0.45 0.00 0.00 1.00 1.00 0.00 0.00 0.00 0.0                                                                                                                                                                                                                                                                                                                                                                                       | dy     0.50     1.00     1.00     1.00     1.00     0.50     0.00       ar     0.53     1.00     1.00     1.00     0.00     0.00     0.00       i     0.53     1.00     1.00     1.00     0.00     0.00     0.00                                                                                                                                                                                                                                                                                                                                    | (3)         (4)         (5)         (6)         (7)         (8)           0.50         1.00         1.00         1.00         0.50           0.53         1.00         1.00         0.45         0.00           1.00         1.00         0.00         0.00         0.00           0.53         1.00         1.00         0.45         0.00 | 0.00                                       | 0.00                                    |
| 100 100 000 000 000 000                                                  | 1.00 1.00 1.00 1.00 0.00 0.00 0.00 0.00                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.50 1.00 1.00 1.00 0.50 0.50 0.00 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (2) (3) (4) (5) (6) (7) (8) (9) (10)<br>0.50 1.00 1.00 1.00 0.50 0.00 0.00<br>0.53 1.00 1.00 1.00 0.45 0.00 0.00                                                                                                                                                                                                                            | 0.00                                       | 0.00                                    |
|                                                                          | 0.53 1.00 1.00 1.00 0.45 0.00 0.00 0.00                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.50 1.00 1.00 1.00 0.50 0.50 0.00 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | (2) (3) (4) (5) (6) (7) (8) (9)<br>0.50 1.00 1.00 1.00 0.50 0.00<br>0.53 1.00 1.00 1.00 0.45 0.00 0.00                                                                                                                                                                                                                                      |                                            |                                         |

Table 3.4.13 (b): Crop Water Requirements for Ponnanai Ar Sub-basin

|     |               |       |       |       |       |       |       |       |       |       |       |       | Cuit  | : Meter |
|-----|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| SN  | Name of crop  | Jun   | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   | Jan   | Feb   | Mar   | Apr   | May   | Total   |
| (1) | (2)           | (3)   | (4)   | (5)   | (9)   | 3     | (8)   | (6)   | (10)  | (11)  | (12)  | (13)  | (14)  | (15)    |
| -   | kh.Paddy      | 0.169 | 0.398 | 0.402 | 0.399 | 0.440 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 000'0 | 1.808   |
| 2   | kh.Jowar      | 0.003 | 0.015 | 0.020 | 0.021 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0,000 | 0.000 | 0000  | 0.059   |
| 8   | kh.Ragi       | 0.022 | 0.018 | 0000  | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.015 | 0.055   |
| 4   | Fodder        | 0.003 | 0.015 | 0.020 | 0.021 | 000.0 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 000'0 | 0.059   |
| 5   | Tobacco       | 0.003 | 0.012 | 0.015 | 0.007 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 000'0 | 0.037   |
| 9   | Pulses        | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.049 | 0.194 | 0.328 | 0.240 | 0.000 | 000'0 | 0.811   |
| 7   | Fruits & vcg. | 0.000 | 0.000 | 0.000 | 0.000 | 0.010 | 0.127 | 0.255 | 0.106 | 0.000 | 0.000 | 0.000 | 0.000 | 0.498   |
| 8   | Ground nut    | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.172 | 0.390 | 0.489 | 0.093 | 0.000 | 1.144   |
| 6   | Sugarcane     | 0.013 | 0.012 | 0.014 | 0.020 | 0.027 | 0.201 | 0.355 | 0.263 | 0.372 | 0.421 | 0.262 | 0.000 | 1.960   |
|     |               |       |       |       |       |       |       |       |       |       |       |       |       |         |

Table 3.4.14 (a): Land Use Coefficients for Upper Coleroon Sub-basin

| Jun  | Jul                       | Aug  | Sep   | Oct   | Nov  | Dec   | Jan  | Feb   | Mar  | Apr  | May  |
|------|---------------------------|------|-------|-------|------|-------|------|-------|------|------|------|
| (3)  | <del>(</del> <del>1</del> | (5)  | (9)   | (7)   | (8)  | 6)    | (10) | (11)  | (12) | (13) | (14) |
| 0.50 | 1.00                      | 1.00 | 1.00  | 1.00  | 0.50 | 00.0  | 00.0 | 00.0  | 00.0 | 0.00 | 0.00 |
| 0.53 | 1,00                      | 1.00 | 1.00  | 0.45  | 0.00 | 00.00 | 00.0 | 00.0  | 00.0 | 0.00 | 0.00 |
| 1.00 | 1.00                      | 0.32 | 00.00 | 00.00 | 00.0 | 00.00 | 00.0 | 00.0  | 00.0 | 0.00 | 0.84 |
| 0.53 | 1,00                      | 1.00 | 1.00  | 0.45  | 0.00 | 00.0  | 0.00 | 00.0  | 00.0 | 0.00 | 0.00 |
|      | 1.00                      | 1.00 | 1.00  | 00'0  | 0.00 | 00.00 | 00.0 | 00.0  | 00.0 | 0.00 | 0.00 |
|      | 0.00                      | 00.0 | 00.0  | 00.0  | 0.00 | 1.00  | 1.00 | 00.1  | 1.00 | 0.00 | 0.00 |
| 0.00 | 0.00                      | 00.0 | 00.0  | 1.00  | 1.00 | 1.00  | 1.00 | 00.00 | 00.0 | 0.00 | 0.00 |
| 00'0 | 0.00                      | 0.00 | 00.00 | 00'0  | 0.00 | 00.00 | 1.00 | 1.00  | 1.00 | 1.00 | 0.00 |
| 00.1 | 1.00                      | 1.00 | 1.00  | 1.00  | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00 |

Table 3.4.14 (b): Crop Water Requirements for Upper Coleroon Sub-basin

|              |                                                              |                                                                                                                                                                                                                                                                                                                                 | ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| Total        | (15)                                                         | 1.808                                                                                                                                                                                                                                                                                                                           | 0.059                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.055                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.059                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0.037                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.811                                                                                                                                                                                                                                                                                                                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| Sep          | (9)                                                          | 0.399                                                                                                                                                                                                                                                                                                                           | 0.021                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Aug          | (5)                                                          | 0.402                                                                                                                                                                                                                                                                                                                           | 0.020                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Jul          | (4)                                                          | 0.398                                                                                                                                                                                                                                                                                                                           | 0.015                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Jun          | (3)                                                          | 0.169                                                                                                                                                                                                                                                                                                                           | 0.003                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Name of crop | (2)                                                          | kh.Paddy                                                                                                                                                                                                                                                                                                                        | kh.Jowar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               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|              | Name of crop Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dec         Jan         Feb         Mar         Apr         May           (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14) | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dec         Jan         Feb         Mar         Apr         May           (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (11)         (12)         (13)         (14)           kh.Paddy         0.169         0.398         0.402         0.399         0.440         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000        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cropJunJulAugSepOctNovDecJanFebMarAprMay(2)(3)(4)(5)(6)(7)(8)(9)(10)(11)(12)(13)(14)kh.Paddy0.1690.3980.4020.03990.4400.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000.0000. | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dec         Jan         Feb         Mar         Apr         May           Kh.Paddy         (3)         (4)         (5)         (6)         (7)         (8)         (10)         (11)         (12)         (13)         (14)           Kh.Paddy         0.169         0.398         0.402         0.399         0.440         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000 | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dec         Jan         Feb         Mar         Apr         May           (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14)           kh.Paddy         0.169         0.399         0.440         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000 | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dec         Jan         Feb         Mar         Apr         May           kh.Paddy         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14)           kh.Paddy         (0.169)         (0.402)         (0.399)         (0.440)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000)         (0.000) | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dec         Jan         Feb         Mar         Apr         May           Kh.Paddy         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14)           Kh.Paddy         0.169         0.398         0.402         0.399         0.440         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000 | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dec         Jan         Feb         Mar         Apr         May           (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14)           kh.Paddy         0.169         0.398         0.440         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000 | Name of crop         Jun         Jul         Aug         Sep         Oct         Nov         Dcc         Jan         Feb         Mar         Apr         May           (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14)           kh.Paddy         0.169         0.398         0.440         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000         0.000 |

Table 3.4.15 (a): Land Use Coefficients for Lower Coleroon Sub-basin

| (3) (4) (5)<br>0.50 1.00 1.00<br>0.53 1.00 1.00<br>1.00 1.00 0.32<br>0.53 1.00 1.00<br>0.53 1.00 1.00<br>0.00 0.00 0.00<br>1.00 0.00 0.00<br>1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | S | Name of crop  | Jun   | Jul  | Aug   | Sep  | Oct  | Nov   | Dec   | Jan   | Feb   | Mar   | Apr   | May  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---------------|-------|------|-------|------|------|-------|-------|-------|-------|-------|-------|------|
| 0.50         1.00         1.00         1.00         1.00         0.50         0.00         0.00           0.53         1.00         1.00         1.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.                                                                                                                                                                                                            | Ξ | (2)           | (3)   | (4)  | (5)   | (9)  | (2)  | (8)   | (6)   | (10)  | (11)  | (12)  | (13)  | (14) |
| 0.53         1.00         1.00         0.45         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00 <th< th=""><th>_</th><th>kh.Paddy</th><th>0.50</th><th>1.00</th><th>1.00</th><th>1.00</th><th>1.00</th><th>0.50</th><th>00.0</th><th>00.0</th><th>00.00</th><th>00.00</th><th>0.00</th><th>00'0</th></th<> | _ | kh.Paddy      | 0.50  | 1.00 | 1.00  | 1.00 | 1.00 | 0.50  | 00.0  | 00.0  | 00.00 | 00.00 | 0.00  | 00'0 |
| 1.00       1.00       0.32       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       0.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00       1.00                                                                                                                                                                                                                                                                                               | 2 | kh. Jowar     | 0.53  | 1.00 | 1.00  | 1.00 | 0.45 | 00.00 | 00.0  | 00.00 | 00.00 | 00.0  | 0.00  | 0.00 |
| 0.53         1.00         1.00         1.00         0.45         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 3 | kh.Ragi       | 1.00  | 1.00 | 0.32  | 0.00 | 0.00 | 00.0  | 00.00 | 00.00 | 00.00 | 00.0  | 00'0  | 0.84 |
| 8.         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1                                                                                                                                                                                                    | 4 | Fodder        | 0.53  | 1.00 | 1.00  | 1.00 | 0.45 | 00.00 | 00.00 | 00.0  | 00.00 | 0.00  | 00.0  | 00'0 |
| g.         0.00         0.00         0.00         0.00         0.00         1.00         1.00         1.00           g.         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00           1.00         1.00         1.00         1.00         1.00         1.00         1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5 | Tobacco       | 0.53  | 1.00 | 1.00  | 1.00 | 0.00 | 00.0  | 00.0  | 00.0  | 00.00 | 00.00 | 0.00  | 00'0 |
| g.         0.00         0.00         0.00         0.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1.00         1                                                                                                                                                                                                    | 9 | Pulses        | 00'0  | 0.00 | 00'0  | 0.00 | 0.00 | 00.00 | 1.00  | 1.00  | 1.00  | 1.00  | 00.00 | 00'0 |
| 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 7 | Fruits & veg. | 00'0  | 00'0 | 00.0  | 0.00 | 1.00 | 00.1  | 1.00  | 1.00  | 00.00 | 00.00 | 00.00 | 00'0 |
| 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ∞ | Ground nut    | 00.00 | 00.0 | 00.00 | 0.00 | 0.00 | 00.0  | 00.0  | 1.00  | 1.00  | 00'1  | 1.00  | 0.00 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6 | Sugarcane     | 1.00  | 1.00 | 1.00  | 1.00 | 1.00 | 1.00  | 1.00  | 1.00  | 1.00  | 00.1  | 00'1  | 1.00 |

Table 3.4.15 (b): Crop Water Requirements for Lower Coleroon Sub-basin

| Meter | Total        | (15)            | 1.808    | 0.059    | 0.055   | 0.059   | 0.037   | 0.811  | 0.498         | 1.144      | 1.960     |
|-------|--------------|-----------------|----------|----------|---------|---------|---------|--------|---------------|------------|-----------|
| Unit  | May          | (14)            | 0.000    | 0.000    | 0.015   | 0.000   | 0.000   | 0.000  | 0.000         | 0.000      | 0.000     |
|       | Apr          | (13)            | 0.000    | 0.000    | 0.000   | 0.000   | 0.000   | 0.000  | 0.000         | 0.093      | 0.262     |
|       | Mar          | (12)            | 0.000    | 00000    | 0.000   | 0.000   | 0.000   | 0.240  | 0.000         | 0.489      | 0.421     |
|       | Feb          | (11)            | 0.000    | 0.000    | 0.000   | 0.000   | 0.000   | 0.328  | 0.000         | 0.390      | 0.372     |
|       | Jan          | (10)            | 0.000    | 0.000    | 0.000   | 0.000   | 0.000   | 0.194  | 0.106         | 0.172      | 0.263     |
|       | Dec          | (6)             | 0.000    | 0.000    | 0.000   | 0.000   | 0.000   | 0.049  | 0.255         | 0.000      | 0.355     |
|       | Nov          | (8)             | 0.000    | 0.000    | 0.000   | 0.000   | 0.000   | 0.000  | 0.127         | 0.000      | 0.201     |
|       | Oct          | 8               | 0,440    | 0.000    | 0.000   | 0.000   | 0.000   | 0.000  | 0.010         | 0.000      | 0.027     |
|       | Sep          | (9)             | 0.399    | 0.021    | 0.000   | 0.021   | 0.007   | 0.000  | 00000         | 0.000      | 0.020     |
|       | Aug          | (5)             | 0.402    | 0.020    | 0.000   | ~ 0.020 | 0.015   | 0.000  | 0.000         | 0.000      | 0.014     |
| H     | Jul          | (4)             | 0.398    | 0.015    | 0.018   | 0.015   | 0.012   | 0.000  | 0.000         | 0.000      | 0.012     |
|       | Jun          | (3)             | 0.169    | 0.003    | 0.022   | 0.003   | 0.003   | 0.000  | 0.000         | 0,000      | 0.013     |
|       | Name of crop | (2)             | kh.Paddy | kh Jowar | kh Ragi | Fodder  | Tobacco | Pulses | Fruits & veg. | Ground nut | Sugarcane |
|       | Z.           | $\widehat{\Xi}$ | -        | 2        | 3       | 4       | 3       | 9      | 7             | ∞          | 6         |

Table 3.4.16 (a): Land Use Coefficients for Cauvery Delta Sub-basin

| SN       | Name of crop  | Jun   | Jul  | Aug  | Sep  | Oct  | Nov  | Dec  | Jan  | Feb   | Mar  | Apr   | May  |
|----------|---------------|-------|------|------|------|------|------|------|------|-------|------|-------|------|
| Ξ        | (2)           | (3)   | (4)  | (5)  | (9)  | (7)  | (8)  | (6)  | (10) | (11)  | (12) | (13)  | (14) |
| _        | kh.Paddy      | 0.50  | 1.00 | 1.00 | 1.00 | 1.00 | 0.50 | 00.0 | 0.00 | 0.00  | 0.00 | 00.00 | 0.00 |
| 2        | kh. Jowar     | 0.53  | 1.00 | 1.00 | 1.00 | 0.45 | 0.00 | 00.0 | 00.0 | 00.0  | 0.00 | 00'0  | 0.00 |
| 3        | kh.Ragi       | 1.00  | 1.00 | 0.32 | 0.00 | 0.00 | 0.00 | 00.0 | 0.00 | 00.0  | 0.00 | 00'0  | 0.84 |
| ব        | Fodder        | 0.53  | 1.00 | 1.00 | 1.00 | 0.45 | 0.00 | 00.0 | 0.00 | 00.00 | 0.00 | 00.00 | 0.00 |
| 5        | Tobacco       | 0.53  | 1.00 | 1.00 | 1.00 | 0.00 | 0.00 | 00.0 | 0.00 | 00.0  | 0.00 | 00'0  | 0.00 |
| 9        | Pulses        | 00.0  | 00.0 | 0.00 | 00.0 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00  | 1.00 | 00.0  | 0.00 |
| 7        | Fruits & veg. | 0.00  | 0.00 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00  | 0.00 | 00.00 | 0.00 |
| <b>∞</b> | Ground nut    | 00.00 | 00.0 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 1.00  | 1.00 | 1.00  | 0.00 |
| 6        | Sugarcane     | 1.00  | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00  | 1.00 | 1.00  | 1.00 |

Table 3.4.16 (b): Crop Water Requirements for Cauvery Delta Sub-basin

| Meter        |       | (CT)     | 1.808    | 0.059    | 0.055   | 0.059  | 0.037   | 0.811  | 0.498         | 1.144      | 1.960     |  |
|--------------|-------|----------|----------|----------|---------|--------|---------|--------|---------------|------------|-----------|--|
| <u>.</u>     | +     | $\dashv$ | $\dashv$ |          |         |        | 0.000   |        |               | 0.000      | 0.000     |  |
| Apr          | : 1:  | (CI)     | 0.000    | 0.000    | 0.000   | 0.000  | 0.000   | 0.000  | 0.000         | 0.093      | 0.262     |  |
| Mar          | (6)   | (71)     | 0.000    | 0.000    | 0.000   | 0.000  | 0.000   | 0.240  | 0.000         | 0.489      | 0.421     |  |
| Feb          | (11)  | (11)     | 0.000    | 0.000    | 0.000   | 0.000  | 0.000   | 0.328  | 0.000         | 0.390      | 0.372     |  |
| Ian          | (10)  | (10)     | 0.000    | 0.000    | 0.000   | 0.000  | 0.000   | 0.194  | 0.106         | 0.172      | 0.263     |  |
| Dec          | (6)   | (2)      | 0.000    | 0.000    | 0.000   | 0.000  | 0.000   | 0.049  | 0,255         | 0.000      | 0.355     |  |
| Nov          | 10/   | (0)      | 0.000    | 0.000    | 0.000   | 0.000  | 0.000   | 0.000  | 0.127         | 0.000      | 0.201     |  |
| Oct          | 5     | $\Xi$    | 0.440    | 0.000    | 0.000   | 0.000  | 0.000   | 0.000  | 0.010         | 0.000      | 0.027     |  |
| Sen          | 4 (9) | <u>(</u> | 0.399    | 0.021    | 0.000   | 0.021  | 0.007   | 0.000  | 0.000         | 0.000      | 0.020     |  |
| Ang          | (4)   | (2)      | 0.402    | 0.020    | 0.000   | 0.020  | 0.015   | 0.000  | 0.000         | 0.000      | 0.014     |  |
| 3            | *     | £)       | 0.398    | 0.015    | 0.018   | 0.015  | 0.012   | 0.000  | 00000         | 0.000      | 0.012     |  |
| Linn         | (5)   | (c)      | 0.169    | 0.003    | 0.022   | 0.003  | 0.003   | 0.000  | 0.000         | 0.000      | 0.013     |  |
| Name of cron | dana  | (7)      | kh.Paddy | kh Jowar | kh Ragi | Fodder | Tobacco | Pulses | Fruits & veg. | Ground nut | Sugarcane |  |
| 2            | 5 5   | (1)      | 1        | 2        | 3       | 4      | ς.      | 9      | 7             | ∞          | 6         |  |

Table 3.5(a): Monthly 75%, 50%, 90%, 100% Dependable Surface Water Yields as per Observed Yields in Upper Cauvery, Kabini and Shimsha Sub-Basins

| Month   |        | Upper Cauvery |       |       |        | Kabini | u i    |        |        | Shimsha | sha    |        |
|---------|--------|---------------|-------|-------|--------|--------|--------|--------|--------|---------|--------|--------|
| INDINIT | 75%    | 20%           | %06   | 100%  | 75%    | %0\$   | %06    | %001   | 75%    | 20%     | %06    | 100%   |
| (1)     | (2)    | (3)           | (4)   | (5)   | (9)    | (C)    | (8)    | (6)    | (01)   | (11)    | (12)   | (13)   |
| Jun     | 470    | 607.90        | 350.4 | 303.7 | 407.6  | 368.2  | 349.7  | 120    | 15.47  | 19.07   | 12.64  | 7.92   |
| Jul     | 1359.6 | 2204.70       | 994   | 882.7 | 783.4  | 231.2  | 492.1  | 376.8  | 9.65   | 11.89   | 7.89   | 4.94   |
| Aug     | 792.1  | 479.40        | 400.9 | 291.1 | 388.3  | 1014.2 | 541.4  | 336.6  | 12.25  | 15.10   | 10,01  | 6.27   |
| Sep     | 9'095  | 384,30        | 551.6 | 508.7 | 960.3  | 1111   | 244    | 217.5  | 81.68  | 109.93  | 72.89  | 45.66  |
| Oct     | 288.7  | 955.10        | 815.7 | 395.3 | 1080.9 | 490    | 598    | 191.3  | 320.33 | 394.85  | 261.81 | 164.02 |
| Nov     | 216.1  | 297.10        | 426.4 | 191   | 795.3  | 122.8  | 194.1  | 282.4  | 127.2  | 156.79  | 103.96 | 65.13  |
| Dec     | 9'99   | 24.00         | 95.4  | 0     | 34.6   | 24.2   | 9.44   | 32.1   | 16.1   | 19.85   | 13.16  | 8.24   |
| Jan     | 13.6   | 0.00          | 26.5  | 0     | 41.3   | 0      | 12.9   | 15.1   | 0.5    | 0.62    | 0.41   | 0.26   |
| Feb     | 4.8    | 30.30         | 7.5   | 26    | 8.6    | 0      | 10.8   | 7.1    | 0.12   | 0.15    | 0.10   | 90'0   |
| Mar     | 40.9   | 130.90        | 6.0   | 0     | 41.5   | 0      | 94     | 40.4   | 0.25   | 0.31    | 0.20   | 0.13   |
| Apr     | 468.4  | \$68.60       | 517.6 | 186.5 | 284.4  | 75.4   | 143.5  | 89.5   | 3.65   | 4.50    | 2.98   | 1.87   |
| May     | 615.8  | 636.30        | 640.7 | 325.9 | 360.4  | 938.9  | 314.5  | 243.5  | 24.39  | 30.06   | 19.93  | 12.49  |
| Total   | 5177   | 6230.3        | 4840  | 3150  | 5188.6 | 4376.0 | 3039.5 | 1982.3 | 616.06 | 763.00  | 506.0  | 317    |
|         |        |               |       |       |        |        |        |        |        |         |        |        |

Table 3.5 (b): Monthly 75%, 50%, 90%, 100% Dependable Surface Water Yields as per Observed Yields in Arkavathi, Middle Cauvery and Suvarnavathi Sub-Basins

|       |       | Arkavathi | vathi |       |        | Middle Cauvery | auvery |       | 5    | Suvamavathi | avathi |       |
|-------|-------|-----------|-------|-------|--------|----------------|--------|-------|------|-------------|--------|-------|
| Month | 75%   | 20%       | %06   | 100%  | 75%    | 20%            | %06    | 7001  | 75%  | 20%         | %06    | 100%  |
| (1)   | (2)   | (3)       | (4)   | (5)   | (9)    | (1)            | (8)    | (6)   | (01) | -(II)       | (12)   | (13)  |
| Jun   | 10.10 | 13.69     | 7.14  | 4.33  | 0.96   | 1.14           | 0.80   | 0.55  | 1.55 | 3.88        | 0.41   | 00.0  |
| Jul   | 7,49  | 10.15     | 5.30  | 3.21  | 17.69  | 21.01          | 14.74  | 10.13 | 3.08 | 7.70        | 0.81   | 00'0  |
| Aug   | 13.80 | 18.70     | 9.76  | 5.91  | 46.15  | 54.82          | 38.46  | 26.43 | 1.67 | 4.18        | 0.44   | 00.0  |
| Sep   | 44'66 | 134.78    | 70.34 | 42.62 | 81.7   | 97.15          | 68.15  | 46.84 | 9.58 | 23.95       | 2.52   | 00.00 |
| Oct   | 90.23 | 122.30    | 63.82 | 38.67 | 72.69  | 86.35          | 60.58  | 41.63 | 9.5  | 23.75       | 2.50   | 0.00  |
| Nov   | 36.94 | 50.07     | 26.13 | 15.83 | 71.73  | 85.21          | 59.78  | 41.08 | 9.62 | 24.05       | 2.53   | 00.0  |
| Dec   | 66.6  | 13.54     | 7.07  | 4.28  | 21.86  | 25.97          | 18.22  | 12.52 | 0.52 | 1.30        | 0.14   | 00'0  |
| Jan   | 3.93  | 5.33      | 2.78  | 1.68  | 8.14   | 19.6           | 6.78   | 4.66  | 90.0 | 0.15        | 0.02   | 00.0  |
| Fcb   | 2.55  | 3.46      | 1.80  | 1.09  | 4.71   | 5.60           | 3.93   | 2.70  | 0.5  | 0.50        | 0.05   | 0.00  |
| Mar   | 1.92  | 2.60      | 1.36  | 0.82  | 2.06   | 2.45           | 1.72   | 1.18  | 0.11 | 0.28        | 0.03   | 00.0  |
| Apr   | 2.81  | 3.81      | 1.99  | 1.20  | 1:6:0  | 1.12           | 0.78   | 0.54  | 0.48 | 1.20        | 0.13   | 00'0  |
| May   | 7.8   | 10.57     | 5.52  | 3.34  | 1.28   | 1.52           | 1.07   | 0.73  | 1.63 | 4.08        | 0.43   | 00.0  |
| Total | 287.0 | 389.00    | 203.0 | 123.0 | 329.90 | 392.0          | 275.0  | 189.0 | 38   | 95.00       | 10.00  | 0.00  |

Table 3.5 (c): Monthly 75%, 50%, 90%, 100% Dependable Surface Water Yields as per Observed Yields in Palar, Chinnar and Bhavani Sub-Basins

| ) ( 4). |        | Pa    | Palar |       |        | Chinnar | ाअर   |       |        | Bhavani | ani.     |           |
|---------|--------|-------|-------|-------|--------|---------|-------|-------|--------|---------|----------|-----------|
| Month   | 75%    | 20%   | %06   | %001  | 75%    | 20%     | %06   | %001  | 75%    | 20%     | %06      | 100%      |
| (1)     | (2)    | (3)   | (4)   | (5)   | (9)    | (7)     | (8)   | (6)   | (01)   | (11)    | (12)     | (13)      |
| Jun     | 98.6   | 16.06 | 92.9  | 1.69  | 10.28  | 12.65   | 7.64  | 2.93  | 154.59 | 247.00  | 99.38457 | 53.68981  |
| Jul     | 20.75  | 33.80 | 14.23 | 3.56  | 3.21   | 3.95    | 2.39  | 0.92  | 373.01 | 214.00  | 8800.89  | 79.4668   |
| Aug     | 26.03  | 42.40 | 17.85 | 4.46  | 3.75   | 4.62    | 2.79  | 1.07  | 266.43 | 223.00  | 218.0085 | 135.1451  |
| Sep     | 28.71  | 46.76 | 19.69 | 4.92  | 78.95  | 97.17   | 58.71 | 22.52 | 142.67 | 252.00  | 125.6709 | 94.41.746 |
| Ö       | 7.4    | 12.05 | 5.07  | 1.27  | 107.38 | 132.16  | 79.85 | 30.63 | 209.17 | 387.00  | 136.9684 | 79,98234  |
| Nov     | 0.25   | 0.41  | 0.17  | 0.04  | 72.39  | 89.10   | 53.83 | 20.65 | 259.74 | 207.00  | 134,6753 | 157.3133  |
| Dec     | 3.86   | 6.29  | 2.65  | 99.0  | 14.65  | 18.03   | 10.89 | 4,18  | 150.77 | 166.00  | 189,0935 | 52.29048  |
| Jan     | 2.88   | 4.69  | 1.97  | 0.49  | 4.55   | 5.60    | 3.38  | 1.30  | 81.43  | 101.00  | 226.2299 | 264.2511  |
| Feb     | 1.73   | 2.82  | 1.19  | 0.30  | 3.05   | 3.75    | 2.27  | 0.87  | 70.09  | 133.00  | 143.1764 | 46.76684  |
| Mar     | 1.56   | 2.54  | 1.07  | 0.27  | 3.3    | 4.06    | 2.45  | 0.94  | 70.18  | 221.00  | 15.82771 | 40.9486   |
| Apr     | 0.17   | 0.28  | 0,12  | 0.03  | 2.45   | 3.02    | 1.82  | 0.70  | 56.48  | 97.00   | 51.0066  | 26.88173  |
| May     | 1.79   | 2.92  | 1.23  | 0.31  | 8.04   | 06.6    | 5.98  | 2.29  | 80.73  | 201.00  | 104.9215 | 186.2572  |
| Total   | 104.99 | 171.0 | 71.99 | 18.00 | 312    | 384.0   | 232.0 | 89.00 | 1915.3 | 2444.0  | 1512.972 | 1218      |

Table 3.5 (d): Monthly 75%, 50%, 90%, 100% Dependable Surface Water Yields as per Observed Yields in Noyil, Amaravathi and Tirumanimuttar Sub-Basins

| Month   |        | Noyil  | Įį.    |        |        | Amaravathi | vathi    |          |        | Tirunanimuttar | muttar |        |
|---------|--------|--------|--------|--------|--------|------------|----------|----------|--------|----------------|--------|--------|
| IUIIOIM | 75%    | 20%    | %06    | %001   | 75%    | 20%        | %06      | 100%     | 75%    | 20%            | %06    | 100%   |
| (I)     | (2)    | (3)    | (4)    | (5)    | (9)    | (7)        | (8)      | (6)      | (01)   | (11)           | (12)   | (13)   |
| Jun     | 0.38   | 0.40   | 0.36   | 0.34   | 63.22  | 34.40      | 50.98738 | 45.65145 | 1.10   | 1.88           | 1.06   | 96'0   |
| Jul     | 1.15   | 1.20   | 1.09   | 1,03   | 119.79 | 26.60      | 67,90921 | 42.0942  | 3.30   | 5.63           | 3.17   | 2.87   |
| Aug     | 00'0   | 0.00   | 0.00   | 00.00  | 138.83 | 56.30      | 92.62633 | 91.85343 | 00.00  | 00'0           | 00.0   | 00'0   |
| Sep     | 5.90   | 6.14   | 5.59   | 5.27   | 76.90  | 261.50     | 94.22384 | 97.27401 | 17.00  | 29.02          | 16.35  | 14.80  |
| Oct     | 116.69 | 121.36 | 110.46 | 104,24 | 108.14 | 164,00     | 64.25563 | 69.70528 | 336.57 | 574.61         | 323.62 | 293.02 |
| Nov     | 63.20  | 65.73  | 59.83  | 56.46  | 147.26 | 219.60     | 9666.991 | 56.40792 | 182.30 | 311.23         | 175.29 | 158.71 |
| Dec     | 37.69  | 39.20  | 35.68  | 33.67  | 103.90 | 48.70      | 69.59548 | 32.43879 | 108.70 | 185.58         | 104.52 | 94.64  |
| Jan     | 00.0   | 0.00   | 00'0   | 00.00  | 35.75  | 100.90     | 48.25089 | 50.18272 | 00.00  | 0.00           | 0.00   | 00.0   |
| Feb     | 00.00  | 00'0   | 0.00   | 00.00  | 13.09  | 4.80       | 5.236301 | 34,42916 | 00.00  | 00.0           | 00'0   | 0.00   |
| Mar     | 00.00  | 0.00   | 0.00   | 00.00  | 9.22   | 42.60      | 6.079435 | 7.961478 | 00.0   | 0.00           | 0.00   | 00'0   |
| Apr     | 00.0   | 0.00   | 0.00   | 00'0   | 12.50  | 49.10      | 33.607   | 32,48113 | 00.00  | 0.00           | 00.0   | 00.0   |
| May     | 0.00   | 0.00   | 0.00   | 00.00  | 24.64  | 99.50      | 105.229  | 81.01227 | 00.00  | 00.0           | 0.00   | 00.0   |
| Total   | 225.01 | 234.0  | 213.00 | 201.0  | 853.2  | 1108.00    | 805.00   | 641.4918 | 648.97 | 1108.00        | 624.00 | 565.00 |
|         |        |        |        |        |        |            |          |          |        |                |        |        |

Table 3.5 (e): Monthly 75%, 50%, 90%, 100% Dependable Surface Water Yields as per Observed Yields in Ponnanai Ar, Upper Cleroon, Lower Coleroon and Cauvery Delta Sub-Basins

|       |       | Ponnani Ar | ni Ar  |       |       | Upper Coleroon | oleroon |       | 1      | Lower Coleroon | olcroon |       |         | Cauver | Cauvery Delta |          |
|-------|-------|------------|--------|-------|-------|----------------|---------|-------|--------|----------------|---------|-------|---------|--------|---------------|----------|
|       | 75%   | %0\$       | %06    | 100%  | 75%   | 20%            | %06     | 100%  | 75%    | 20%            | %06     | %001  | 75%     | %0\$   | %06           | 100%     |
| Ξ     | (2)   | (3)        | (4)    | (5)   | (9)   | (7)            | (8)     | (6)   | (10)   | (11)           | (12)    | (13)  | (14)    | (15)   | (91)          | (17)     |
| Jun   | 2.31  | 2.91       | 1.94   | 0.77  | 7.29  | 9.15           | 5.86    | 2.35  | 5.8    | 6.87           | 4.30    | 1.66  | 26.86   | 41.72  | 15.05858      | 4.959871 |
| Ju]   | 2.31  | 2.91       | 1.94   | 0.77  | 35.94 | 45.09          | 28.87   | 11.57 | 15.2   | 25.85          | 11.27   | 4.36  | 70.45   | 109.43 | 39.49653      | 13.00904 |
| Aug   | 3.08  | 3.89       | 2.58   | 1.03  | 51.05 | 64.05          | 41.01   | 16.44 | 33.93  | 17.73          | 25.17   | 9.74  | 157.17  | 244.14 | 88.11453      | 29.02244 |
| Sep   | 22.33 | 28.18      | 18.71  | 7.48  | 92.59 | 116.17         | 74.39   | 29.82 | 41.66  | 70.86          | 30.90   | 11.96 | 193.02  | 299.83 | 108.2132      | 35.64238 |
| Oct   | 35.54 | 44.84      | 129.TJ | 11.91 | 82.18 | 103.11         | 66.02   | 26.46 | 33.89  | 57.64          | 25.14   | 9.73  | 157     | 243.88 | 88.01923      | 28.99105 |
| Nov   | 66.03 | 83.32      | 55.31  | 22.13 | 165.9 | 208.15         | 133.3   | 53.43 | 28.88  | 49.12          | 21.42   | 8.29  | 133.78  | 207.81 | 75.00135      | 24.70333 |
| Dec   | 26.4  | 33.31      | 22.12  | 8.85  | 93.55 | 117.37         | 75.16   | 30.13 | 32.64  | 55.52          | 24.21   | 9.37  | 152.2   | 236.42 | 85.32819      | 28.1047  |
| Jan   | 9.27  | 11.70      | 7.77   | 3.11  | 21.63 | 27.14          | 17.38   | 6.97  | 11.66  | 19.83          | 8.65    | 3.35  | 54.08   | 84.01  | 30.31898      | 9.986217 |
| Feb   | 8.53  | 10.76      | 7.15   | 2.86  | 13.25 | 16.62          | 10.64   | 4.27  | 5.34   | 80.6           | 3.96    | 1.53  | 24.77   | 38.48  | 13.88686      | 4.573939 |
| Mar   | 5.56  | 7.02       | 4.66   | 1.86  | 10.71 | 13.44          | 8.60    | 3.45  | 5.42   | 9.22           | 4.02    | 1.56  | 25.17   | 39.10  | 14.11111      | 4.647801 |
| Apr   | 2.36  | 2.98       | 1.98   | 0.79  | 5.78  | 7.25           | 4.64    | 1.86  | 6.72   | 11.43          | 4.98    | 1.93  | 31.17   | 48.42  | 17.4749       | 5.75574  |
| May   | 7.28  | 9.19       | 6.10   | 2.44  | 10.13 | 12.71          | 8.14    | 3.26  | 5.38   | 9.15           | 3.99    | 1.54  | 24.96   | 38.77  | 13.99338      | 4.609023 |
| Total | 161   | 241.0      | 160.0  | 64.00 | 590   | 739.0          | 474.0   | 190.0 | 226.52 | 381.0          | 168.0   | 65.0  | 1050.63 | 1632.0 | 589           | 194.0    |

|         |                                       | ,      |                         |          |                              |                                          |                                   | (         | *                                       |                                          |                                    |              |                                 |
|---------|---------------------------------------|--------|-------------------------|----------|------------------------------|------------------------------------------|-----------------------------------|-----------|-----------------------------------------|------------------------------------------|------------------------------------|--------------|---------------------------------|
|         |                                       | Geolog | Geological area         |          |                              |                                          |                                   | Cron      | Ground Water                            |                                          |                                    |              |                                 |
| SI. No. | State/District &<br>Name of sub-basin | whole  | within the<br>sub-basin | Factor % | Total replenishable resource | Provision for dome stic & industrial use | Available resource for imiga-tion | Net draft | Total<br>repleni-<br>shable<br>resource | Provision for dome stic & industrial use | Available resource for irriga-tion | Net<br>draft | Balance<br>for<br>future<br>use |
|         | 2                                     | n      | **                      | 5        | . 9                          | 7                                        | 8                                 | 6         | 10                                      | 11                                       | 12                                 | 13           | 14                              |
| 1       | Upper cauvery sub-basin               |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Karnataka                             |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Chikmangalur                          | 7201   | 714                     | 9.92     | 590.5                        | 88.6                                     | 501.9                             |           | 58.5                                    | 8.8                                      |                                    | 3.1          | 46.7                            |
|         | Kodagu                                | 4102   | 2515                    | 64.12    | 504.7                        | 75.7                                     | 429.0                             | 47.0      |                                         | 48.5                                     | 275.1                              | 30.1         | 244.9                           |
|         | Hassan                                | 6814   | 4369                    | 61.31    | 165.9                        | 24.9                                     | 141.0                             | 11.0      | 101.7                                   | 15.3                                     | 86.5                               | 6.7          | 79.7                            |
|         | Mandya                                | 4961   | 965                     | 19.45    | 790.6                        | 118.6                                    | 672.0                             | 78.0      | 153.8                                   | 23.1                                     | 130.7                              | 15.2         | 115.5                           |
| . —     | Mysore                                | 11594  | 2056                    | 17.20    | 812.9                        | 121.9                                    | 691.0                             | 158.0     | 139.8                                   | 21.0                                     | 118.8                              | 27.2         | 91.7                            |
| -       | Total                                 |        | 10619                   |          |                              |                                          |                                   |           | 777.5                                   | 116.6                                    | 8.099                              | 82.3         | 578.5                           |
| 2       | Kabini sub-basin                      |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Karnataka                             |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Kodagu                                | 4102   | 151                     | 3.68     | 165.9                        | 24.9                                     | 141.0                             | 11.0      |                                         | 6.0                                      | 5.2                                | 0.4          | 4.8                             |
|         | Mysore                                | 11954  | 4757                    | 39.79    | 812.9                        | 121.9                                    | 691.00                            | 158.0     | 323.5                                   | 48.5                                     | 275.0                              | 62.9         | 212.1                           |
|         | Kcrala                                |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Cannanore                             | 4958   | 18                      | 0.36     | 733.1                        | 110.0                                    | 623.1                             |           |                                         | 0.4                                      | 2.3                                | 0.3          | 2.0                             |
|         | kozhikode                             | 2345   | 29                      | 1.24     | 423.1                        | 63.5                                     | 359.6                             | 118.3     | 5.2                                     | 0.8                                      | <b>ਹ</b> ੋਂ                        | 1.5          | 2.9                             |
|         | Wyanad                                | 2132   | 1873                    | 87.85    | 424,6                        | 63.7                                     | 360.9                             | 178.0     | 373.0                                   | 56.0                                     | 317.0                              | 156.4        | 160.6                           |
|         | Tamilnadu                             |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Niligiris                             | 2549   | 212                     | 8.32     | 58.0                         | 8.7                                      | 49.3                              | 1.6       | 4.8                                     | 0.7                                      | 4.1                                | 0.1          | 4.0                             |
|         | Total                                 |        | 7040                    |          |                              |                                          |                                   |           | 715.3                                   | 107.3                                    | 608.0                              | 221.6        | 386.4                           |
| 3       | Shimsha sub-basin                     |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Karnataka                             |        |                         |          |                              |                                          |                                   |           |                                         |                                          |                                    |              |                                 |
|         | Bangalore                             | 5008   | 1344                    | 16.79    | 763.5                        | 114.5                                    |                                   | 4         | 128.2                                   | 19.2                                     | 109.0                              | 79.8         | 29.2                            |
|         | Hassan                                | 6814   | 527                     | 7.73     | 504.7                        | 75.7                                     | 429.0                             | 47.0      | 39.0                                    | 5.9                                      |                                    |              | 29.5                            |
|         | Mandya                                | 4961   | 2750                    | 55.43    | 790.6                        | 118.6                                    | 672.0                             | 78.0      | 438.2                                   | 65.7                                     | 372.5                              | 43.2         | 329,3                           |
|         | Mysore                                | 11954  | 49                      | 0.41     | 812.9                        | 121.9                                    | 691.0                             | 158.0     | 3,3                                     | 0.5                                      |                                    |              | 2.2                             |
|         | Turnkur                               | 10598  | 3799                    | 35.85    | 895.3                        | 134.3                                    | 761.0                             | 438.0     | 320.9                                   | 48.1                                     | 272.8                              | 157.0        | 115.8                           |
|         | Total                                 |        | 8469                    |          |                              |                                          |                                   |           | 929.7                                   | 139.5                                    |                                    | 790.3 284.3  | 606.0                           |

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|   | Table 3.6(b): Ground Water Potential |
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| SuperDistrict   SuperDistrict   SuperDistrict   SuperDistriction   S |         |                                       | Geolog            | Geological area         |          |                             |                                           |                                      | Gr        | Ground Water                |                                           | į                                    |          | ,                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|---------------------------------------|-------------------|-------------------------|----------|-----------------------------|-------------------------------------------|--------------------------------------|-----------|-----------------------------|-------------------------------------------|--------------------------------------|----------|-----------------------|
| Column   C | SI. No. | State/District/&<br>Name of sub-basin | whole<br>district | within the<br>sub-basin | Factor % | Total<br>repleni-<br>shable | Provision<br>for domestic &<br>industrial | Available<br>resource<br>for irriga- | Net draft | Total<br>repleni-<br>shable | Provision<br>for domestic &<br>industrial | Available<br>resource<br>for irriga- |          | Balance<br>for future |
| Actionatity are bearin   Actionatity and actionate   Actionatity   Actiona |         |                                       |                   | 1                       |          | resource                    | use                                       | -tion                                |           | resource                    | nsc                                       | -tion                                |          | S S                   |
| Managalore   Section   According   Section   | -       | 2                                     | 3                 | 4                       | 5        | 9                           | 7                                         | ∞                                    | 6         | 10                          | =                                         | 12                                   | -23      | 4                     |
| Kontactela         8805         4109         51.33         76.35         144.5         64.90         475.0         391.8         333.1         24.88           Kolaratela         Rolaratela         82023         4109         51.33         76.35         118.6         672.0         475.0         10.0         1.2         4.6         4.6           Mandya         4561         6.0         1.7         1.74         118.4         770.5         683.1         471.0         0.6         1.2         4.6           Inallindu         4561         1.4         1.74         118.4         173.2         981.5         648.5         20.0         3.0         170.1         11.1           Incial         Middle centrery and-basin         4561         1.148         23.14         790.6         118.6         672.0         78.0         182.9         27.4         15.3         48.1         17.1           Advancing         4561         1.163.4         1.20         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4         1.10.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 7       | Arkavathi sub-basin                   |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          | ļ                     |
| Sampolece   Sacratic   Sacratic |         | Karnataka                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| Name                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         | Bangalore                             | 8008              | 4109                    | _        | 763.5                       | 114.5                                     |                                      |           |                             |                                           |                                      | 243.8    | 89.3                  |
| Manidya         4961         69         139         790.6         118.6         672.0         78.0         11.0         1.7         94         1.1           Tamilhadu         9622         167         1.74         11547         11547         173.2         981.5         648.5         20.0         3.0         17.0         11.3           Dammapuri         9622         167         1.74         11547         11547         173.2         981.5         648.5         20.0         3.0         17.0         11.3           Mondya         4961         1148         2.3.4         790.6         118.6         672.0         78.0         182.9         13.0         17.0         11.3           Mandya         4961         11954         152.8         12.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0         18.0 <th></th> <th>Kolar</th> <th>8223</th> <th>9</th> <th>0.07</th> <th>803.6</th> <th>120.5</th> <th></th> <th>471.0</th> <th></th> <th></th> <th>9.9</th> <th>4.6</th> <th>7</th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         | Kolar                                 | 8223              | 9                       | 0.07     | 803.6                       | 120.5                                     |                                      | 471.0     |                             |                                           | 9.9                                  | 4.6      | 7                     |
| Tamilandu   Total   Tamilandu   Total   Tota |         | Mandya                                | 4961              | 69                      | 1.39     | 790.6                       | 118.6                                     |                                      |           |                             |                                           | 9.4                                  | <u>-</u> | 8.3                   |
| Domingpuri   Dom |         | Tamilnadu                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           | 3                                    |          |                       |
| Total   Middle causery sub-basin   4551   1   1   1   1   1   1   1   1   1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         | Dharmapuri                            | 9622              | 191                     | 1.74     | 1154.7                      | 173.2                                     |                                      |           |                             |                                           | 17                                   | 11.3     | 5.8                   |
| Middle cauvery sub-basin         4         1         Middle cauvery sub-basin         6         1         8         1         8         1         8         1         8         1         1         8         1         1         8         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Total                                 |                   | 4351                    |          |                             |                                           |                                      |           | 423.5                       |                                           |                                      | 256.5    | 103.5                 |
| Karnatika         Mandya         1148         23.14         790.6         118.6         672.0         78.0         182.9         27.4         155.5         18.0         137.5           Mysorde         1193.4         152.8         12.8         812.9         121.9         691.0         158.0         133.9         13.5         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2 <th< th=""><th>5</th><td>Middle cauvery sub-basin</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>,</td><td></td><td></td><td></td><td></td></th<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 5       | Middle cauvery sub-basin              |                   |                         |          |                             |                                           |                                      |           | ,                           |                                           |                                      |          |                       |
| Mandya         4961         1148         23.14         79.06         118.6         672.0         78.0         182.9         27.4         155.5         18.01/35         18.01/35         18.01/35         15.5         18.01/35         18.02/681         19.04         155.6         18.9         27.4         155.5         18.01/35         15.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681         19.02/681                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         | Karnataka                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      | •        |                       |
| Mysore training to the training tr                      |         | Mandya                                | 4961              | 1148                    | 23.14    | 9.067                       | 118.6                                     |                                      |           |                             |                                           |                                      | 18.0     | 137.5                 |
| Total Elements   Lotal Elements   Lota |         | Mysore                                | 11954             | 1528                    | 12.78    | 812.9                       | 121.9                                     |                                      |           |                             |                                           |                                      |          | 68.1                  |
| Suvornavalti sub-basin         Suvornavalti sub-basin         Remarka         11954         1207         10.1         812.9         1219         691.0         158.0         82.1         12.3         69.8         16.0           Tanilinadu         Tanilinadu         8209         580.0         7.07         1232.8         184.9         1047.9         904.5         87.1         13.1         74.0         63.9           Periyar         Rarnatka         1787         7.07         1232.8         184.9         1047.9         904.5         87.1         13.8         79.9           Periyar         Rarnatka         11954         187.0         15.64         812.9         121.9         691.0         158.0         124.7         140.2         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7         124.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Total                                 |                   | 2676                    |          |                             |                                           |                                      |           | 286.9                       |                                           |                                      |          | 205.6                 |
| Karmataka         Kormataka         Kormataka         11954         1207         10.1         812.9         121.9         691.0         158.0         82.1         12.3         69.8         16.0           Total         Total         10.1         812.9         10.1         812.9         10.47.9         904.5         87.1         13.1         74.0         63.9           Feriyar         Romataka         11954         1870         15.64         812.9         10.47.9         904.5         87.1         13.8         79.9           Karmataka         11954         1870         15.64         812.9         121.9         691.0         158.0         127.2         19.1         108.1         24.7           Farmataka         Mysore         11954         18.7         123.2         123.2         124.2         24.7         14.0         120.9           Salem         8650         247         2.86         1736.7         260.5         146.2         176.0         49.7         7.4         42.2         50           Salem         8650         247         2.86         1736.7         260.5         146.2         176.0         49.7         7.4         42.2         50.3         14.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 9       | Suvarnavathi sub-basin                |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| Mysore         11954         1207         10.1         812.9         121.9         691.0         158.0         82.1         12.3         69.8         16.0           Familiadu         Patient         8209         580.0         7.07         1232.8         184.9         1047.9         904.5         87.1         13.1         74.0         63.9           Total         Patier sub-basin         Ramataka         11954         187.0         15.64         812.9         121.9         691.0         158.0         127.2         10.1         108.1         24.7           Mysione         11954         187.0         15.64         812.9         121.9         691.0         158.0         127.2         10.1         108.1         24.7           Mysione         8509         1097         13.36         123.2         121.9         691.0         156.0         120.9         120.0         120.1         120.9           Salem         8650         24.7         2.86         1736.7         260.5         1446.2         176.0         497.7         74         42.2         50.3           Chinal sale         8005         100         1.23.5         114.5         649.5         475.0         95.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         | Karnataka                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| Tamilnadu         Tamilnadu         Feriyar         13.1         74.0         63.9           Periyar         Periyar         1787         7.07         1232.8         184.9         1047.9         904.5         87.1         13.1         74.0         63.9           Portyar         Total         Ramataka         11954         1870         15.64         812.9         121.9         691.0         158.0         127.2         19.1         108.1         24.7           Karnataka         Mysore         11954         1870         13.6         123.2         121.9         691.0         158.0         127.2         19.1         108.1         24.7           Periyar         8209         1097         13.6         123.2         184.9         1047.9         904.5         164.7         24.7         24.7         120.9           Salem         3214         2.86         1736.7         2.60.5         1476.2         176.0         49.7         24.2         290.3         150.6           Chinnar sub-basin         8005         100         1.25         763.5         114.5         648.5         435.6         65.3         370.3         244.7         1           Tamilinadu         8650                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Mysore                                | 11954             | 1207                    | 10.1     | 812.9                       | 121.9                                     |                                      |           |                             |                                           |                                      |          | 53.8                  |
| Periyar         Periyar         1232.8         184.9         1047.9         904.5         87.1         13.1         74.0         63.9           Total         Total         Total         1787         1232.8         184.9         1047.9         904.5         87.1         13.1         74.0         63.9           Full sub-basin         Kamataka         Mysore         11954         1870         15.64         812.9         121.9         691.0         188.0         127.2         19.1         108.1         24.7           Ferryar         Responsable         1097         13.36         1232.8         184.9         1047.9         904.5         164.7         24.7         140         120.9           Salem         8650         24.7         2.86         1736.7         260.5         1476.2         176.0         49.7         74.2         25.0         150.9           Chinnar sub-basin         8005         100         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         59.3           Tamillandu         8650         33.0         37.73         1154.7         981.5         648.5         435.6         65.3         370.3         244.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         | Tanijinadu                            |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      | _1       |                       |
| Total         Total         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         1787         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Periyar                               | 8200              | 580.0                   | 7.07     | 1232.8                      | 184.9                                     | ı                                    |           |                             |                                           |                                      |          | 10                    |
| Karnataka         Karnataka         11954         1870         15.64         812.9         121.9         691.0         158.0         127.2         19.1         108.1         24.7           Mysoce         Tamilnadu         8209         1097         13.36         1232.8         184.9         1047.9         904.5         164.7         24.7         140         120.9           Salem         8650         24.7         2.86         1736.7         260.5         1476.2         176.0         49.7         7.4         42.2         5.0           Salem         8650         24.7         2.86         1736.7         260.5         1476.2         176.0         49.7         7.4         42.2         5.0           Karnataka         8005         100         1.25         76.3         114.5         649.5         475.0         95.5         1.4         42.2         5.0           Bangalore         8005         100         1.25         76.3         114.5         648.5         435.6         65.5         65.5         65.5         65.5         65.5         65.5         67.7         1           Total         8650         33.1         38.3         1736.7         260.5         1476.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         | Total                                 |                   | 1787                    |          |                             |                                           |                                      |           | 169.2                       |                                           |                                      | J        | 63.9                  |
| Karnataka         Holoset         11954         1870         15.64         812.9         121.9         691.0         158.0         127.2         19.1         108.1         24.7           Mysore         Tamilnadu         8209         1097         13.36         123.28         184.9         1047.9         904.5         164.7         24.7         140.1         120.9           Salem         8650         247         2.86         1736.7         260.5         1476.2         176.0         497.7         7.4         422.9         5.0           Chinnar sub-basin         8005         100         1.25         763.5         114.5         649.7         475.0         9.5         1.4         8.1         5.9           Ramapun         9622         3630         37.73         1154.7         260.5         1476.2         176.0         66.5         65.3         370.3         244.7         1           Salem         8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         65.3         370.3         1           Chial         4061         4061         475.0         511.6         651.6         160.3         1736.7         1736.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 7       | Palar sub-basin                       |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| Mysore         11954         1870         15.64         812.9         121.9         691.0         158.0         127.2         19.1         108.1         24.7           Tamilnadu         Beriyar         8209         1097         13.36         123.28         184.9         1047.9         904.5         164.7         24.7         140         120.9           Periyar         8650         247         2.86         1736.7         260.5         1476.2         176.0         49.7         7.4         42.2         5.0           Salem         8650         247         2.86         1736.7         260.5         1476.2         176.0         49.7         7.4         42.2         5.0           Karnataka         8005         100         1.25         763.5         114.5         649.5         475.0         9.5         1.4         8.1         5.9           Tamilnadu         9622         3630         37.73         1154.7         260.5         1476.2         176.0         66.5         66.5         66.5         66.5         67.7         434.9         257.3         1           Tamilnadu         9622         331         3.83         1736.7         260.5         1476.2         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         | Karnataka                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| Tamilnadu         Periyar         Ralem         8209         1097         13.36         1232.8         184.9         1047.9         904.5         164.7         24.7         140         120.9           Salem         8650         247         2.86         1736.7         260.5         1476.2         176.0         49.7         7.4         42.2         50.3         150.6         1           Chinnar sub-basin         Karnataka         8005         100         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Karnataka         Bangalore         8005         100         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Tamilnadu         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           Salem         4061         4061         66.5         176.0         66.5         160.5         176.7         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Mysore                                | 11954             | 1870                    | 15.64    | 812.9                       | 121.9                                     |                                      |           | 127.2                       |                                           | 108.1                                | 24.7     | 83.4                  |
| Periyar         8209         1097         13.36         1232.8         184.9         1047.9         904.5         164.7         24.7         140         120.9           Salem         8650         247         2.86         1736.7         260.5         1476.2         176.0         49.7         7.4         42.2         5.0           Chinnar sub-basin         Chinnar sub-basin         8005         160         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Bangalore         8005         160         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Tanillaadu         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           Salem         8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         76.7         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         | Tamilnadu                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| Salem         8650         247         2.86         1736.7         260.5         1476.2         176.0         49.7         7.4         42.2         5.0           Total         Total         3214         2.86         1736.7         114.5         649         475.0         49.7         7.4         42.2         5.0           Karnataka         Bangalore         8005         100         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Panilhadu         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           Salem         4061         4061         3.83         1736.7         476.2         176.0         66.5         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |         | Periyar                               | 8209              | 1097                    | 13.36    | 1232.8                      | 184.9                                     |                                      |           |                             | Z                                         |                                      | <u> </u> | 19.2                  |
| Total         3214         3214         3214         341.5         51.2         290.3         150.6         1           Chinnar sub-basin         Karnataka         8005         100         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Bangalore         8005         160         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Tamilnadu         9622         3530         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           Salem         8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         56.5         67         7         743.4         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         | Salem                                 | 8650              | 247                     | 2.86     | 1736.7                      | 260.5                                     |                                      |           |                             |                                           |                                      |          | 37.1                  |
| Chinnar sub-basin         Chinnar sub-basin         Chinnar sub-basin         Chinnar sub-basin         649         475.0         9.5         1.4         8.1         5.9           Karnataka Bangalore         8005         160         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           Tamilnadu         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           Salem         8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         56.5         67.         76.7         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         | Total                                 |                   | 3214                    |          |                             |                                           |                                      |           | 341.5                       |                                           |                                      |          | 139.7                 |
| traka         8005         10         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           nadu         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           apuni         8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         56.5         67           4061         4061         36.5         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | *       | Chinnar sub-basin                     |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| lore         8005         10         1.25         763.5         114.5         649         475.0         9.5         1.4         8.1         5.9           madu         nadu         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           appuri         8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         56.5         6.7         1           4061         4061         36.5         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         | Karnataka                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| nadu         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           apuri         8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         56.5         6.7         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         | Bangalore                             | 8005              | 001                     | 1.25     | 763.5                       | 114.5                                     |                                      |           |                             | -                                         |                                      | 5.9      | 2.2                   |
| Lapturi         9622         3630         37.73         1154.7         173.2         981.5         648.5         435.6         65.3         370.3         244.7         1           8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         56.5         6.7         6.7           4061         4061         36.5         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |         | Tamilnadu                             |                   |                         |          |                             |                                           |                                      |           |                             |                                           |                                      |          |                       |
| 8650         331         3.83         1736.7         260.5         1476.2         176.0         66.5         10         56.5         6.7           4061         4061         434.9         257.3         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | •       | Dharmapuri                            | 9622              | 3630                    | 37.73    | 1154.7                      | 173.2                                     |                                      |           |                             | 9                                         |                                      | _        | 125.6                 |
| 4061 511.6 76.7 434.9  257.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |         | Salem                                 | 8650              | 331                     | 3.83     | 1736.7                      | 260.5                                     |                                      |           |                             |                                           |                                      |          | 49.8                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         | Total                                 |                   | 4061                    |          |                             |                                           |                                      |           | 511.6                       |                                           |                                      |          | 177.6                 |

Balance for future use 29.0 68.0 308.0 10.7 84.6 13.0 11.5 21.3 **8**.4 17.0 140.5 14.1 43.1 35.2 54.2 28.1 184.1 187.7 350.1 7 3.2 93.3 197.0 81.8 12.4 13.1 107.5 719.8 6.6 379.5 291.2 183.2 1039.9 184.0 583.3 199.3 Net draft 383.4 13.9 226.8 94.7 23.9 345.4 94.4 107.4 315.2 36.4 **567.2** 29.5 162.3 345.6 212.3 891.4 21.5 124.6 860.5 resource for irriga-Available 7 for domestic & industrial 18.9 55.6 6.4 5.2 3.8 22.0 151.8 67.7 245.3 2.4 40.0 16.7 4.2 61.0 28.6 61.0 37.5 25.0 157.3 16.7 00.1 Provision nse Table 3.6(c): Ground Water Potential for Cauvery River Basin in India. **Ground Water** repleni-shable 16.3 126.3 370.8 42.8 406.4 34.8 25.3 266.9 111.4 191.0 451.0 11.1.1 667.3 249.7 1012.3 10-48.7 resource 166.7 Total 9 78.6 158 695.1 904.5 904.5 984.6 695.1 597.4 904.5 695.1 19.2 984.6 479.2 904.5 1235.1 984.6 Net 800.3 1122.0 1047.9 752.8 800.3 800.3 1047.9 1893.8 1893.8 691 389.3 893.8 788.6 1047.9 1476.2 Available resource for irriga-tion 49.3 ∞ Provision for domestic & industrial 132.8 121.9 141.2 141.2 184.9 334.2 141.2 198.0 184.9 139.2 184.9 260.5 334.2 184.9 334.2 68.7 8.7 941.5 1320.0 1232.8 2228.0 1232.8 812.9 885.6 941.5 1232.8 58.0 941.5 2228 458.0 927.8 2228.0 Total repleni-shable resource 28.34 12.54 13.42 30.08 73.79 9.04 7.59 20.28 30.80 20.26 2.01 7.48 2.73 11.89 58.29 20.24 Factor % 742 140 2999 240 1002 2469 1881 6154 1515 3888 1663 830 976 5042 2246 562 2117 384 8280 165 within the sub-basin Scological area 11095 11954 4480 7469 7469 12624 8209 1095 7491 8241 2549 8209 8650 5061 11095 whole district Tirumanimuttar sub-basin State/District/ & Name of sub-basin Amaravathi sub-basin Bhavani sub-basin Noyil sub-basin Dindugal Anna inuchirappalli **firuchirappalli** iruchirappalli Lamilnadu Coimbatore Coimbatore Camilnadu Familnadu Karnataka Combatore **Familnadu Tanijnadu** Niligins Madurai Mysore Palghat Periyar Kerala envar Kerala Periyar Periyar dukki Salem Total Fotal Total Total SI. No. 30 1 77 0

|         |                                       | Geolog            | Geological area         |             |                                         |                                              |                                   | F            | Ground Water                            |                                          |                                    |              |                                 |
|---------|---------------------------------------|-------------------|-------------------------|-------------|-----------------------------------------|----------------------------------------------|-----------------------------------|--------------|-----------------------------------------|------------------------------------------|------------------------------------|--------------|---------------------------------|
| SI. No. | State/District/&<br>Name of sub-basin | whole<br>district | within the<br>sub-basin | Factor<br>% | Total<br>repleni-<br>shable<br>resource | Provision<br>for dome<br>suc &<br>industrial | Available resource for imiga-tion | Net<br>draft | Total<br>replení-<br>shable<br>resource | Provision for dome stic & industrial use | Available resource for irriga-tion | Net<br>draft | Balance<br>for<br>future<br>use |
|         | 2                                     | 3                 | 4                       | 'n          | 9                                       | 7                                            | ∞                                 | 6            | 2                                       | 11                                       | 12                                 | 13           | 14                              |
| 13      | Pounanai Ar sub-basin                 |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Tamilnadu                             |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Madurai                               | 12624             | 24                      | 0.19        | 1320.0                                  | 0.861                                        | 1122.0                            | 597.4        | 2.5                                     | . 0.4                                    | 2.1                                |              | 1:0                             |
|         | Pudukkottai                           | 4661              | 486                     | 10.43       | 1181.0                                  | 177.2                                        | 1003.9                            | 235.0        | 123.1                                   | 5.81                                     | 104.7                              | 24.5         | 80.2                            |
|         | Thanjavur                             | 8280              | 3                       | 0.04        | 1631.6                                  | 244.7                                        | 1386.9                            |              | 9.0                                     | 0.1                                      | 0.5                                | 0.7          | 0.3                             |
|         | Tiruchirappalli                       | 11095             | 1537                    | 13.85       | 2228.0                                  | 334.2                                        | 1893.8                            | 984.6        | 308.6                                   | 46.3                                     | 262.3                              | 136.4        | 126.0                           |
|         | Total                                 |                   | 2050                    |             |                                         |                                              |                                   |              | 434.9                                   | 65.2                                     | 369.7                              | 162.2        | 207.4                           |
| 14      | Upper coleroon sub-basin              |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Tamilnadu                             |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Tiruchirappalli                       | 11095             | 3080                    | 27.76       | 2228.0                                  | 334.2                                        | 1893.8                            | 984.6        | 618.5                                   | 92.8                                     | 525.7                              | 273.3        | 252.4                           |
|         | Thanjavur                             | 8280              | 2                       | 0.02        | 1631.6                                  | 224.7                                        | 1386.9                            | 580.9        | 0.4                                     | 0.1                                      | 6.0                                | 0.1          | 0.2                             |
|         | Total                                 |                   | 3082                    |             |                                         |                                              |                                   |              | 618.8                                   | 92.8                                     | 526.0                              | 273.4        | 252.6                           |
| 15      | Lower coleroon sub-basin              |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Tamilnadu                             |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Tiruchirappalli                       | 11095             | 522                     | 4.70        | 2228                                    | 334.2                                        | 1893.8                            | 984.6        | 104.8                                   | 15.7                                     | 89.1                               | 46.3         |                                 |
|         | Thanjavur                             | 8280              | 144                     | 1.74        | 1631.6                                  | 244.7                                        | 6'98E1                            |              | 28.4                                    | 4.3                                      |                                    | 10.1         | 14.0                            |
|         | South Arcot                           | 10895             | 712                     | 6.54        | 4218.1                                  | 632.7                                        | 3585.4                            | 2608.8       | 275.7                                   | 41.3                                     | 234.3                              | 170.5        | 63.8                            |
|         | Total                                 |                   | 1378                    |             |                                         |                                              |                                   |              | 408.9                                   | 61.3                                     | 347.5                              | 226.9        | 120.6                           |
| 91      | Cauvery Delta sub-basin               |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Tamilnadu                             |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Pudukkottai                           | 4661              | 144                     | 3.09        | 1181.0                                  | 177.2                                        | 1003.9                            |              | 36.5                                    | 5.5                                      |                                    | 7.3          | 23.8                            |
|         | Thanjavur                             | 8280              | 1915                    | 23.13       | 1631.6                                  | 244.7                                        | 6.9861                            | 580.9        | 377.4                                   | 56.6                                     |                                    | 134.4        | 186.4                           |
|         | Nagappatti                            | 4664              | 4269                    | 91.53       | 590.6                                   | 88.6                                         | 502.0                             | 500.3        | 540.6                                   | 81.1                                     | 459.5                              | 457.9        | 1.6                             |
|         | nam Quaid-E-Millad                    |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    | 1            |                                 |
|         | Tiruchirappalli                       | 11095             | 68                      | 08.0        | 2228.0                                  | 334.2                                        | 1893.8                            | 984.6        | 17.9                                    | 2.7                                      | 15.2                               | 7.9          | 7.3                             |
|         | Pondecherry                           |                   |                         |             |                                         |                                              |                                   |              |                                         |                                          |                                    |              |                                 |
|         | Karaikal                              | 492               | 149                     | 30.28       | 28.8                                    | 4.3                                          | 24.5                              | 0.9          | 8.7                                     | 1.3                                      | 7.4                                | 1.8          | 5.6                             |
|         | Total                                 |                   | 9959                    |             |                                         |                                              |                                   |              | 981.0                                   | 147.2                                    | 833.9                              | 609.3        | 224.6                           |
|         | Grand total Canvery basin.            |                   |                         |             |                                         |                                              |                                   |              | 10356.5                                 | 1553.5                                   | 8803                               | 4936.5       | 3866.5                          |

#### WATER BALANCE STUDIES OF CAUVERY RIVER BASIN

#### 4.1 GENERAL

In India, rainfall is confined to the monsoon season and is unevenly distributed both in space and time even during the monsoon season. As a result, frequent droughts and floods affect the country's economy. It is necessary to harness the water resources in a most scientific and efficient manner. Cauvery river basin often faces shortage of water resulting in a longstanding dispute between the upper riparian state of Karnataka and lower riparian state of Tamilnadu. Therefore the water balance studies for different sub-basins and the Cauvery basin as a whole are necessary to quantify the requirements in the sub-basins and the basin as a whole. The monthly water balance technique includes, the assessment of the water yield in the sub basin/basin, quantification of existing uses, and reasonable requirements of basin states in the foreseeable future and the determination of order of surplus/deficits. Such a study is attempted here and the procedure is given in this chapter for the "Kabini sub-basin of the Cauvery River basin in India" and the same procedure is adopted for all the 16 sub-basins, and by adding all the 16-sub-basins, the order of surplus/deficit for Cauvery river basin as a whole is determined for 75%, 50%. 90%, and 100% water year dependable flows as given in this chapter.

#### 4.2 WATER BALANCE OF A RIVER BASIN

For overall assessment of the water balance of a river basin, availability of both surface water and ground water is required to be assessed. To establish the

surplus/deficit in a river basin with reasonable reliability, it is necessary to take into consideration, the total availability of water, the present water utilizations and the utilization, which could possibly be made in the foreseeable future.

The following steps are involved in the surface water and ground water balance of a river basin at the specified site:

- (i) Fill in the missing discharge data, if any.
- (ii) Check the consistency of discharge data.
- (iii) Estimate the regeneration from the upstream water utilisation.
- (iv) Then, the virgin flow is given byVirgin flow = observed flow + upstream water utilizations.
- (v) Derive rainfall-runoff relations for the monsoon period on monthly basis and use the relation for finding run-off from the rainfall record.
- (vi) Calculate the non-monsoon run-off as a percent of the monsoon run-off.
- (vii) Calculate the 75% water year dependable flow/yield from the catchment.
- (viii) Estimate ground water availability based on annual replenishment.
- (ix) Calculate the future projections of human and live stock populations for the year; for which, the water resources planning is being done.
- environmental water requirements with the given guidelines as follows, on the basis of guidelines of NWDA, for water balance studies.
  - (a) Irrigation Water requirements

Existing: As per projects reports, designed,

Ongoing: As per projects reports, designed,

Future: (as per norms of NWDA)

Major projects (irrigation intensity 150 %) water depth in m.

Medium projects (irrigation intensity 125 %) water depth in m.

Minor project (irrigation intensity 100 %) water depth in m.

(b) Domestic water requirements

Urban: 200 liters/day/capita

Rural: 70 liters/day/capita,

Live stock: 50 liters/day/capita

(c) Industrial Water Requirements

As the adequate data is not available about the industries, the water needs are calculated on the same basis as those for domestic. Industrial water is supplied from the surface water.

- (d) Hydropower Water Requirements

  The evaporation loss from the reservoirs should be estimated and added to the consumptive uses. Evaporation losses from the reservoirs: (i) Existing and ongoing reservoirs: (as per actual);

  (ii) Proposed: (20% of utilizable water).
- (e) Environmental Water Requirements

  The monthly/annual environmental water requirements in this study are considered as 1% of the monthly/annual surface water inflows/yields in the sub-basin/basin.
- (xi) Determine the import of water from other basins and the export of water to other sub-basins/basins, both with respect to the basin under consideration.
- (xii) Finally the water balance at the specified site is done in the following manner: -

Water balance = [(The 75% water year dependable flow/yield + Ground water availability + Regeneration + Imports) -(Export + Total water needs)].

(iii) The water balance will be determined by the surplus or the deficit in the basin/sub-basins at that specified site.

## 4.3 A SAMPLE WATER BALANCE OF KABINI SUB - BASIN

The Kabini river is one of the tributaries of the river Cauvery in its upper-reach in South India. The Kabini sub-basin lies between north latitudes 11° 29' and 12° 20' and east longitudes 75° 48' and 75° 54'. The Kabini river rises in the Western Ghats at an elevation of about 2140 m above mean sea level in the Wyand district of Kerala state.

#### 4.3.1 Basin Hydrology

#### 4.3.1.1 Surface water availability

The data of 49-rain gauge stations out of the 52 stations, in and around catchment up to the T. Narsipur G&D site has been considered. The catchment of the sub-basin also being the same as that of the T. Narsipur G&D site, the values of weighted average yearly monsoon rainfall of the sub-basin /up to the T.Narsipur G&D site for the period from 1901-02 to 1985-86 have been computed by Thiessen polygon method.

#### 4.3.1.2 Rainfall and runoff data

For computations of the yield, the rainfall and runoff data is required. As per the Kabini sub-basin NWDA report, there are 18 G&D sites and 1 gauge site in the sub-basin, inflow data of 4 reservoirs and 1 Anicut are also available. The discharge data of

T.Narasipur G&D site has been considered for the hydrological studies as it covers the entire catchment of Kabini sub-basin and also better method of observation is followed at this site. The monthly-observed yield data at T.Narasipur G&D site for the period from 1971-72 to 1985-86 having catchment area 7040 km<sup>2</sup> are given in Table 4.1.

## 4.3.1.3 Upstream utilizations

The utilization upstream of above G&D site through the existing projects has been added to the observed yields at the G&D site and the regeneration from the major and medium projects has been deducted to arrive at gross monsoon yields up to the G&D site of each year for the period from 1971-72 to 1985-86.

There are 8 major/medium existing irrigation projects in the catchment upstream of T.Narasipur G&D site. Out of these 8 projects, 5 are storage projects and the remaining 3 are Anicut channels. In the absence of actual utilisation data in respect of 2 anicuts, the utilisation for the same has been computed from the designed area by adopting a delta of 1.6m uniformly for all the years. For the other projects, the utilisation has been arrived at from the inflow and outflow data of the respective projects. The regeneration from the utilizations of above projects has been computed, taking 18% for old projects, i.e., Anicut channels and Nugu reservoir and 10% in respect of all the other projects.

## 4.3.1.4 Computation of surface water yield

Using the gross monsoon yields of the catchment up to T.Narasipur G&D site and the corresponding weighted average monsoon rainfall of each year for the period from 1971-72 to 1985-86 rainfall run-off relationships have been developed by regression analysis considering both the linear and non-linear forms of equations as given below:

Table 4.1: Monthly Observed Yield of Kabini River at T. Narasipur G&D Site

Units: MCM

| Annual Total | (14) | 4249.8  | 3116.8  | 3597.1  | 3294.5  | 4092.1  | 2216.5  | 3198.4  | 4354.9  | 4778.2  | 4986.2  | 4893.8  | 2712.2  | 2869.3  | 3916.7  | 2552.9  |
|--------------|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| May          | (13) | 282.6   | 151.0   | 29.8    | 120.6   | 1.531   | 215.0   | 82.6    | 266.4   | 107.7   | 85.5    | 121.9   | 73.8    | 8.16    | 64.7    | 50.0    |
| Apr          | (12) | 21.8    | 21.2    | 14.14   | 7.86    | 134.6   | 6'66    | 172.8   | 223.9   | 85.1    | 64.1    | 85.5    | 0.69    | 7.67    | 77.2    | 51.6    |
| Mar          | (11) | 15.6    | 11.7    | 7.8     | 8.09    | 96.5    | 71.6    | 77.7    | 74.2    | 58.7    | 75.9    | 82.1    | 63.2    | 87.4    | 53.9    | 58.0    |
| Fcb          | (10) | 23.3    | 25.1    | 15.2    | 50.9    | 49.5    | 54.1    | 32.5    | 46.4    | 42.5    | 47.5    | 93.9    | 88.0    | 58.1    | 31.3    | 58.9    |
| Jan          | (6)  | 53.0    | 47.5    | 30.8    | 42.3    | 46.4    | 43.2    | 49.0    | 56.40   | 35.2    | 90.4    | 73.6    | 82.8    | 65.7    | 37.7    | 43.8    |
| Dec          | (8)  | 153.2   | 165.0   | 65.2    | 162.3   | 99.1    | 43.2    | 122.6   | 113.3   | 102.0   | 173.5   | 134.4   | 143.9   | 121.2   | 115.8   | 200.5   |
| Nov          | (7)  | 219.6   | 141.1   | 116.3   | 93.8    | 188.7   | 91.8    | 276.0   | 231.8   | 231.5   | 238.8   | 251.9   | 165.2   | 216.3   | 171.0   | 158.2   |
| Oct          | (9)  | 470.8   | 309.8   | 169.8   | 256.0   | 413.4   | 154.7   | 452.3   | 210.4   | 211.5   | 317.0   | 334.14  | 204.0   | 289.6   | 511.2   | 179.3   |
| Sep          | (5)  | 546.6   | 347.7   | 375.8   | 390.5   | 508.0   | 523.6   | 596.1   | 451.1   | 312.5   | 445.9   | 807.0   | 197.3   | 415.0   | 301.6   | 287.5   |
| Aug          | (4)  | 853.4   | 536.2   | 980.3   | 1225.   | 1307.7  | 706.5   | 444.5   | 1239.6  | 1711.   | 9.777   | 1319.7  | 869.7   | 816.0   | 593.3   | 624.7   |
| Jul          | (3)  | 920.3   | 1258.7  | 1152.1  | 763.6   | 775.9   | 132.7   | 875.8   | 8.196   | 1707.1  | 1989.8  | 607.5   | 471.4   | 566.3   | 1252.7  | 420.8   |
| Jun          | (2)  | 9'689   | 8.101   | 637.1   | 30.0    | 307.2   | 80.2    | 16.5    | 473.6   | 173.4   | 6.619   | 479.4   | 283.9   | 62.2    | 706.3   | 419.6   |
| Year         | (1)  | 1971-72 | 1972-73 | 1973-74 | 1974-75 | 1975-76 | 1976-77 | 81-1161 | 62-8261 | 08-6261 | 18-0861 | 1981-82 | 1982-83 | 1983-84 | 1984-85 | 1985-86 |

(a) 
$$Y = ax + b$$

(b) 
$$Y = ax^b$$

where Y is the gross monsoon yield in mm; X is the weighted average monsoon rainfall in mm; and a and b are regression constants.

The linear equation is found to be the best-fit equation based on the least standard error of estimation and it has been assumed to hold good for the entire sub-basin. The monsoon yields for the period 1901-02 to 1985-86 for sub-basin were computed by substituting the weighted average monsoon rainfall values of each year in the best-fit equation. The percentage of gross non-monsoon yield to the gross monsoon yield is found to be 11.32. Considering this percentage the non-monsoon yields of each year is computed and the same is added to the monsoon yields to arrive at the annual yield of the sub-basin for that year. The annual yield series thus generated is arranged in descending order, from which the 75% water year dependable yield of the sub-basin are found to be 3641 MCM.

# 4.3.1.5 Ground water availability / assessment

From the gross ground water potential, provision for domestic uses and existing irrigation (uses) draft in the sub basin have been assessed on proportionate area basis from district-wise ground water statistics published by Central Ground Water Board (CGWB), under the Ministry of Water Resources, Government of India, report for 1995. Based on these details, total as well as balance ground water available for irrigation development has been worked out. The urban water requirement in full and 50% of the rural water requirement is proposed to be met from groundwater sources and the entire livestock water requirement is proposed to be met from groundwater

groundwater, and for Kabini sub-basin this works out to 225 MCM and 280 MCM for without ground water and with ground water considerations, respectively. The details are given in Tables 3.6(a) to 3.6(d).

### 4.3.2 Compilation of Land Use Statistics

The areas under different land use and their percentage to the geographical area of the sub-basin for five years were compiled from taluka—wise statistics. The cultivable area was taken to comprise net area sown, land under miscellaneous crops and trees, current fallows, other fallows and cultivable waste. The land use figure for the year in which the cultivable area is maximum has been considered in the study.

#### 4.3.3 Imports and Export

#### 4.3.3.1 Imports

There is an existing import of 28.44 MCM of water through Anicut channels from Upper Cauvery sub-basin. Further a quantity of 31.42 MCM of Upper Cauvery water is being used for water supply to Mysore City through right bank low level canal of KRS.

A quantity of 297.33 MCM is envisaged to be imported from Upper Cauvery sub-basin through an ongoing project namely extension under Krishnarajasagar stage-I.

Apart from the above, a small quantity of 2.05 MCM is also proposed to be imported from Upper Cauvery sub-basin through Middle Cauvery sub-basin for Anicut channels under Rabi crops. The total import works out to 359 MCM.

#### **4.3.3.2** Exports

There is no export of water from the existing projects.

As regards ongoing projects, Kabini project stage-I envisages an export of 425.48 MCM and 201.87 MCM to Middle Cauvery and Suvarnavathi sub-basins,

respectively. Other two projects namely Mananthvady multi purpose scheme and Banasursagar Sagar project located in Kerala portion of the sub-basin also envisage an export of 495.50 MCM and 189.00 MCM to Valapattanam and Kuttiyadi basins, respectively, of west flowing rivers of Kerala. The Cauvery water supply scheme stage-III to Bangalore city (Arkavathi sub-basin) which is under construction at present also receives water from Kabini sub-basin to the extent of 98.55 MCM. The export from the proposed Kabini sub-basin project stage-II is estimated to be 95 MCM and 289.63 MCM of water to Middle Cauvery and Suvarnavathi sub-basin, respectively. Thus the total export from Kabini sub-basin is 1795 MCM.

## 4.3.4 Water Requirements / Water Needs

#### 4.3.4.1 General

While planning for water resources development in any basin, an assessment of reasonable needs of the basin in the foreseeable future for various purposes like domestic, irrigation, hydropower and industries is essential. These needs are to be met either from the surface flows or from ground water sources or from a combination of both. Assessment of the reasonable requirements of water in the Kabini sub-basin by the end of 2050 AD under each category has been attempted in the following paragraphs.

The requirement of water for various uses, viz., domestic, irrigation, industrial and hydro-power generation was determined as under.

#### 4.3.4.2 Domestic water needs

The requirement of domestic consumption in the rural and urban areas as well as for the livestock has been obtained by projecting the rural, urban and live stock population of the Kabini sub-basin to the 2050 AD. The requirement of water per capita

per day for rural and urban and live stock populations is considered as 70 liters, 200 liters and 50 liters, respectively.

The population as per census 1981 for states of Karnataka, Kerala and Tamilnadu are available (NWDA Report of Kabini Sub-basin, 1992).

The population and livestock have been projected from 1981 to the year 2050 AD using the formula.

$$P_{2050} = P_{1981} \left[ 1 + \frac{R}{100} \right]^{N}$$

where  $P_{2050}$  = Population in 2050 AD.

 $P_{1981}$  = Population (known) in the year 1981 AD,

R = Compound rate of growth of population, and

N = Number of years.

## 4.3.4.3 Population

For Human population projections, the growth rates assumed are as given in Table 4.2. (Guidelines of NWDA for preparation of preliminary water balance study, 1998):

Table 4.2: Growth Rates for Projecting Human Population

| Period (Years) | Growth rate in % |
|----------------|------------------|
| (1)            | (2)              |
| 1981-1985      | 2.06             |
| 1985-1990      | 2.06             |
| 1990-1995      | 1.93             |
| 1995-2000      | 1.78             |
| 2000-2010      | 1.53             |
| 2010-2020      | 1.10             |
| 2020-2030      | 0.92             |
| 2030-2040      | 0.72             |
| 2040-2050      | 0.48             |

The human population and live stock population for Karnataka, Kerala and Tamilnadu for Kabini sub-basin are as given in Table 4.3.

Table 4.3: Kabini Sub-basin: Projected Human and Livestock Population by 2050 AD

| Population  | Karnataka | Tamilnadu    | Kerala  | Total   |
|-------------|-----------|--------------|---------|---------|
| (1)         | (2)       | (3)          | (4)     | (5)     |
| Urban human | 2770894   | 0            | 0       | 2770894 |
| Rural human | 1041194   | 23027        | 729785  | 1794006 |
| Total human | 3812088   | 23027        | 729785  | 4564900 |
| Livestock   | 711434    | 87 <b>77</b> | 1818490 | 902060  |

The live stock population as per the senses (1982-83) in Kabini sub-basin is projected for 2050 AD as given in Table 4.3. The growth rate for calculating projected live stock population is considered 1% per year. The urban water requirement in full and 50% of the rural water requirement is proposed to be met from surface water resources and this works out to 225.0 MCM. The entire live stock water requirement and 50% of the rural water requirement is proposed to be met from ground water sources and 50% of the domestic water requirement to be met from surface water resources is considered to be available as regeneration.

## 4.3.4.4 Irrigation needs

The modified Penman method was used to compute the crop water requirement.

The annual irrigation under future major, medium and minor schemes is assessed considering irrigation intensity of 150%, 125% and 100%, respectively, as per NWDA norms and the annual utilisation has been determined on climatological approach.

The designed annual irrigation and utilisation in respect of all the existing and ongoing projects have been kept undisturbed in assessing surface water needs. For assessing the surface water needs for irrigation, an estimate has been made of the area that can be brought under irrigation by 2050 AD and the reasonable requirement for irrigating the area. The area that can be brought under irrigation by surface water is taken to comprise the area under irrigation from the existing major, medium and minor projects and the area that would be brought under irrigation from the ongoing and identified future major, medium and minor projects. The water needs for irrigating the crops under future projects including the additional area to be brought under irrigation has been computed on climatological approach. Normal monthly values of potential evapo-transpiration of Mysore observatory computed by modified Penmen's method are given in the IMD publication "Potential Evapo-transpiration (PE) over India" (Scientific Report No. 136, February 1971) and these values are used for computing the net irrigation requirement of different crops.

The potential evapo-transpiration, humidity, temperature, sunshine hours, normal monthly rainfall for Mysore observatory are given in Table 4.4.

The gross irrigation requirement of different crops have been worked out considering an irrigation efficiency of 65% for paddy and 55% for other crops under major and medium projects and an irrigation efficiency of 80% for paddy and 70% for other crops under minor projects. The computations of net and gross irrigation water requirement for different crops are done to find out the irrigation requirements. Considering evaporation losses at 20% of the gross irrigation water requirement for the crops, values of weighted average gross delta have been computed and found to be 1.14 m for major projects, 1.14 m for medium projects and 0.88 m for minor projects. Details of the computation are given in Tables 4.5, 4.6 and 4.7, respectively.

Table 4.4: Metrological Data for Kabini Sub-basin Observed at Mysore I.M.D. Station

| Month |      | erature<br>C) | Hun          | ative<br>nidity<br>%) | Wind  | Speed  |              | Cover<br>(Oktas) | Normal<br>Rainfall | Monthly<br>Evapo-<br>transpiration |
|-------|------|---------------|--------------|-----------------------|-------|--------|--------------|------------------|--------------------|------------------------------------|
|       | Max  | Min           | 08.30<br>hrs | 17.30<br>hrs          | km/hr | km/day | 08.30<br>hrs | 17.30<br>hrs     | mm                 | mm                                 |
| 1     | 2    | 3             | 4            | 5                     | 6     | 7      | 8            | 9                | 10                 | 11                                 |
| Jan   | 28.3 | 16.4          | 75           | 30                    | 11.3  | 225    | 3.0          | <b>2</b> .9      | 2.8                | 128.4                              |
| Feb   | 31.2 | 18.2          | 69           | 25                    | 9.1   | 181    | 2.8          | 2.9              | 5.5                | 133.5                              |
| Mar   | 33.5 | 20.2          | 71           | 21                    | 8.8   | 175    | 2.3          | 3.2              | 12.0               | 165.9                              |
| Арг   | 34.0 | 21.4          | 75           | 34                    | 8.4   | 167    | 3.7          | 5.1              | 67.6               | 154.2                              |
| May   | 32.6 | 21.2          | 79           | 51                    | 10.2  | 203    | 4.9          | 5,5              | 156.9              | 147.6                              |
| Jun   | 28.9 | 20.2          | 81           | 66                    | 13.9  | 277    | 5.9          | 6.4              | 60.5               | 123.5                              |
| Jul   | 27.3 | 19.7          | 84           | 70                    | 14.1  | 281    | 6.4          | 6.8              | 71.9               | 115.5                              |
| Aug   | 27.9 | 19.6          | 84           | 67                    | 12,5  | 249    | 6.2          | 6.7              | 80.1               | 117.2                              |
| Sep   | 28.7 | 19.3          | 83           | 61                    | 10.7  | 213    | 5,7          | 6,1              | 116,3              | 116.9                              |
| Oct   | 28.4 | 19.6          | 85           | 61                    | 7.9   | 157    | 5,6          | 5,9              | 179.9              | 110.5                              |
| Nov   | 27.4 | 18.3          | 80           | 54                    | 9.3   | 185    | 4.7          | 4.9              | 66.6               | 106.0                              |
| Dec   | 27.0 | 16.5          | 78           | 43                    | 11.3  | 225    | 3.6          | 3.9              | 14.7               | 114.3                              |

Table 4.5: Computation of Weighted Average Delta for Proposed Major Projects

CCA = 100 ha, Annual Irrigation = 150 ha.

| Name of Crop (1)    | Area (%) (2) | GIR<br>(m)<br>(3) | Water Requirement (ham) (4) |
|---------------------|--------------|-------------------|-----------------------------|
| Kharif              |              |                   |                             |
| Paddy               | 42           | 1.494             | 62.75                       |
| Jowar               | 6            | 0.268             | 1.61                        |
| Ragi                | 12           | 0.268             | 3.22                        |
| Fodder              | 6            | 0.268             | 1.61                        |
| Cotton              | 6            | 0.445             | <b>2</b> .67                |
| Rabi                |              |                   | 1 / 45 / 7                  |
| Paddy               | 12           | 1.835             | 22.02                       |
| Pulses              | 24           | 0.566             | 13.58                       |
| Fruits & Vegetables | 12           | 0.503             | 6.03                        |
| Ground nut          | 18           | 0.664             | 11.95                       |
| Perennial           |              | 122               | U/8 C                       |
| Sugarcane           | 6            | 1.349             | 8.09                        |
| Coconut             | 6            | 1.535             | 9.21                        |
| Total               | 150          |                   | 142.74                      |

Add 20% evaporation losses = 28.55

Total water requirement = 171.29

Weighted average delta =171.20/150

= 1.14 m.

Table 4.6: Computation of Weighted Average Delta for Proposed Medium **Projects** 

CCA = 100 ha.

Annual Irrigation = 125 ha.

| (%)<br>(2)<br>35<br>5<br>10             | (1)  Kharif  Paddy                 |
|-----------------------------------------|------------------------------------|
| 35<br>5<br>10                           | Kharif<br>Paddy                    |
| 5                                       | Paddy                              |
| 5                                       |                                    |
| 10                                      | Inner                              |
|                                         | Jowar                              |
| 5                                       | Ragi                               |
|                                         | Fodder                             |
| 5                                       | Cotton                             |
|                                         | Rabi                               |
| 10                                      | Paddy                              |
| 20                                      | Pulses                             |
| 10                                      | Fruits &<br>Vegetables             |
| 15                                      | Ground nut                         |
|                                         | Perennial                          |
| 5                                       | Sugarcane                          |
| 5                                       | Coconut                            |
| 125                                     | Total                              |
| 5                                       | Sugarcane Coconut                  |
| 0.50<br>0.66<br>1.34<br>1.53<br>Add 20% | 5 1.34<br>5 1.53<br>125<br>Add 20% |

Weighted average delta = 142.76/125

= 1.14 m.

Table 4.7: Computation of Weighted Average Delta for Proposed Minor Projects

CCA = 100 ha. Annual Irrigation = 100 ha.

| Name of Crop | Агеа | GIR                | Water Requirement |
|--------------|------|--------------------|-------------------|
|              | (%)  | (m)                | (ham)             |
| (1)          | (2)  | (3)                | (4)               |
| Kharif       |      |                    |                   |
| Paddy        | 30   | 1.174              | 35.22             |
| Jowar        | 5    | 0.211              | 1.06              |
| Ragi         | 10   | 0.211              | 2.11              |
| Fodder       | 5    | 0.211              | 1.06              |
| Cotton       | 5    | 0.350              | 1.75              |
| Rabi         |      | THE REAL PROPERTY. | 11805             |
| Paddy        | 5    | 1.441              | 7.21              |
| Pulses       | 15   | 0.445              | 6.68              |
| Fruits &     | 8    | 0.395              | 3.16              |
| Vegetables   |      |                    | 12 / 12 14        |
| Ground nut   | . 7  | 0.522              | 3.65              |
| Perennial    | V 3  | get.               | 180               |
| Sugarçane    | 5    | 1.060              | 5.30              |
| Coconut      | 5    | 1.206              | 6.03              |
| Total        | 100  | n n                | 73.23             |

Add 20% evaporation losses = 14.64

Total water requirement = 87.87

Weighted average delta = 87.87/100

= 0.88 m.

The ultimate annual irrigation water requirements for the existing ongoing and future irrigation schemes are given in the Table 4.8.

Table 4.8: Ultimate Surface Water Requirement for Irrigation

| Category                      | Annu     | al Irrigatio | n (ha) | Annual  | Utilization | (MCM)   |
|-------------------------------|----------|--------------|--------|---------|-------------|---------|
|                               | In basin | From         | Total  | In      | From        | Total   |
|                               | 100      | import       | 70     | basin   | import      |         |
| (1)                           | (2)      | (3)          | (4)    | (5)     | (6)         | (7)     |
| Existing Projects             | 36346    | 1580         | 37926  | 637.77  | 28.44       | 666.21  |
| Ongoing Projects              | 49288    | 41700        | 90988  | 574.63  | 297.33      | 871.96  |
| Identified Future<br>Projects | 92876    | 180          | 93056  | 1033.06 | 2.05        | 1035.11 |
| Total                         | 178510   | 43460        | 221970 | 2245,46 | 327.82      | 2573.28 |

Thus the ultimate annual irrigation water requirement will be 2573 MCM including import of 12 MCM. The climatic data of Mysore IMD station is used for calculating monthly ETo values.

#### 4.3.4.5 Industrial Needs

In the absence of actual data on the existing, ongoing and future industries, the industrial water requirement was assumed to be of the same order as that of ultimate domestic water requirements by 2050 AD. The entire industrial water requirement is proposed to be met from surface water source, which is 280 MCM, and 80% of this requirement is considered to be available as regeneration to the stream. This works out to 224 MCM.

#### 4.3.4.6 Hydropower Needs

There are no existing, ongoing or proposed hydroelectric projects in the subbasin. As such, the requirement of water for hydropower generation is taken as nil.

#### 4.3.4.6.1 Environmental Needs

Environmental needs are considered to maintain the minimum flow required in the river to keep quality of the water to a designed standard which is taken as 1% of the surface water available in the sub basin / basin.

## 4.3.4.7 Regeneration

The quantum of return flows to the stream has been considered as 10% of gross utilization for irrigation from ongoing and future major and medium projects and 18% of the gross water utilized for irrigation from the existing major and medium irrigation projects; and 80% of domestic and industrial needs to be met from surface water resources is considered as regeneration to the stream. The total regeneration works out to 651 MCM.

## 4.3.4.8 Ultimate Surface Water Requirements

The ultimate surface water requirement for irrigation, domestic, hydropower and industrial needs and environmental needs works out to 2577 MCM, 225 MCM, 9 MCM and 280 MCM, respectively. Thus, the total surface waters requirement for all uses in the Kabini sub-basin will be 3127 MCM including 36 MCM for environmental releases.

#### 4.3.5 Water Balance

The water balance taking into account, the water availability, import, export, requirements (water needs) and regeneration is given in Table 4.9 below:

Table 4.9: Water Balance for Kabini Sub-basin

| Sl. I | No. Item       |                                                  | Amount (MCM) |
|-------|----------------|--------------------------------------------------|--------------|
| Ī.    | Surface water  | r availability @ 75% dependability               | 3641         |
| 2.    | Regeneration   |                                                  | 651          |
| 3.    | Surface water  | r import (+)                                     | 359          |
| 4.    | Overall availa | ability                                          | <b>4</b> 651 |
| 5.    | Surface water  | export (-)                                       | 1795         |
| 6.    | Surface water  | requirement for                                  |              |
|       | (i)            | Irrigation by in-basin and imported water        | 2577         |
|       | (ii)           | Domestic use                                     | 225          |
|       | (iii)          | Industrial use                                   | 280          |
|       | (iv)           | Hydro power                                      | 9 .          |
|       | (v)            | Environmental use                                | 36           |
| - 6   | 08/            | Sub total                                        | 3127         |
| 7.    | Regeneratio    | 'n                                               | 24 Part      |
|       | (i)            | Domestic use 80 %                                | 180          |
|       | (ii)           | Irrigation use 10%                               | 247          |
| ч     | (iii)          | Industrial use 80%                               | 224          |
| ď     | 100            | Sub total                                        | 651          |
| 3.    | Surface water  | yield                                            | 3641         |
| ).    | Ground water   |                                                  |              |
| - 3   | (a)            | Gross ground water potential                     | 716          |
| i     | (b)            | Provision for domestic and industrial use        | 108          |
|       | (c)            | Total ground water available for irrigation (a-  | b) 608       |
|       | (d)            | Existing irrigation draft                        | 222          |
|       | (e)            | Balance ground water available for               |              |
|       |                | additional irrigation (c-d)                      | 386          |
| 10.   | Overall water  | balance of the sub-basin                         |              |
|       | (i)            | With consideration of ground water:              |              |
|       |                | (Overall availability) – (export + total water n | eeds)        |
|       |                | (4651 + 386 = 5037) - (1795 + 3127) =            | 115          |
|       | (ii <b>)</b>   | Without consideration of ground water:           |              |
|       |                | (4651 - 1795 - 3127) =                           | -271         |

# 4.4 DETAILED SUB-BASINWISE WATER BALANCE STUDY OF CAUVERY

#### 4.4.1 Methodology Used For Water Balance Study

The data required for water balance study, i.e., the total annual irrigation requirements of ongoing, existing and proposed major, medium and minor irrigation projects, exports and imports, rural, urban, livestock population, regenerations from irrigation projects, hydropower use etc. were collected from the various reports of preliminary water balance studies and basic data reports of Cauvery basin from National Water Development Authority, under the Ministry of Water Resources, Government of India, New Delhi.

The following steps were used for computation of water balance on monthly basis for all the sixteen sub-basins in Cauvery basin and Cauvery basin as a whole.

Column 1: Months starting from June to May (i.e. water year).

Column 2: The monthly net irrigation requirements for the proposed major, medium and minor irrigation projects are calculated by climatological approach by using modified Penman method. The gross irrigation requirements were calculated by adding 20 percent to the net irrigation requirements for accounting for the reservoir evaporation losses.

Column 3: The monthly gross irrigation requirements for the existing major, medium and minor irrigation projects are calculated by distributing the annual irrigation requirements of the projects in the same proportion as of the monthly gross irrigation requirements of the proposed irrigation projects.

Column 4: The monthly gross irrigation requirements for the ongoing projects are calculated by distributing the annual irrigation requirements of projects in the same proportion of monthly irrigation requirements of the proposed irrigation projects.

Column 5: The total monthly irrigation requirement of the system is computed by summing the columns 2, 3 and 4.

Column 6: The requirement of domestic consumption in the rural and urban as well as for the livestock has been obtained by projecting the rural, urban and live stock population of a sub-basin/basin to the 2050 AD. The requirement of water per capita per day for rural and urban and live stock population is considered as 70 liters, 200 liters and 50 liters respectively.

Column 7: Due to the non-availability of the data, the monthly and total water requirements of industrial water use are taken equal to the water requirements for domestic purposes.

NWDA. The storage products which are used purely for generation of hydropower as single purpose, the water stored throughout the year for electricity generation and after utilization for electricity generation, the water is released in the parent river. Hence, annual evaporation losses in the single purpose hydropower projects are taken as hydropower requirement and annual hydropower requirement is distributed on the monthly basis in the proportion of the number of days.

Column 9: The monthly environmental water requirements are taken equal to 1 percent of the monthly surface water available in the sub-basin.

Column 10: The monthly water requirement in a sub-basin is computed by summing the water utilizations for irrigation, domestic, industrial, hydropower and environmental purposes.

Column 11: The monthly exports are calculated by distributing the total annual exports in a sub-basin in the proportion of the monthly availability of the surface water in that sub-basin.

Column 12: The monthly gross water requirements are computed by summing all the monthly water requirements for irrigation, domestic, industrial, hydropower, environmental and exports.

Column 13: The monthly imports are computed by distributing of total annual import in the proportion of the monthly irrigation requirements of the importing sub-basin.

Column 14: The monthly regeneration from irrigation water use is assumed as 10 percent to 20 percent of the monthly irrigation water requirements.

Column 15: Regeneration from domestic purposes is computed as 80 percent of the domestic water use.

Column 16: The monthly regeneration from industrial water use is taken as 80 percent of the monthly industrial water use.

Column 17: The total monthly regeneration is computed by summing of monthly regenerations from irrigation, domestic and industrial water uses.

Column 18: The monthly surface water yield in the sub-basin is taken in the proportion of the monthly-observed run-off in the sub-basin.

Column 19: The monthly ground water yield in a basin is computed by distributing the annual ground water yield in the proportion of the monthly irrigation water requirements.

Column 20: The total monthly water availability in a basin is computed summing monthly imports from other basins; monthly regenerations from irrigation, domestic and industrial uses; monthly surface water and ground water yields.

Column 21: The monthly water balance of a basin is the difference between the total monthly water available and the total monthly water utilizations.

If the monthly water availability is more than the monthly utilization in a basin then it is known as water surplus basin; and if the monthly utilization is more than the monthly water availability, then it is known as water deficit basin.

## 4.4.2 Results of Sub-basinwise Water Balance Study

The detailed water balance studies carried out monthly on annual basis for all the 16 sub-basins in the Cauvery river basin for 75%, 50%, 90%, and 100% water year dependable flows, with and without considerations of ground water are presented in the

Tables 4.10.1(a) to Table 4.10.4(h). The abstracts of the sub-basinwise annual water balance studies for Cauvery basin for 75%, 50%, 90% and 100% water year dependable flows, are presented in Table 4.11.1 to Table 4.11.5. The sub-basin wise annual water balance for 75%, 50%, 90% and 100% water year dependable flows without and with ground water are presented in Table 4.12.1 to Table 4.12.4. The sub-basinwise monthly deficits/surpluses for 75%, 50%, 90%, and 100% water year dependable flows, with and without considerations of ground water are presented in the Table 4.13.1 to Table 4.13.4. The sub-basinwise monthly deficits or surpluses in descending order with percent of deficit or surplus for 75%, 50%, 90%, and 100% water year dependable flows, with and without considerations of ground water are presented in the Table 4.14.1 to Table 4.14.16. The graphical presentations of monthly water deficits surplus without groundwater and with groundwater considerations for all the 16 sub-basins are shown in Figures 4.1 to Figure 4.16.

# 4.5 ANALYSIS OF WATER BALANCE STUDIES FOR THE 75% WATER YEAR DEPENDABLE FLOW

The water balance studies are carried out monthly on an annual basis, for with and without considerations of ground water for a normal year, i.e., the 75% water year dependable flow.

4.5.1 The sub-basin wise analysis of the water balance studies for the 75% water year dependable flows, without ground water considerations, for the Cauvery river basin is as follows:

## 4.5.1.1 Upper Cauvery Sub-basin

In the case of water balance studies of Upper Cauvery sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground

water considerations [refer Table 4.10.1(a)], the sub-basin was found short of water in the months of June and September to April, where as the sub-basin is surplus in its water resources in the months of July, August and May. The maximum deficit of 391.3 MCM (8%) occurred in the sub-basin in the month of October, while the minimum deficit of 17.62 MCM (0.40 %) occurred in the sub-basin in the month of November. The maximum surplus of 598.37 MCM (12%) occurred in the month of July, while the minimum surplus of 18.00 MCM (0.40%) occurred in the month of May. The annual deficit in the sub-basin is 274.4 MCM (6%).

#### 4.5.1.2 Kabini Sub-basin

For the water balance studies carried out monthly on an annual basis for Kabini sub-basin for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.2(a)], it was found that in the sub-basin deficits occurred in the months of September and December to April, while the surpluses occurred in the months of June, July, August, October and May. The maximum deficit of 253.1 MCM (5.2%) occurred in the sub-basin in the month of January, while minimum deficit of 5.67 MCM (0.10 %) occurred in the sub-basin in the month of April. The maximum surplus of 132.86 MCM (2.71%) occurred in the month of June, while the minimum surplus of 4.46 MCM (0.09%) occurred in the month of November. The annual deficit in the sub-basin is 267.8 MCM (5.5%).

#### 4.5.1.3 Shimsha Sub-basin

For the water balance studies carried out monthly on an annual basis for Shimsha sub-basin for the 75% water year dependable flow, without ground water consideration [refer Table 4.10.3(a)], it was found that in the sub-basin deficits

occurred in the months of June to August and December to April, while the surpluses occurred in the months of September to November and May. The maximum deficit of 68.87 MCM (2%) occurred in the sub-basin in the month of January, while minimum deficit of 0.25 MCM (0.02 %) occurred in the sub-basin in the month of June. The maximum surplus of 294.72 MCM (8%) occurred in the month of October, while the minimum surplus of 8.86 MCM (0.2%) occurred in the month of May. The annual deficit in the sub-basin is 150.81 MCM (4%).

#### 4.5.1.4 Arkavathi Sub-basin

In the case of water balance studies of Arkavathi sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.4(a)], the sub-basin was found short of water through out the year. The maximum deficit of 205.2 MCM (10.9%) occurred in the sub-basin in the month of September, while the minimum deficit of 24.56 MCM (1.30 %) occurred in the sub-basin in the month of April. The annual deficit in the sub-basin is 799.2 MCM (42.4%).

# 4.5.1.5 Middle Cauvery Sub-basin

For the water balance studies carried out monthly on an annual basis for Middle Cauvery sub-basin for the 75% water year dependable flow, without ground water consideration [refer Table 4.10.5(a)], it was found that in the sub-basin deficits occurred in the months of January to June, while the surpluses occurred in the months of July to December. The maximum deficit of 3.31 MCM (0.2%) occurred in the sub-basin in the month of March, while minimum deficit of 1.63 MCM (0.01 %) occurred in the sub-basin in the month of January. The maximum surplus of 24.14 MCM (1.1%)

occurred in the month of September, while the minimum surplus of 3.54 MCM (0.20%) occurred in the month of December. The annual surplus in the sub-basin is 67.40 MCM (3.1%).

#### 4.5.1.6 Suvarnavathi Sub-basin

In the case of water balance studies of Suvarnavathi sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.6(a)], the sub-basin was found short of water in the months of June to September and December to May, where as the sub-basin is surplus in its water resources in the months of October and November. The maximum deficit of 17.01 MCM (2.3%) occurred in the sub-basin in the month of July, while the minimum deficit of 0.55 MCM (0.10 %) occurred in the sub-basin in the month of May. The maximum surplus of 6.52 MCM (0.88%) occurred in the month of October, while the minimum surplus of 3.83 MCM (0.52%) occurred in the month of November. The annual deficit in the sub-basin is 80.00 MCM (11%).

#### 4.5.1.7 Palar Sub-basin

For the water balance studies carried out monthly on an annual basis for Palar sub-basin for the 75% water year dependable flow, without ground water consideration [refer Table 4.10.7(a)], it was found that in the sub-basin deficits occurred throughout the year except the months of June and October. The maximum deficit of 30.75 MCM (9.5%) occurred in the sub-basin in the month of July, while minimum deficit of 0.59 MCM (0.20 %) occurred in the sub-basin in the month of May. The maximum surplus of 6.00 MCM (1.9%) occurred in the month of June, while the minimum surplus of 1.84 MCM (0.60%) occurred in the month of October. The annual deficit in the sub-basin is 161 MCM (50%).

#### 4.5.1.8 Chinnar Sub-basin

In the case of water balance studies of Chinnar sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.8(a)], the sub-basin was found short of water throughout the year. The maximum deficit of 4322.6 MCM (32%) occurred in the sub-basin in the month of October, while the minimum deficit of 156.75 MCM (1.20 %) occurred in the sub-basin in the month of July. The annual deficit in the sub-basin is 13103 MCM (96%).

#### 4.5.1.9 Bhavani Sub-basin

In the case of water balance studies of Bhavani sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.9(a)], the sub-basin was found short of water in the months of June to September and January to May, where as the sub-basin is surplus in its water resources in the months of October, November and December. The maximum deficit of 164.53 MCM (5.8%) occurred in the sub-basin in the month of March, while the minimum deficit of 8.84 MCM (0.30 %) occurred in the sub-basin in the month of July. The maximum surplus of 98.8 MCM (3.50%) occurred in the month of November, while the minimum surplus of 35.44 MCM (1.30%) occurred in the month of December. The annual deficit in the sub-basin is 424.90 MCM (15%).

#### 4.5.1.10 Noyil Sub-basin

For the water balance studies carried out monthly on an annual basis for Noyil sub-basin for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.10(a)], it was found that in the sub-basin deficits

occurred in the months of June to September and January to May, while the surpluses occurred in the months of October, November and December. The maximum deficit of 49.75 MCM (4.3%) occurred in the sub-basin in the month of June, while minimum deficit of 11.19 MCM (1.0%) occurred in the sub-basin in the month of September. The maximum surplus of 106.39 MCM (9.2%) occurred in the month of October, while the minimum surplus of 23.26 MCM (2.0%) occurred in the month of December. The annual deficit in the sub-basin is 66.4 MCM (5.7%).

#### 4.5.1.11 Amaravathi Sub-basin

For the water balance studies carried out monthly on an annual basis for Amaravathi sub-basin for the 75% water year dependable flow, without ground water consideration [refer Table 4.10.11(a)], the sub-basin was found short of water in the months of June to September and January to May, where as the sub-basin is surplus in its water resources in the months of October, November and December. The maximum deficit of 207.3 MCM (7.7%) occurred in the sub-basin in the month of March, while minimum deficit of 40.31 MCM (1.50 %) occurred in the sub-basin in the month of September. The maximum surplus of 189.8 MCM (7.1%) occurred in the month of November, while the minimum surplus of 124.3 MCM (4.60%) occurred in the month of October. The annual deficit in the sub-basin is 744.14 MCM (28%).

#### 4.5.1.12 Tirumanimuttar Sub-basin

In the case of water balance studies of Tirumanimuttar sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.12(a)], the sub-basin was found short of water in the months of June to September and January to May, where as the sub-basin is surplus

in its water resources in the months of October, November and December. The maximum deficit of 147.3 MCM (4%) occurred in the sub-basin in the month of March, while the minimum deficit of 37.17 MCM (1.0%) occurred in the sub-basin in the month of January. The maximum surplus of 267.5 MCM (7.3%) occurred in the month of October, while the minimum surplus of 50.49 MCM (1.4%) occurred in the month of December. The annual deficit in the sub-basin is 225.54 MCM (6%).

#### 4.5.1.13 Ponnanai Ar Sub-basin

For the water balance studies carried out monthly on an annual basis for Ponnanai sub-basin for the 75% water year dependable flow, without ground water consideration [refer Table 4.10.13(a)], the sub-basin was found short of water in the months of June to September and January to May, where as the sub-basin is surplus in its water resources in the months of October, November and December. The maximum deficit of 18.84 MCM (1.9%) occurred in the sub-basin in the month of July, while minimum deficit of 1.59 MCM (0.20 %) occurred in the sub-basin in the month of December. The maximum surplus of 43.78 MCM (4.5%) occurred in the month of November, while the minimum surplus of 0.19 MCM (0.02%) occurred in the month of February. The annual deficit in the sub-basin is 13.54 MCM (1.4%).

# 4.5.1.14 Upper Coleroon Sub-basin

In the case of water balance studies of Upper Coleroon sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.14(a)], the sub-basin was found short of water in the months of June to September and February to April, where as the sub-basin is surplus in its water resources in the months of October to January. The maximum

deficit of 69.07 MCM (1.9%) occurred in the sub-basin in the month of July, while the minimum deficit of 2.80 MCM (0.20 %) occurred in the sub-basin in the month of June. The maximum surplus of 132.5 MCM (9.8%) occurred in the month of November, while the minimum surplus of 4.80 MCM (0.40%) occurred in the month of May. The annual surplus in the sub-basin is 86.64 MCM (6%).

## 4.5.1.15 Lower Coleroon Sub-basin

For the water balance studies carried out monthly on an annual basis for Lower Coleroon sub-basin for the 75% water year dependable flow, without ground water consideration [refer Table 4.10.15(a)], it was found that the sub-basin is surplus in its water resources throughout the year. The maximum surplus of 46.01 MCM (0.38%) occurred in the month of September, while the minimum surplus of 2.80 MCM (0.02%) occurred in the month of May. The annual surplus in the sub-basin is 222.2 MCM (2%).

## 4.5.1.16 Cauvery Delta Sub-basin

In the case of water balance studies of Cauvery Delta sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, without ground water considerations [refer Table 4.10.16(a)], it was found that the sub-basin is surplus in its water resources throughout the year. The maximum surplus of 256.40 MCM (2.6%) occurred in the month of September, while the minimum surplus of 10.45 MCM (0.10%) occurred in the month of May. The annual surplus in the sub-basin is 1203.1 MCM (12%).

4.5.2 The sub-basin wise analysis of the water balance studies for the 75% water year dependable flows, with ground water considerations, for the Cauvery river basin is as follows:

## 4.5.2.1 Upper Cauvery Sub-basin

In the case of water balance studies of Upper Cauvery sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.1(b)], the sub-basin was found short of water in the months of June and September to April, where as the sub-basin is surplus in its water resources in the months of July, August and May. The maximum deficit of 276.1 MCM (6%) occurred in the sub-basin in the month of October, while the minimum deficit of 9.87 MCM (0.20 %) occurred in the sub-basin in the month of November. The maximum surplus of 705.08 MCM (14%) occurred in the month of July, while the minimum surplus of 18.00 MCM (0.40%) occurred in the month of May. The annual surplus in the sub-basin is 304.05 MCM (6%).

#### 4.5.2.2 Kabini Sub-basin

For the water balance studies carried out monthly on an annual basis for Kabini sub-basin for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.2(b)], it was found that in the sub-basin deficits occurred in the months of September and December to March, while the surpluses occurred in the months of June, July, August, October, November, April and May. The maximum deficit of 201.6 MCM (4.1%) occurred in the sub-basin in the month of January, while minimum deficit of 0.47 MCM (0.02 %) occurred in the sub-basin in the month of September. The maximum surplus of 193.24 MCM (3.9%) occurred in the month of August, while the minimum surplus of 0.05 MCM (0.01%) occurred in the month of April. The annual surplus in the sub-basin is 118.62 MCM (2.4%).

#### 4.5.2.3 Shimsha Sub-basin

For the water balance studies carried out monthly on an annual basis for Shimsha sub-basin for the 75% water year dependable flow, with ground water consideration [refer Table 4.10.3(b)], it was found that in the sub-basin deficits occurred in the months of April, while the surpluses occurred in the remaining months throughout the year. The maximum deficit of 1.03 MCM (0.01%) occurred in the sub-basin in the month of April. The maximum surplus of 301.47 MCM (7.8%) occurred in the month of October, while the minimum surplus of 3.94 MCM (0.1%) occurred in the month of March. The annual surplus in the sub-basin is 657.95 MCM (17%).

#### 4.5.2.4 Arkavathi Sub-basin

In the case of water balance studies of Arkavathi sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.4(b)], the sub-basin was found short of water through out the year except the months of September and October. The maximum deficit of 149.2 MCM (7.6%) occurred in the sub-basin in the month of January, while the minimum deficit of 24.58 MCM (1.30 %) occurred in the sub-basin in the month of May. The maximum surplus of 16.73 MCM (0.9%) occurred in the month of October, while the minimum surplus of 5.11 MCM (0.3%) occurred in the month of September. The annual deficit in the sub-basin is 695.7 MCM (35%).

#### 4.5.2.5 Middle Cauvery Sub-basin

For the water balance studies carried out monthly on an annual basis for Middle Cauvery sub-basin for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.5(b)], it was found that in the sub-basin deficits

occurred in the months of May and June, while the surpluses occurred in the months of July to April. The maximum deficit of 1.83 MCM (0.1%) occurred in the sub-basin in the month of May, while minimum deficit of 0.85 MCM (0.003 %) occurred in the sub-basin in the month of June. The maximum surplus of 52.90 MCM (2.4%) occurred in the month of September, while the minimum surplus of 2.54 MCM (0.10%) occurred in the month of April. The annual surplus in the sub-basin is 274 MCM (12%).

#### 4.5.2.6 Suvarnavathi Sub-basin

In the case of water balance studies of Suvarnavathi sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.6(b)], the sub-basin was found short of water in the months of June to August and December to May, where as the sub-basin is surplus in its water resources in the months of September, October and November. The maximum deficit of 6.05 MCM (0.8%) occurred in the sub-basin in the month of January, while the minimum deficit of 0.22 MCM (0.01 %) occurred in the sub-basin in the month of May. The maximum surplus of 7.32 MCM (1.0%) occurred in the month of October, while the minimum surplus of 3.13 MCM (0.40%) occurred in the month of September. The annual deficit in the sub-basin is 17 MCM (2%).

#### 4.5.2.7 Palar Sub-basin

For the water balance studies carried out monthly on an annual basis for Palar sub-basin for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.7(b)], the sub-basin was found short of water in the months of July and November to April, where as the sub-basin is surplus in its water resources in the months of June, August, September, and October. The maximum deficit of 11.86 MCM

(3.3%) occurred in the sub-basin in the month of February, while minimum deficit of 2.88 MCM (0.80%) occurred in the sub-basin in the month of April. The maximum surplus of 10.59 MCM (3.0%) occurred in the month of September, while the minimum surplus of 0.19 MCM (0.10%) occurred in the month of May. The annual deficit in the sub-basin is 22 MCM (6%).

#### 4.5.2.8 Chinnar Sub-basin

In the case of water balance studies of Chinnar sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.8(b)], the sub-basin was found short of water throughout the year. The maximum deficit of 4309.00 MCM (32%) occurred in the sub-basin in the month of October, while the minimum deficit of 150.00 MCM (1.0 %) occurred in the sub-basin in the month of July. The annual deficit in the sub-basin is 12925 MCM (95%).

#### 4.5.2.9 Bhavani Sub-basin

In the case of water balance studies of Bhavani sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.9(b)], the sub-basin was found short of water in the months of June, August, September and January to May, where as the sub-basin is surplus in its water resources in the months of July, October, November and December. The maximum deficit of 137.4 MCM (4.8%) occurred in the sub-basin in the month of March, while the minimum deficit of 7.69 MCM (0.30 %) occurred in the sub-basin in the month of September. The maximum surplus of 99.72 MCM (3.50%) occurred in the month of November, while the minimum surplus of 22.65 MCM (0.8%) occurred in the month of July. The annual deficit in the sub-basin is 237.39 MCM (8%).

#### 4.5.2.10 Novil Sub-basin

For the water balance studies carried out monthly on an annual basis for Noyil sub-basin for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.10(b)], it was found that in the sub-basin deficits occurred in the months of June to September and January to May, while the surpluses occurred in the months of October, November and December. The maximum deficit of 41.33 MCM (3.4%) occurred in the sub-basin in the month of June, while minimum deficit of 9.54 MCM (0.8 %) occurred in the sub-basin in the month of September. The maximum surplus of 106.6 MCM (8.7%) occurred in the month of October, while the minimum surplus of 24.17 MCM (2.0%) occurred in the month of December. The annual deficit in the sub-basin is 31.52 MCM (3%).

#### 4.5.2.11 Amaravathi Sub-başin

For the water balance studies carried out monthly on an annual basis for Amaravathi sub-basin for the 75% water year dependable flow, with ground water consideration [refer Table 4.10.11(b)], the sub-basin was found short of water in the months of June to September and January to May, where as the sub-basin is surplus in its water resources in the months of October, November and December. The maximum deficit of 170.7 MCM (6.2%) occurred in the sub-basin in the month of March, while minimum deficit of 18.6 MCM (0.7 %) occurred in the sub-basin in the month of September. The maximum surplus of 191.4 MCM (7.1%) occurred in the month of November, while the minimum surplus of 126.6 MCM (4.60%) occurred in the month of October. The annual deficit in the sub-basin is 438.6 MCM (16%).

#### 4.5.2.12 Tirumanimuttar Sub-basin

In the case of water balance studies of Tirumanimuttar sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.12(b)], the sub-basin was found short of water in the months of June to September and January to May, where as the sub-basin is surplus in its water resources in the months of October, November and December. The maximum deficit of 79.73 MCM (2.1%) occurred in the sub-basin in the month of March, while the minimum deficit of 26.28 MCM (0.7%) occurred in the sub-basin in the month of January. The maximum surplus of 293.1 MCM (7.7%) occurred in the month of October, while the minimum surplus of 71.65 MCM (1.9%) occurred in the month of December. The annual surplus in the sub-basin is 124.24 MCM (3%).

#### 4.5.2.13 Ponnanai Ar Sub-basin

For the water balance studies carried out monthly on an annual basis for Ponnanai sub-basin for the 75% water year dependable flow, with ground water consideration [refer Table 4.10.13(b)], the sub-basin was found that the sub-basin is surplus in its water resources throughout the year. The sub-basin has been changed from water deficit for some months to water surplus throughout the year. The maximum surplus of 67.79 MCM (6.75%) occurred in the month of November, while the minimum surplus of 0 MCM (0.0%) occurred in the month of April. The annual surplus in the sub-basin is 193.69 MCM (19%).

## 4.5.2.14 Upper Coleroon Sub-basin

In the case of water balance studies of Upper Coleroon sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water

considerations [refer Table 4.10.14(b)], the sub-basin was found short of water in the months of July, August, March and April, where as the sub-basin is surplus in its water resources in the months of June, September to February. The maximum deficit of 12.36 MCM (0.9%) occurred in the sub-basin in the month of July, while the minimum deficit of 0.47 MCM (0.01 %) occurred in the sub-basin in the month of August. The maximum surplus of 148.1 MCM (10.8%) occurred in the month of November, while the minimum surplus of 0.59 MCM (0.40%) occurred in the month of June. The annual surplus in the sub-basin is 339.2 MCM (25%).

# 4.5.2.15 Lower Coleroon Sub-basin

For the water balance studies carried out monthly on an annual basis for Lower Coleroon sub-basin for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.15(b)], it was found that the sub-basin is surplus in its water resources throughout the year. The maximum surplus of 74.34 MCM (5.7%) occurred in the month of September, while the minimum surplus of 3.1 MCM (0.02%) occurred in the month of May. The annual surplus in the sub-basin is 342.76 MCM (26%).

# 4.5.2.16 Cauvery Delta Sub-basin

In the case of water balance studies of Cauvery Delta sub-basin, carried out monthly on an annual basis for the 75% water year dependable flow, with ground water considerations [refer Table 4.10.16(b)], it was found that the sub-basin is surplus in its water resources throughout the year. The maximum surplus of 352.2 MCM (3.5%) occurred in the month of September, while the minimum surplus of 11.44 MCM (0.10%) occurred in the month of May. The annual surplus in the sub-basin is 1611 MCM (16%).

# 4.6 ANALYSIS OF WATER BALANCE STUDIES FOR THE 75%, 50%, 90% AND 100% WATER YEAR DEPENDABLE FLOWS

The water balance studies are carried out on the monthly basis, for with and without considerations of ground water for a normal year, i.e., the 75% water year dependable flow.

The water balance studies for two water deficit years and one water surplus year, i.e., 90% and 100%, and 50% water year dependable flows, respectively, are also carried out.

The water balances of each sub-basin were compared with and without consideration of ground water. The sub-basin wise analysis of the water balance studies for the 75%, 50%, 90% and 100% water year dependable flows for the Cauvery river basin is as follows:

# 4.6.1 Upper Cauvery Sub-basin

By comparing monthly water balances in the various water year dependable flows in the Upper Cauvery sub-basin [Refer Table 4.10.1(a) to Table 4.10.1(h)], it is found that the months of July and May are surplus, in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability in all the four water year dependable flows and it is water deficit in the months of September, December and February in all four water year dependable flows. The maximum water surplus of 704 MCM (40%) is in the month of July for a normal year, i.e., the 75% water year dependable flow and the maximum water deficit of 291 MCM is in the month of August for the 100% water year dependable flow with the ground water availability considerations. The sub-basin has become water deficit from water surplus sub-basin in the month of August from 75% water year dependable to

other water year dependable flows.

The amount of annual surplus and annual deficit water has decreased from 3940 MCM and 286 MCM to -262 MCM and -1935 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

#### 4.6.2 Kabini Sub-basin

In the Kabini sub-basin [Refer Table 4.10.2(a) to Table 4.10.2(h)], it is found that the months of June, October and May are surplus in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability and in months of December, January, February and March are water deficit with the ground water availability considerations in all four water year dependable flows. The maximum water surplus is 446 MCM in the month of May for 100% water year dependable flow and the maximum water deficit is 203 MCM in the month of January for 75% water year dependable flow.

The sub-basin has become water deficit sub-basin from water surplus sub-basin in the month of August from 192 MCM, 219 MCM to -16 MCM and -103 MCM for 75%, 50%, 90% and 100% water year dependable flows, respectively.

The amount of annual surplus and annual deficit water has decreased from 835 MCM and 108 MCM to -487 MCM and -1535 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

#### 4.6.3 Shimsha Sub-basin

In the Shimsha sub-basin [Refer Table 4.10.3(a) to Table 4.10.3(h)], it is found

that in all the months the water availability is excess than water requirements, very few months are deficit in the water availability in comparison to the water needs in the sub-basin with the consideration of ground water availability. The maximum water surplus of 372 MCM is in the month of October for 50% water year dependable flow and maximum water deficit of 4 MCM is in the month of April for 100% water year dependable flow with the ground water availability considerations.

The amount of annual surplus water has decreased from 783 MCM to 640 MCM, 628 MCM and 341 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

#### 4.6.4 Arkavathi Sub-basin

In the Arkavathi sub-basin [Refer Table 4.10.4(a) to Table 4.10.4(h)], it is found that in all the months of are deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability. The maximum water deficit of 226 MCM is in the month of September for 90% water year dependable flow.

The amount of annual deficit water is 594 MCM, 713 MCM, 796 MCM and 415 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

# 4.6.5 Middle Cauvery Sub-basin

In the Middle Cauvery sub-basin [Refer Table 4.10.5(a) to Table 4.10.5(h)], it is found that the months of June and May are deficit in the water availability in comparison to the water needs in the sub-basin, and other months are surplus in the water availability in comparison to the water needs in the sub-basin with the

The maximum water surplus 58 MCM is in the month of September for 50% water year dependable flows.

The amount of annual surplus water is 331 MCM, 269 MCM, 215 MCM and 128 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

#### 4.6.6 Suvarnavathi Sub-basin

In the Suvarnavathi sub-basin [Refer Table 4.10.6(a) to Table 4.10.6(h)], it is found that the months of September, October and November are surplus for 75% and 50% water year dependable flows and other months are deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability. The maximum water surplus 19 MCM is in the month of October in 50% water year dependable flow and for 90% and 100% water year dependable flows sub-basin is water deficit throughout the year.

The amount of annual surplus and annual deficit water has decreased from 12 MCM to -22 MCM, -50 MCM and -60 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

# 4.6.7 Palar Sub-basin

In the Palar sub-basin [Refer Table 4.10.7(a) to Table 4.10.7(h)], it is found that the months of November to May are deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability in all the four water year dependable flows. The maximum water surplus 29 MCM is in

the month of September in 50%water year dependable flow and maximum water deficit of 18 MCM is in the month of August in 100%water year dependable flow. In the moth of August the sub-basin becomes water deficit in 90% and 100% water year dependable flow from water surplus in 75% and 50% water year dependable flows.

The amount of annual surplus and annual deficit water has decreased from 44 MCM to -28 MCM, -61 MCM and -115 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

# 4.6.8 Chinnar Sub-basin

In the Chinnar sub-basin [Refer Table 4.10.8(a) to Table 4.10.8(h)], it is found that all the months are deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability in all four water year dependable flows. The maximum water deficit of 5294 MCM is in the month of October in 50% water year dependable flow.

The amount of annual deficit water is -15787 MCM, -12932 MCM, -13012 MCM and -13155 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

## 4.6.9 Bhavani Sub-basin

In the Bhavani sub-basin [Refer Table 4.10.9(a) to Table 4.10.9(h)], it is found that the months of October, November and December are surplus and the months of June, August, February, March and April are deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability in all the four water year dependable flows. The maximum water surplus

157 MCM is in the month of October in 50% water year dependable flow and maximum water deficit of 144 MCM is in the month of August in 100% water year dependable flow with the ground water availability considerations.

The amount of annual surplus and annual deficit water has decreased from 239 MCM to -247 MCM, -652 MCM and -947 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

# 4.6.10 Noyil Sub-basin

In the Noyil sub-basin [Refer Table 4.10.10(a) to Table 4.10.10(h)], it is found that the months of October, November and December are surplus and the months of June, July, August, September, January, February, March, April and May are deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability in all the four water year dependable flows. The maximum water surplus 108 MCM is in the month of October in 50% water year dependable flow and maximum water deficit of 45 MCM is in the month of June in 50% water year dependable flow with the ground water availability considerations.

The amount of annual deficit water is -65 MCM, -40 MCM, -52 MCM and -64 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

#### 4.6.11 Amaravathi Sub-basin

In the Amaravathi sub-basin [Refer Table 4.10.11(a) to Table 4.10.11(h)], it is found that the months of October and November are surplus and the months of June,

July, August, January, February, March and April are deficit in the water availability in

comparison to the water needs in the sub-basin, with the consideration of ground water availability in all the four water year dependable flows. The maximum water surplus 195 MCM is in the month of November in 50% water year dependable flow and maximum water deficit of 172 MCM is in the month of March in 50% water year dependable flow with the ground water availability considerations. In the month of December the sub-basin becomes water deficit in 90% and 100% water year dependable flows from water surplus in 50% and 75% water year dependable flows.

The amount of annual deficit water is -304 MCM, -454 MCM, -547 MCM and -711 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

#### 4.6.12 Tirumanimuttar Sub-basin

In the Tirumanimuttar sub-basin [Refer Table 4.10.12(a) to Table 4.10.12(h)], it is found that in the months of October, November and December are surplus in the water availability in comparison to the water needs in the sub-basin, and other months are deficit in the water availability in comparison to the water needs in the sub-basin with the consideration of ground water availability for all the four water year dependable flows. The maximum water surplus 531 MCM is in the month of October for 50% water year dependable flow and in the month of March deficit 82 MCM for 90% water year dependable flow is in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability.

The amount of annual surplus water has decreased from 583 MCM to 219 MCM, 76 MCM and 17 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

# 4.6.13 Ponnanai Ar Sub-basin

In the Ponnanai Ar sub-basin [Refer Table 4.10.13(a) to Table 4.10.13(h)], it is found that all the months are surplus in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability except the months of April and May in 100% water year dependable flow. The maximum water surplus 85 MCM is in the month of November in 50% water year dependable flow and maximum water deficit of 2 MCM is in the month of April in 100% water year dependable flow.

The amount of annual surplus water has decreased from 244 MCM to 217 MCM, 157 MCM and 61 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

## 4.6.14 Upper Coleroon Sub-basin

In the Upper Coleroon sub-basin [Refer Table 4.10.14(a) to Table 4.10.14(h)], it is found that the months of October, November and December are surplus and the month of June, is deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability in all the four water year dependable flows. The maximum water surplus 192 MCM is in the month of November in 50% water year dependable flow and maximum water deficit of 37 MCM is in the month of June in 100% water year dependable flow with the ground water availability considerations. In the month of August the sub-basin becomes water deficit in 90% and 100% water year dependable flows from water surplus in 50% and 75% water year dependable flows.

The amount of annual surplus and annual deficit water has decreased from 508 MCM, 358 MCM, 243 MCM to -65 MCM in the sub-basin with the ground water

availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

## 4.6.15 Lower Coleroon Sub-basin

In the Lower Coleroon sub-basin [Refer Table 4.10.15(a) to Table 4.10.15(h)], it is found that in any month no deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability for all four water year dependable flows. The maximum water surplus 102 MCM is in the month of September in 50% water year dependable flow.

The amount of annual surplus water has decreased from 485 MCM to 340 MCM, 285 MCM and 183 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

# 4.6.16 Cauvery Delta Sub-basin

In the Cauvery Delta sub-basin [Refer Table 4.10.16(a) to Table 4.10.16(h)], it is found that in any month no deficit in the water availability in comparison to the water needs in the sub-basin, with the consideration of ground water availability for all four water year dependable flows except in the month of May in 90% and 100% water year dependable flows. The maximum water surplus 192 MCM is in the month of September in 50% water year dependable flow.

The amount of annual surplus water has decreased from 2121 MCM to 1413 MCM, 952 MCM and 554 MCM in the sub-basin with the ground water availability for 50%, 75% 90% and 100% water year dependable flows, respectively.

## 4.7 WATER BALANCE OF CAUVERY BASIN AS A WHOLE

The detailed water balance studies carried out monthly on annual basis for all the 16 sub-basins in the Cauvery river basin for 75%, 50%, 90%, and 100% water year

dependable flows, with and without considerations of ground water are presented in the Tables 4.10.1(a) to Table 4.10.4(h). The abstracts of the sub-basinwise annual water balance studies for Cauvery basin for 75%, 50%, 90% and 100% water year dependable flows without and with considerations of ground water, are presented in Table 4.11.1 to Table 4.11.4. The abstract of annual water balance for Cauvery basin as a whole for 75%, 50%, 90% and 100% water year dependable flows without and with ground water considerations is presented in table 4.11.5. The sub-basin wise annual water balance for 75%, 50%, 90% and 100% water year dependable flows without and with ground water are presented in Table 4.12.1 to Table 4.12.4. The sub-basinwise monthly deficits/surpluses for 75%, 50%, 90%, and 100% water year dependable flows, with and without considerations of ground water are presented in the Table 4.13.1 to Table 4.13.4. The sub-basinwise monthly deficits or surpluses in descending order with percent of deficit or surplus for 75%, 50%, 90%, and 100% water year dependable flows, with and without considerations of ground water are presented in the Table 4.14.1 to Table 4.14.16. The graphical presentations of the monthly water deficits-surpluses for all the 16 sub-basins in the Cauvery river-basin, without and with ground water considerations are presented in the Figures 4.4.1 to 4.4.16. STATE OF THE

Table 4.10.1(a): Upper Cauvery Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                               |                           |                                       |            |         | -                  | Water Utilisation | sation                             |          |            |             |                                       |        |            | A                                | Water Availability | sility |          |           | . 4 1.1. |
|-----------------------------------------------|---------------------------|---------------------------------------|------------|---------|--------------------|-------------------|------------------------------------|----------|------------|-------------|---------------------------------------|--------|------------|----------------------------------|--------------------|--------|----------|-----------|----------|
|                                               |                           |                                       |            | Wat     | Water requirements | ents              |                                    |          |            |             | Gross                                 |        |            | Regeneration from uses           | from uses          |        | Surface  | Gross     | Monuny   |
| Moning                                        | Utilisation               | Utilisation under irrigation projects | gation pro | H       | Dome-              | Indus.            | Hydro-                             | Environ. | 1.00       | Export      | total                                 | Import | lmiga-     | Dome-                            | Indus-             |        | water    | water     | balance  |
|                                               | Proposed Existing Ongoing | Nisting Or                            | Roing      | Total   | stic               | trial             | power                              | mental   | I OF       |             | utilisation                           |        | tion       | stic                             | tra                |        | yıcıldıs | available |          |
| €                                             | (2)                       | (3)                                   | 9          | (5)     | (9)                | (-)               | 8                                  | (6)      | (10)       | (IE)        | (12)                                  | (13)   | (14)       | (31)                             | (91)               | (7)    | (18)     | (61)      | (20)     |
| Jun                                           | 36.60                     | 117.70                                | 87.02      | 241.32  | 19.15              | 26.38             | 00.0                               | 1.62     |            | 79.12       |                                       | 00:0   | 14.94      | 15.32                            | 21.11              | 51.36  | 191.67   | 213.03    | -154.57  |
| Jul                                           | 85.40                     | 274.64                                | 203.05     | \$63.09 | 19.79              | 27.26             | 000                                | (        | 632.84     | 1110.68     | 1743.52                               | 00:0   | 34.85      | 15.83                            | 21.81              | 72.49  | 2269.40  | 2341.89   | 598.37   |
| Aug                                           | 86.20                     | 277.22                                | 204.95     | 568.37  | 19.79              | 27.26             | 0.00                               | Ī        |            | \$89.46     | 1523.05                               | 0.00   | 35.18      | 15.83                            | 21.81              | 72.82  | 1817.38  | 1890.20   | 367.15   |
| Scp                                           | 07 12                     | 271.43                                | 200.67     | 556.50  | 19.15              | 26.38             | 00.0                               | 4.81     | Н          | 235.42      | 842.27                                | 000    | ¥.         | 15.32                            | 21.11              | 70.87  | 481.03   | 551.90    | -290,37  |
| Oct                                           | 92.20                     | 296.51                                | 219.21     | 607.93  | 19.79              | 27.26             | 0.00                               | 3.76     | 658.74     | 184,22      |                                       | 0.00   | 37.62      | 15.83                            | 21.81              | 75.27  | 376.41   | 451.68    | -391.29  |
| Nov                                           | 6.20                      | 19.94                                 | 14.74      | 40.88   | 19.15              | 36.38             | 00.0                               |          | 87.01      | 79.17       | 116.18                                | 000    | 2.53       | 15.32                            | 21.11              | 38.96  | 19.65    | 98.57     | -17.62   |
| Dec                                           | 13.50                     | 43.42                                 | 32.10      | 10.68   | 19.79              | 27.26             | 000                                |          | Γ          |             | 171.78                                | 00:0   | 5.51       | 15.83                            | 21.811             | 43.15  | 11.11    | 114.66    | -57.12   |
| Jan                                           | 15.90                     | 51.13                                 | 37.80      | 104.81  | 19.79              | 27.26             | 0.00                               |          | 152.18     | 14.20       | 166.38                                | 000    | 640        | 15.83                            | 21.81              | 44.13  | 29.03    | 73.15     | -93.23   |
| Feb                                           | 20.02                     | 64.32                                 | 47.55      | 131.87  | 17.87              | 24.62             | 000                                | 0.30     | 174.67     | 14.60       | 189.27                                | 00:0   | 8.16       | 14.30                            | 19.70              | 42.16  | 29.83    | 71.991    | -117.28  |
| Mar                                           | 19.30                     | 62.07                                 | 15.89      | 127.26  | 19.79              | 27.26             | 000                                | 0.23     | 174.53     | 10.84       | 185.36                                | 0.00   | 7.88       | 15.83                            | 21.81              | 45.52  | 22.14    | 67.66     | .117.71  |
| yby                                           | 3.30                      | 10.61                                 | 7.85       | 21.76   | 19.15              | 26.38             | 00:0                               | 0.21     | 67.51      | 10.49       | 78.00                                 | 00.00  | 1.35       | 15.32                            | 21.11              | 37.77  | 21.43    | 59.20     | .18.79   |
| Mar                                           | 00:0                      | 000                                   | 000        | 00.00   | 19.79              | 27.26             | 00.0                               | 0.55     | 47.60      | 26.80       | 74.40                                 | 00:00  | 00'0       | 15.83                            | 21.81              | 37.64  | 54.75    | 92.39     | 18.00    |
| Total                                         | 463.00                    | 463.00 1489.0                         | 1100.82    | 3052.8  | 233.0              | 321.0             | 00.0                               | 53.94    | 3660.76    | 2640.0      | 6300.76                               | 0.0    | 6.881      | 186.4                            | 256.8              | 632.1  | 5394.18  | 6026.31   | -274.45  |
| Note : Column no. 10 = Column no (5+6+7+8+9). | 2.10 ≈ Colum              | n no.(5+6+                            | 7+8+9)     | Colun   | En No. 12 =        | Column n          | Column No. 12 = Column no. (10+11) |          | Umn no. 19 | = Column no | Column no. 19 = Column no. (13+17+18) |        | no.20 - Co | Column no.20 = Column no.(19-12) | -12).              |        |          |           |          |

Unit: MCM Table 4.10.1(b): Upper Cauvery Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|   | 1                                       | Monthly water          | halance                               |                  | (21)              | 110.28    | 703.58  | 473.36  | 18636  | .277.58 | -11.32 | 41.75  | -74.86 | -93.64 | -95.09 | -16.11 | 16.50 | 286.45     |  |
|---|-----------------------------------------|------------------------|---------------------------------------|------------------|-------------------|-----------|---------|---------|--------|---------|--------|--------|--------|--------|--------|--------|-------|------------|--|
|   |                                         |                        | _                                     | available        |                   | . \$54.55 | 2454.57 | 2003.88 | 663.14 | 572.85  | 112,10 | 137.51 | 00.66  | 102.38 | 57.75  | 11.69  | 98.37 | 11.5799    |  |
|   |                                         | Gross                  | water                                 | avai             | (20)              |           | _       | L       | Ш      |         |        | Ľ      |        |        |        |        |       | Ш          |  |
|   |                                         | Ground                 | water                                 | yields           | (61)              | 45.73     | 106.70  | 107,70  | 105.45 | 115.20  | 7.75   | 16.87  | 19.87  | 24.99  | 24.1   | 4,13   | 0.00  | 578.50     |  |
|   |                                         | Surface                | water                                 | yields           | (81)              | 191.67    | 2269 40 | 1817.38 | 481.03 | 376.41  | 19.63  | 15.17  | 29.02  | 29 83  | 22 14  | 21,43  | 34.75 | 5394.18    |  |
|   | bility                                  |                        | 1040                                  | 7                | (۱)               | 57.15     | 78.47   | 08.87   | 76.65  | 81.24   | 4.7    | 49.13  | 8.11   | 47.56  | 51.50  | 43.56  | 43.62 | 702,53     |  |
|   | Water Availability                      | rom uses               | Indus-                                | trial            | (16)              | 21.11     | 21.81   | 21.81   | 21.11  | 21.81   | 21.11  | 21.81  | 21.81  | 19.70  | 21.81  | 21.11  | 23.81 | 256.80     |  |
|   | ======================================= | Regeneration from uses | - Ропис-                              | stic             | (15)              | 21.11     | 21.81   | 21.81   | 21.11  | 21.81   | 21.11  | 21.81  | 21.81  | 19.70  | 21.81  | 21,11  | 21.81 | 256.80     |  |
|   |                                         | Re                     | Irriga. I                             | tion             | ( <del>†</del> 2) | 1.9       | 34.85   | 35.18   | 34.44  | 37.62   | 2.53   | 5.51   | 6.49   | 8.16   | 7.88   | 1.35   | 0.00  | 6'881      |  |
|   |                                         |                        | Import                                |                  | (13)              | 0.00      | 000     | 00.0    | 00.0   | 00.0    | 0.00   | 000    | 0.00   | 0.00   | 0.00   | 000    | 000   | 00.0       |  |
|   |                                         | Gross                  | total In                              | utilisation      | (12)              | 374.83    | 750.99  | 530.52  | 849.50 | 850.44  | 123.42 | 179.25 | 173.86 | 196.02 | 192.84 | 85.23  | 81.87 | 6388.76    |  |
|   |                                         | 3                      |                                       | alita            |                   | 79.12     | 1110.68 | 889.46  | 235.42 | 184.22  | 29.17  | 35.00  | 14.20  | 14.60  | 10.84  | 10.49  | 26.80 | 26-40.0 6. |  |
|   |                                         |                        | Export                                |                  | (E)               | =         |         |         |        |         | 4      |        |        | C!     | 9      | 4      |       |            |  |
|   |                                         |                        | T                                     | Lotes            | (10)              | 295.7     | 640.31  | 641.07  | 614.07 | 666.22  | 94.24  | 144.25 | 159.65 | 181.42 | 182.00 | 74.74  | 55.07 | 3748.76    |  |
|   |                                         |                        | Environ-                              | mental           | 6                 | 1.62      | 22.69   | 18.17   | 4.81   | 3.76    | 09.0   | 0.72   | 0.29   | 0.30   | 0.22   | 0.21   | 0.55  | 53.94      |  |
|   | ation                                   |                        | Hydro                                 | power            | (61)              | 0.00      | 000     | 000     | 00.0   | 0.00    | 000    | 0.00   | 0.00   | 0.00   | 0.00   | 000    | 0.00  | 000        |  |
|   | Water Utilisation                       | cnts                   | Indus-                                | trial            | 3                 | 26.38     | 27.26   | 27.26   | 26.38  | 27.26   | 26 38  | 27.26  | 27.26  | 24.62  | 27.26  | 26.38  | 27.26 | 321.0      |  |
|   | 2                                       | Water requirements     | Dome-                                 | stic             | (9)               | 26.38     | 27.26   | 27.26   | 26.38  | 27.26   | 26.38  | 27.26  | 27.26  | 24.62  | 27.26  | 26.38  | 27.26 | 321.0      |  |
|   |                                         | Wa                     | ojects                                | Total            | (5)               | 241.32    | 563.09  | 568.37  | 556.50 | 607.93  | 38.05  | 89.01  | 104.84 | 131.87 | 127.26 | 21.76  | 000   | 3052.8     |  |
|   |                                         |                        | Utilisation under irrigation projects | Ongoing          | €                 | 87.02     | 203.05  | 204.95  | 200.67 | 219.21  | 14,74  | 32.10  | 37.80  | 47.55  | 45.89  | 7.85   | 0.00  | 1100.82    |  |
|   |                                         |                        | n under i                             | Existing Ongoing | €                 | 117.70    | 274.64  | 277.22  | 271.43 | 296.51  | 19.94  | 43.42  | 51.13  | 64.32  | 62.07  | 10.61  | 0.00  | 1489.0     |  |
|   |                                         |                        | Ltilisatio                            | Proposed f       | 3                 | 36.60     | 85.40   | 86.20   | 84.40  | 92.20   | 6.20   | 13.50  | 15.90  | 20.00  | 19.30  | 3.30   | 00.00 | 463.0      |  |
|   |                                         | - Yourk                | TIMEDIA                               |                  | Ξ                 |           |         |         |        |         |        |        |        |        |        |        |       |            |  |
| ļ | _                                       |                        |                                       |                  |                   | Jun       | Jo.     | Aug     | Sep    | ŏ       | 8<br>2 | å      | Jan    | F.     | Mar    | Apr    | May   | Total      |  |

Unit: MCM Table 4.10.1(c): Upper Cauvery Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| V Combiler         | Monthly                | balance                              |                  | (20) | 68.81     | 565.98  | -302.62 | -338.79  | -101.61   | 101.27 | -80.90 | -107.76 | 117.04   | -63.26   | 255.11  | 309.11 | 188.30          |                                                     |
|--------------------|------------------------|--------------------------------------|------------------|------|-----------|---------|---------|----------|-----------|--------|--------|---------|----------|----------|---------|--------|-----------------|-----------------------------------------------------|
| }-<br>   <br>      | Gross                  | Waler                                | ovailable        | (61) | 659.26    | 2277.19 | \$52.22 | 455.17   | 1030.37   | 336.06 | 67.15  | 44.13   | 72.46    | 176.42   | 606.37  | 673.94 | 6950.73         |                                                     |
|                    | Surface                | water                                | yields           | (18) | 607.90    | 2204.70 | 479.40  | 384.30   | 955.10    | 297.10 | 24.00  | 00.00   | 30.30    | 130.90   | \$68.60 | 636.30 | 6318.60         |                                                     |
| ility              |                        | Total                                | 1                | (17) | 51.36     | 72.49   | 72.82   | 70.87    | 75.27     | 38.96  | 43.15  | 44.13   | 42.16    | 45.52    | 37.77   | 37.64  | 632.1           |                                                     |
| Water Availability | from tises             | -snpu                                | trial            | (16) | 21.11     | 21.81   | 21.81   | 21.11    | 21.81     | 21.11  | 21.81  | 21,81   | 19.70    | 21.81    | 21.11   | 21.81  | 256.8           | -12)                                                |
| M                  | Regeneration from used | Dome-                                | stic             | (15) | 15.32     | 15.83   | 15.83   | 15.32    | 15.83     | 15.32  | 15.83  | 15.83   | 14.30    | 15.83    | 15.32   | 15.83  | 186.4           | Column no.20 = Column no.(19-12)                    |
|                    |                        | Imga                                 | tion             | (14) | 14.94     | 34.85   | 35.18   | 34.44    | 37.62     | 2.53   | 5.51   | 6.49    | 8.16     | 7.88     | 1.35    | 00.00  | 188.9           | n no.20 $=$ Cc                                      |
|                    |                        | Import                               |                  | (13) | 00.0      | 00.0    | 0.00    | 0.00     | 00.00     | 00.0   | 0.00   | 0.00    | 00.00    | 0.00     | 00.0    | 0.00   | 0.0             | Colum                                               |
|                    | Gross                  | total                                | utilisation      | (12) | 590.45    | 1711.21 | 854.84  | 793.96   | 1131.97   | 234 79 | 148.05 | 151,89  | 189.50   | 239.68   | 351.26  | 364.83 | 6762.4          | (13+17+18)                                          |
|                    |                        | Export                               |                  | (11) | 297.52    | 1079.02 | 234.63  | 188.08   | 467.41    | 145.41 | 11.75  | 0.00    | 14.83    | 64.06    | 278.28  | 311.42 | 3092.4          | Column no. 19 = Column no. (13+17+18)               |
|                    |                        | Total                                | 10101            | (10) | 292.94    | 632.19  | 620.21  | 605.87   | 664.53    | 89.39  | 136,31 | 151.89  | 174.67   | 175.62   | 72.98   | 53.42  | 3670.01         | umn no. 19 =                                        |
|                    |                        | Environ-                             | mental           | (6)  | 6.08      | 22.05   | 4.79    | 3.84     | 9.55      | 2.97   | 0.24   | 00.00   | 08:0     | 1.31     | 5.69    | 6.36   | 63.19           |                                                     |
| isation            |                        | Hydro                                | power            | (8)  | 000       | 0000    | 000     | 00.0     | 000       | 000    | 000    | 0000    | 000      | 00.0     | 000     | 00.0   | 0.001           | no. (10 + 11                                        |
| Water Utilisation  | ements                 | -snpul                               | File             | 0    | 26.38     | 27.26   | 27.26   | 26.38    | 27.26     | 26.38  | 27.26  | 27.26   | 24.62    | 27.26    | 26.38   | 27.26  | 321.0           | Column No. 12 = Column no. (10 + 11                 |
|                    | Water requirements     | Болте-                               | stic             | 9    | 19.15     | 19.79   | 19.79   | 19.15    | 19.79     | 19.15  | 19.79  | 19.79   | 17.87    | 19.79    | 19.15   | 19.79  | 233.0           | lumn No. 1                                          |
|                    | 1                      | projects                             | Total            | (5)  | 21 241.32 | 563.09  | 568.37  | 7 556.50 | 11 607.93 | +0.88  | 10.68  | 104.84  | 5 131.87 | 9 127.26 | 51.76   | 00.00  | 1100.82 3052.82 |                                                     |
|                    |                        | Julisation under irragation projects | Existing Ongoing | €    | 87.02     | 203.05  | 204.95  | 200.67   | 219.21    | 14.74  | 32.10  | 37.80   | 47.55    | 45.89    | 7.85    | 00:00  |                 | 6+2+8+0                                             |
|                    |                        | ion under                            | Existing         | Đ    | 117,70    | 274.64  | 277.22  | 271,43   | 296.51    | 19.94  | 43.42  | \$1.13  | 64.32    | 62.07    | 10.61   | 00:0   | 1489.0          | mn no.(5                                            |
|                    |                        | Utilisa                              | Proposed         | 9    | 36.60     | 35.40   | 86.20   | 81.40    | 92 20     | 6.201  | 13.50  | 15.90   | 20.00    | 19.30    | 3.30    | 00.0   | 463.00          | 3.10 = Colu                                         |
|                    | 1011                   | Month                                |                  | Ξ    | Jun       | 13      | Aug     | Sen      | ð         | No.    | 3      | Jan     | Feb      | Mar      | Apr     | ) Lay  | Total           | Note : Column no $10 = \text{Column no}(5+6+7+8+9)$ |

Unit: MCM Table 4.10.1(d): Upper Cauvery Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                             | _                         |             |                                      |         |                    | Water Utilisation                    | alion      |          |           |           |                                          |        |            |                                    | Vater Availability | bility |         |        |           | 1,60,1  |
|---------------------------------------------|---------------------------|-------------|--------------------------------------|---------|--------------------|--------------------------------------|------------|----------|-----------|-----------|------------------------------------------|--------|------------|------------------------------------|--------------------|--------|---------|--------|-----------|---------|
| -                                           |                           |             |                                      | Wa      | Water requirements | nents                                |            |          |           |           | Gross                                    |        |            | Regeneration from uses             | from uses          |        | Surface | Ground | Gross     | Monthly |
| Month                                       | Utilisati                 | on under it | Utilisation under imigation projects | ojects  | Dome-              | Indus-                               | Hydro-     | Environ- | T of a    | Export    | total                                    | Import | Irriga-    | Dome-                              | Indus-             |        | water   | water  | water     | halance |
|                                             | Proposed Existing Ongoing | Existing (  | Ongoing                              | Total   | stic               | fr.ial                               | power      | mental   | 10191     |           | utilisation                              |        | tion       | stic                               | trial              | LOTE   | yiclds  | yields | available |         |
| ε                                           | (2)                       | (3)         | €                                    | 9       | (9)                | 3                                    | (61)       | (6)      | (01)      | (11)      | (12)                                     | ((13)  | (+1)       | (51)                               | (91)               | (11)   | (81)    | (61)   | (20)      | (11)    |
| Jun                                         | 36.60                     | 117.70      | 87 02                                | 241.32  | 26.38              | 26.38                                | 0.00       | 6.08     | 300.17    | 297.52    | 597.69                                   | 00.0   | 14.94      | 21.11                              | 21.11              | 57.15  | 607.90  | 45.73  | 710.78    | 113.09  |
| Jul                                         | 85.40                     | 274.64      | 203.05                               | \$63.09 | 27.26              | 27.26                                | 0.00       | 22.05    | 639.66    | 1079.0    | 1718.68                                  | 00.0   | 34.85      | 21.81                              | 21.81              | 78.47  | 2204.70 | 106.70 | 2389.9    | 61.16   |
| Aug                                         | 86.20                     | 377.22      | 204.95                               | 568.37  | 27.26              | 27,26                                | 0,00       | 4.79     | 657.69    | 234.63    | 862.31                                   | 00.0   | 35.18      | 21.81                              | 21.81              | 78.80  | 479.40  | 107.70 | 665.90    | -196.4  |
| Sep                                         | 84.40                     | 271.43      | 200.67                               | 556.50  | 26.38              | 26.38                                | 0.00       | 3.84     | 613.11    | 188.08    | 801.19                                   | 00:00  | 34.44      | 21.11                              | 21.11              | 76.65  | 384.30  | 105.45 | 14.995    | -234.78 |
| Ş                                           | 92.20                     | 296.51      | 219.21                               | 607.93  | 27.36              | 27.26                                | 0.00       | 9.55     | 672.00    | 467,44    | 1139.45                                  | 00.0   | 37.62      | 21.81                              | 21.81              | 81.24  | 955.10  | 115.20 | 1151.54   | 12.10   |
| Nov                                         | 6.20                      | 19.94       | 14.74                                | 88.04   | 26.38              | 26.38                                | 0.00       | 297      | 96.62     | 145.41    | 242.02                                   | 0.00   | 2.53       | 21.11                              | 21.11              | 41.74  | 297.10  | 7.75   | 349.59    | 107.57  |
| l<br>å                                      | 13.50                     | 43.42       | 32.10                                | 89.01   | 27.26              | 27.26                                | 0.00       | 0.24     | 143.78    | 11.75     | 155.53                                   | 0.00   | 5.51       | 21.81                              | 21.81              | 49.13  | 24.00   | 16.87  | 90.00     | -65.53  |
| Jan                                         | 15.90                     | 51.13       | 37.80                                | 104.81  | 27.26              | 27.26                                | 0.00       | 0.00     | 159.36    | 00'0      | 159.36                                   | 000    | 6.49       | 21.81                              | 21.81              | 50.11  | 0.00    | 19.87  | 86.69     | -89.39  |
| Feb                                         | 20.00                     | 64.32       | 47.55                                | 131.87  | 24.62              | 24.62                                | 0.00       | 0.30     | 181.42    | 14.83     | 196.25                                   | 00.0   | 8.16       | 19.70                              | 02.61              | 17.56  | 30.30   | 24.99  | 102.85    | -93.40  |
| Mar                                         | 19.30                     | 62.07       | 45.89                                | 127.26  | 27.26              | 27.26                                | 0.00       | 1.31     | 183.09    | 64.06     | 247.16                                   | 0.00   | 7.88       | 21.81                              | 21.81              | 51.50  | 130.90  | 24.11  | 206.51    | 40.64   |
| Apr                                         | 3.30                      | 19'01       | 7.85                                 | 21.76   | 26.38              | 26.38                                | 0.00       | 8.69     | 80.21     | 278.28    | 358.49                                   | 00.0   | 1.35       | 21.11                              | 21.11              | 43.56  | 568.60  | 4.12   | 616.28    | 257.79  |
| May                                         | 0.00                      | 0.00        | 0.00                                 | 00.0    | 27.26              | 27.26                                | 0.00       | 6.36     | 68.09     | 311.42    | 372,30                                   | 00.00  | 00.0       | 21.81                              | 21.81              | 43.62  | 636.30  | 0.00   | 679.92    | 307.62  |
| Total                                       | 463.0                     | 1489.0      | 1100.82 3052.82                      | 3052.82 | 321.0              | 321.0                                | 0.00       | 62.30    | 3757,12   | 2640.0    | 6850.4                                   | 00.00  | 188.9      | 256.80                             | 256.80             | 702.53 | 6230.30 | 578.50 | 7511.33   | 06.090  |
| Note: Column no 10 = Column no (5+6+7+8+9). | 30.10 = Colun             | n no.(5+¢   | 147+8+9)                             | Colu    | nn No. 12          | Column No. 12 = Column no. (10 + 11) | 0. (10+11) |          | umn no.20 | Column no | Column no. 20 = Column no. (13+17+18+19) |        | umn no. 21 | Column no. 21 = Column no. (20-12) | 6.(20-12).         |        |         |        |           |         |

Unit: MCM Table 4.10.1(e): Upper Cauvery Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                                              |              |                           | :                                  |        |                                      | Water Utilisation | sation     |          |             |             |                                       |        |                                    | =                      | Water Availability | ifity |         |           | L.Consthier |
|----------------------------------------------|--------------|---------------------------|------------------------------------|--------|--------------------------------------|-------------------|------------|----------|-------------|-------------|---------------------------------------|--------|------------------------------------|------------------------|--------------------|-------|---------|-----------|-------------|
|                                              |              |                           |                                    | Wa     | Water requirements                   | nents             |            |          |             |             | Gross                                 |        | 145                                | Regeneration from uses | ा from धाइस्ट      |       | Surface | Gross     | water       |
| Month                                        | Utilisati    | on under it               | Julisation under impation projects |        | Domc-                                | Indus-            | Hydro      | Environ- | 1           | Export      | total                                 | Import | Irriga-                            | Dome-                  | Indus-             |       | water   | water     | balance     |
|                                              | Proposed     | Proposed Existing Ongoing | Davoine                            | Total  | stic                                 | trial             | power      | mental   |             |             | utilisation                           |        | tion                               | stic                   | trial              |       | yicids  | available |             |
| 3                                            | 6            | Θ                         | 9                                  | 3      | 9                                    | ε                 | (8)        | 6        | (01)        | ε           | (12)                                  | (13)   | (14)                               | (51)                   | (91)               | (17)  | (18)    | (19)      | (30)        |
| l/tim                                        | 36.60        | 1                         | 87.02                              | 241.32 | 19.15                                | 26.38             | 00.0       | 3.50     | 290.36      | 171.47      | 461.83                                | 0.00   | 14.94                              | 15.32                  | 21.11              | 51.36 | 350.35  | 401.71    | -60.12      |
|                                              | 85.40        | Ľ                         | 203 05                             | 563.09 | 19.79                                | 27.26             | 000        | 566      | 620.08      | 486.50      | 1106.58                               | 0.00   | 34.85                              | 15.83                  | 21.81              | 72.49 | 994.04  | 1066.53   | -40.05      |
| Ais                                          | 86.20        | <u>L</u>                  | 201.05                             | 1      | 10.70                                | 77.26             | 000        | 401      | 619.43      | 196 19      | 815.61                                | 000    | 35.18                              | 15.83                  | 21.81              | 72.82 | 400.86  | 473.68    | -341.94     |
|                                              | 9            | ſ                         | 200 67                             | 1      | 19.15                                | 26 38             | 000        | 5.52     | 607.55      | 269.96      | 877.51                                | 0.00   | 34.44                              | 15.32                  | 21.11              | 70.87 | 551.60  | 622.47    | -255.04     |
| j                                            | 92.20        | Ĺ                         | 219.21                             | 60793  | 19.79                                | 27.26             | 000        | 8.16     | 663.14      | 399.21      | 1062 34                               | 0.00   | 37.62                              | 15.83                  | 21.81              | 75.27 | 815.68  | 890.95    | -171.40     |
| Zez                                          | 620          | L                         | 14 74                              | 40.88  | 10 15                                | 26 38             | 000        | 4.26     | 8906        | 208 67      | 299.35                                | 00'0   | 2.53                               | 15.32                  | 11.12              | 38.96 | 426.36  | 465.32    | 165.97      |
| ا ا                                          | 13 50        | L                         | 22.10                              | 89.01  | 19 79                                | 27.26             | 000        | 560      | 137.02      | 52.54       | 183.71                                | 00.0   | 5.51                               | 15.83                  | 21.81              | 43.15 | 95.41   | 138.56    | 45.15       |
| Jan                                          | 15.90        | l                         | 37.80                              | 1      | 19.79                                | 27.26             | 000        | 0.26     | 152.15      | 12.95       | 165.10                                | 0.00   | 6,49                               | 15.83                  | 21.81              | # 13  | 26.45   | 70.58     | -94 52      |
| 6                                            | 20.00        | L                         | 47.55                              |        | 17.87                                | 24.62             | 000        | 0.20     | 174.57      | 9.82        | 184.39                                | 0.00   | 8.16                               | 14.30                  | 19.70              | 42.16 | 20.07   | 62.23     | -122 16     |
| Mar                                          | 19.30        | $\perp$                   | 45.89                              | 127.26 | 19.79                                | 27.26             | 000        | 0.03     | 174.32      | 0 43        | 174.74                                | 0.00   | 7.88                               | 15.83                  | 21.81              | 45.52 | 0.87    | 46.39     | -128.36     |
| Por                                          | 3.30         | L                         | 7.85                               | 21.76  | 19.15                                | 26.38             | 0000       | \$ 18    | 72.47       | 253 32      | 325.79                                | 00.0   | 1.35                               | 15.32                  | 21.11              | 37.77 | 517.59  | 555.36    | 229.58      |
| Vav                                          | 00.0         | _                         | 000                                | 000    | 19.79                                | 27.76             | 000        | 643      | 53.46       | 313.58      | 367.04                                | 00.0   | 0.00                               | 15.83                  | 21.81              | 37.64 | 640.72  | 678.36    | 311.32      |
| Total                                        | 463.00       | 1489.0                    | 1100.82                            | 3052.8 | 233.0                                | 321.0             | 00.0       | 48.40    | 3655.22     | 2368.81     | 6024.00                               | 0.0    | 188.9                              | 186.4                  | 256.8              | 632.1 | 4840.00 | 5472.13   | -551.86     |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Colu | m no.(5+t                 | (6+8+1+5                           | Solu   | Column No. 12 = Column no. (10 + 11) | = Column n        | 10. (10+11 |          | mn no. 19 = | - Column no | Column no. 19 = Column no. (13+17+18) |        | Column no. 20 = Column no. (19-12) | fumn no.(15            | 3-12).             |       |         |           |             |
|                                              |              |                           |                                    |        |                                      |                   |            |          |             |             |                                       | 1      |                                    |                        |                    |       |         |           |             |

Hait - MCM Table 4.10.1(f): Upper Cauvery Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                              | _              |                  |                                     |         |                    | Water Utilisation | ration                               |          |              |           |                                          |        |                                   |                        | Water Availability | bility |         |          |           |         |
|----------------------------------------------|----------------|------------------|-------------------------------------|---------|--------------------|-------------------|--------------------------------------|----------|--------------|-----------|------------------------------------------|--------|-----------------------------------|------------------------|--------------------|--------|---------|----------|-----------|---------|
|                                              |                |                  |                                     | Wai     | Water requirements | nents             |                                      |          |              |           | Gross                                    |        | 2                                 | Regeneration from uses | from uses          |        | Surface | Ground   | Gross     | Monthly |
| Month                                        | Unisatio       | on under i       | Utilisation under impation projects |         | Доше-              | Indus-            | Hydro-                               | Environ- | -            | Export    | total                                    | Import | Imiga-                            | Dome-                  | Indus-             | Total  | water   | _        | water     | balance |
| _                                            | Proposed       | Existing Ongoing | Ongoing                             | Fotal   | Stic               | trial             | power                                | mental   | 10131        |           | utilisation                              |        | tion                              | stic                   | trial              | 301    | yields  | yields 8 | available |         |
| €                                            | <u>છ</u>       | Ē                | Ŧ                                   | 3       | (9)                | 6                 | (61)                                 | (6)      | (01)         | (3)       | (21)                                     | (13)   | (14)                              | (15)                   | (91)               | (11)   | (18)    | (61)     | (30)      | (E)     |
| Jun                                          | 36.60          | 117.70           | 87.02                               | 241.32  | 26.38              | 26.38             | 000                                  | 3.501    | 297.60       | 171.47    | 469.06                                   | 0.00   | 14,94                             | 21.11                  | 21.11              | 57.15  | 350.35  | 45.73    | 453.23    | -15.83  |
| 174                                          | 85 +10         | 274.64           | 203.05                              | \$63.09 | 27.26              | 27.26             | 000                                  | 9.94     |              | 486.50    | 1114.06                                  | 00.0   | 34.85                             | 21.81                  | 21.81              | 78.47  | \$04.04 | 106.70   | 11 29 21  | 65 16   |
| Aug                                          | 86.20          | 277.22           | 204.95                              | 568.37  | 27.26              | 27.26             | 000                                  | 4.01     |              | 196.19    | 823.09                                   | 00:00  | 35.18                             | 21.81                  | 23.81              | 78.80  | 400.86  | 107.70   | 587.36    | -235.73 |
| Sep                                          | 84.40          | 271.43           | 200.67                              | \$56.50 | 26.38              | 26.38             | 000                                  | 5.52     | 614.78       | 269.96    | 884.74                                   | 0.00   | 34.44                             | 21.11                  | 21.11              | 76.65  | 551.60  | 105.45   | 733.71    | -151.03 |
| Ş                                            | 92.20          | 296.51           | 219.21                              | 607.93  | 27.26              | 27.26             | 00.0                                 | 8.16     | 670.61       | 399.21    | 1069.82                                  | 0.00   | 37.62                             | 21.81                  | 21.81              | 81.24  | 89.518  | 115.20   | 1012.12   | -\$7.09 |
| .vov                                         | 6.20           | 19.94            | 14,74                               | 40.88   | 26.38              | 26.38             | 0.00                                 | 4.36     | 1676         | 208.67    | 306.58                                   | 00:0   | 2.53                              | 21.11                  | 23.11              | 44.74  | 426.36  | 7.75     | 478.85    | 172.27  |
| 3 <u>2</u>                                   | 13.50          | 43.42            | 32.10                               | 10.68   | 27.26              | 27.26             | 0.001                                | 0.95     | 144.49       | 46.70     | 191.19                                   | 00:00  | 5.51                              | 21.81                  | 21.81              | 49.13  | 14:56   | 16.87    | 161.41    | .19.78  |
| lei<br>Lei                                   | 15.90          | 51.13            | 37.80                               | 10.1    | 27.26              | 27.26             | 0000                                 | 0.26     | 159.63       | 12.95     | 172.57                                   | 0.00   | 6.49                              | 21.81                  | 21.81              | 50.11  | 36.45   | 19.87    | 96.43     | -76.15  |
| Feb                                          | 20.00          | 64.32            | 47.55                               | 131.87  | 24.62              | 24.62             | 00.0                                 | 0.20     | 181.32       | 9.82      | 191.14                                   | 00.0   | 8.16                              | 19.70                  | 19.70              | 47.56  | 20.07   | 24.99    | 92.62     | -98.52  |
| Mar                                          | 19.30          | 62.07            | 45.89                               | 127.26  | 27.26              | 27.26             | 0.00                                 | 10.0     | 181.79       | 0.43      | 182.22                                   | 00.00  | 7.88                              | 21.81                  | 21 81              | \$1.50 | 0.87    | 24.11    | 76.48     | -105.74 |
| Ed F                                         | 3.30           | 10.61            | 7.85                                | 21.76   | 26.38              | 26.38             | 000                                  | 5.18     | 20.50        | 253.32    | 333.02                                   | 00.0   | 1.35                              | 21.11                  | 21.11              | 43.56  | 517.59  | 4.12     | 565.27    | 232.25  |
| Velv                                         | 000            | 0.00             | 00.0                                | 9       | 27.26              | 27.26             | 00:0                                 | 6.41     | 60 93        | 313.581   | 374.51                                   | 0.00   | 00.0                              | 21.81                  | 21.81              | 43.62  | 640.72  | 0.00     | 684,34    | 309.83  |
| Total                                        | 463.0          | 1489.0           | 1100.87                             | 3052.8  | 321.0              | 321.0             | 0.00                                 | 18.40    | 3743.22      | 2640.0    | 6112.00                                  | 0.00   | 188.9                             | 256.80                 | 256.80             | 702.53 | 4840.00 | 578.50   | 6121.03   | 262.19  |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | ia. 10 = Colun | nn no.(5+1       | (6+8+2+)                            | Colum   | nn No. 12 -        | - Column n        | Column No. 12 = Column no. (10 + 11) |          | umn no. 20 = | Column no | Column no. 20 = Column no. (13+17+18+19) |        | Column no. 21 = Column no.(20-12) | - Column ac            | 0.(20-12).         | :      |         |          |           |         |

Unit: MCM Table 4,10.1(g): Upper Cauvery Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                                              | <u> </u>    |                  |                                      |        |                    | Water Utilisation                    | sation   |          |           |             |                                        |        |                                  | N.                     | Water Availability | clity |         |           | ) (0001) |
|----------------------------------------------|-------------|------------------|--------------------------------------|--------|--------------------|--------------------------------------|----------|----------|-----------|-------------|----------------------------------------|--------|----------------------------------|------------------------|--------------------|-------|---------|-----------|----------|
| -                                            |             |                  |                                      | Walt   | Water requirements | nents                                |          |          |           |             | Gross                                  |        | 124                              | Regeneration from uses | from uses          |       | Surface | Gross     | water    |
| Month                                        | Utilisation | n under in       | Julisation under irrigation projects | , ,    | Dome-              | Indus-                               | Hydro    | Environ- | Total     | Export      | total                                  | Import | Imiga-                           | роше-                  | Indus-             | Total | water   | water     | balance  |
|                                              | Proposed I  | Existing Ongoing | nkoing                               | Total  | stic               | trial                                | power    | mental   | Torqu     |             | utilisation                            |        | Cion                             | Sirc                   | trial              |       | yields  | available |          |
| 3                                            | (C)         | 3                | €                                    | (5)    | (9)                | 3                                    | 9        | (6)      | (10)      | (11)        | (12)                                   | (61)   | (14)                             | (13)                   | (91)               | (LD)  | (18)    | (19)      | (3g)     |
| Jun.                                         | 36.60       | 117.70           | 87.02                                | 241.32 | 19.15              | 26.38                                | 00.0     | 3.6      | 289.90    | 148.62      | 438.52                                 | 0.00   | 14.941                           | 15.32                  | 21.11              | 51.36 | 303.67  | 355.03    | -83.48   |
| Ja.                                          | 85.4D       | 27.52            | 303.05                               | 563.09 | 19.79              | 27.26                                | 00:0     | 8.83     | 618.97    | 432.02      | 1050.99                                | 0.00   | 34.85                            | 15.83                  | 21.81              | 72.49 | 882.73  | 955.22    | -95.77   |
| Aug                                          | 86.20       | 27.72            | 201.95                               | 568.37 | 19.79              | 27.26                                | 000      | 2.91     | 618.33    | 142,49      | 760.82                                 | 00'0   | 35.18                            | 15.83                  | 21.81              | 72.82 | 291.14  | 363.96    | -396.86  |
| Sep                                          | 8-1-40      | 271.43           | 200.67                               | 556.50 | 19.15              | 26.38                                | 0.00     | 5.09     | 607.12    | 248.97      | 856.08                                 | 0.00   | 4                                | 15.32                  | 21.11              | 70.87 | 508.70  | 579.57    | .276.52  |
| Ö                                            | 92.20       | 296.51           | 219.21                               | 607.93 | 19.79              | 27.26                                | 00.0     | 3.95     | 658.93    | 193.47      | 852.40                                 | 0.00   | 37.62                            | 15.83                  | 21.81              | 75.27 | 395.31  | 470.58    | -381.83  |
| 202                                          | 6.20        | 16.01            | 14.74                                | 40.88  | 19.15              | 26.38                                | 00.0     | 1.61     | 88.02     | 78.78       | 166.80                                 | 0.00   | 2.53                             | 15.32                  | 21.11              | 38,96 | 160.96  | 199.92    | 33.12    |
| ğ                                            | 13.50       | 43.42            | 32.10                                | 10.68  | 19.79              | 27.26                                | 000      | 0.00     | 136.07    | 00.0        | 136.07                                 | 00.00  | 5.51                             | 15.83                  | 21.81              | 43,15 | 0.00    | 43.15     | -92.91   |
| Van                                          | 15.90       | 51.13            | 37.80                                | 104.84 | 19.79              | 27.26                                | 000      | 00.0     | 151.89    | 00:0        | 151.89                                 | 0.00   | 6.49                             | 15.83                  | 21.81              | 44.13 | 00.0    | 44.13     | -107.76  |
| Feb                                          | 20.00       | 64.32            | 17.55                                | 131.87 | 17.87              | 24.62                                | 00.0     | 0.07     | 175.34    | 47.48       | 222.82                                 | 0.00   | 8.16                             | 14.30                  | 19.70              | 42,16 | 120.79  | 139.18    | \$3.64   |
| Mar                                          | 19.30       | 62.07            | 15,89                                | 127.26 | 19.79              | 27.26                                | 000      | 0.00     | 174.31    | 00'0        | 174.31                                 | 00.0   | 7.88                             | 15.83                  | 21.81              | 45.52 | 0.00    | 45.52     | .128.79  |
| Apr                                          | 3.30        | 10.61            | 7.85                                 | 21.76  | 19.15              | 26.38                                | 000      | 1.86     | 91.69     | 91.25       | 160,41                                 | 00.00  | 1.35                             | 15.32                  | 21.11              | 37.77 | 186.45  | 224.22    | 63.81    |
| May                                          | 00.0        | 00.0             | 800                                  | 00.0   | 19.79              | 27.26                                | 000      | 3 26     | 50.31     | 159.50      | 209.81                                 | 0.00   | 00.0                             | 15.83                  | 21.81              | 37.64 | 325.89  | 3,63,53   | 153.72   |
| Total                                        | 463.00      | 463.00 1489.0    | 11:00.82                             | 3052.8 | 233.0              | 321.0                                | 00.0     | 31.50    | 3638.32   | 1542.6      | 5180.92                                | 0.0    | 188.9                            | 186.4                  | 256.8              | 632.1 | 3150.00 | 3782.13   | .1398.76 |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10 = Colum  | n no.(5+6-       | +7+8+9).                             | Colum  | in No. 12 :-       | Column No. 12 = Column no. (10 + 11) | 0 (10+11 |          | on un. 19 | = Column no | Column no. 19 = Column no. (13+17+18). |        | Column no.20 = Column no.(19-12) | umn no.(19             | -12).              |       |         |           |          |

Table 4.10.1(h): Upper Cauvery Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                               | _              |                  |                                      |        |                    | Water Utilisation                   | Salion       |         |              |             |                                          |        |                                    |                        | Water Availability | bility |          |        |           | 11/2-11   |
|-----------------------------------------------|----------------|------------------|--------------------------------------|--------|--------------------|-------------------------------------|--------------|---------|--------------|-------------|------------------------------------------|--------|------------------------------------|------------------------|--------------------|--------|----------|--------|-----------|-----------|
| ;                                             |                |                  |                                      | Wal    | Water requirements | nents                               |              |         |              |             | Gross                                    |        | W.                                 | Regeneration from uses | from uses          |        | Surface  | Ground | Gross     | Yionuniy. |
| North                                         | Utilisati      | on under ir      | Julisation under irrigation projects | jects  | Dome-              | Inchus.                             | Hydro        | Emiron- | T app        | Export      | total                                    | Import | Ітіва-                             | Dome-                  | Indus-             | 100    | water    | water  | Waler     | halance   |
|                                               | Proposed       | Existing Ongoing | Angoing                              | Total  | stic               | F.                                  | power        | mentai  | I OFFI       |             | utilisation                              |        | tion                               | stic                   | trial              | 100    | yields   | yields | available |           |
| ε                                             | (3)            | <b>©</b>         | €                                    | 3      | (9)                | 0                                   | (61)         | 6       | (01)         | (11)        | (13)                                     | (13)   | (40)                               | (15)                   | (16)               | ((1)   | (18)     | (61)   | (20)      | (21)      |
| ra)                                           | 36.60          | 117.70           | 87.02                                | 241.32 | 26.38              | 26.38                               | 000          | 3.04    | 297,13       | 148.62      | 445.75                                   | 00'0   | 14.94                              | 21.11                  | 21,11              | \$7.15 | 303.67   | 45.73  | 406.55    | 39.20     |
| Inc                                           | 85.40          | 27.52            | 203 05                               | 563.09 | 27.26              | 27.26                               | 000          | 8.83    | 626.44       | 432.02      | 1058.47                                  | 00'0   | 34.85                              | 21.811                 | 21.81              | 78.47  | 882.73   | 106.70 | 067.901   | 9.14      |
| Aug                                           | 86.20          | 277.22           | 20.192                               | 568.37 | 27.26              | 27.26                               | 00:0         | 2.91    | 625.80       | 142.49      | 768.29                                   | 00:0   | 35.18                              | 21.81                  | 21.81              | 78.80  | 291.14   | 107.70 | 477.64    | .290.65   |
| Sep                                           | 84.40          | 271.43           | 200.67                               | 556.50 | 26.38              | 26.38                               | 000          | 5.09    | 614.35       | 248.97      | 863.32                                   | 00:0   | 74.44                              | 21,11                  | 21.11              | 76.65  | 508.70   | 105.45 | 18.069    | 172.51    |
| DG<br>O                                       | 92.20          | 296.51           | 219.21                               | 607.93 | 27.26              | 27.26                               | 00.0         | 3,95    | 666.41       | 193.47      | 88.658                                   | 00.0   | 37.62                              | 21.81                  | 21.81              | 81.24  | 395.31   | 115.20 | 591.75    | -268.12   |
| 57                                            | 6.20           | 19.94            | 4.74                                 | 88.01  | 26.38              | 26.38                               | 0.00         | 1.61    | 95.26        | 78.78       | 174.03                                   | 000    | 2.53                               | 21.11                  | 21.11              | 44.74  | 160.96   | 7.75   | 213.45    | 39.42     |
| 3<br>1                                        | 13.50          | 13.42            | 32.10                                | 10.68  | 27.26              | 27.26                               | 00.0         | 00.0    | 143,54       | 0.00        | 143.SE                                   | 000    | 5.51                               | 21.81                  | 21.81              | 49.13  | 9;<br>9; | 16.87  | 66.00     | .77.54    |
| Jan                                           | 15.90          | 51.13            | 37.80                                | 104.84 | 27.26              | 27.26                               | 00.0         | 00.0    | 159.36       | 00.0        | 159.36                                   | 00.00  | 6.49                               | 21.81                  | 21.81              | 50 11  | 0.00     | 19.87  | 86.69     | -89.39    |
| d:<br>d:                                      | 20.00          | £ 32             | 47.55                                | 131.87 | 24.62              | 24.62                               | 00.0         | 0.97    | 182.09       | 47.48       | 229.57                                   | 0.00   | 8.16                               | 19.70                  | 19.70              | 47.56  | 97.02    | 24 99  | 169.57    | -60.00    |
| Mar                                           | 19.30          | 62.07            | 45.89                                | 127.26 | 27.26              | 27.26                               | 00.0         | 000     | 181 78       | 0.00        | 181.78                                   | 000    | 7.88                               | 21.81                  | 21.81              | 51.50  | 0.00     | 24.11  | 75.61     | -106.17   |
| Apr                                           | 3.30           | 19.61            | 7.85                                 | 21.76  | 26.38              | 26.38                               | 00.0         | 1.86    | 76.39        | 91.25       | 167.64                                   | 00'0   | 1.35                               | 21.11                  | 21.11              | 43.56  | 186.45   | 4,12   | 234.13    | 66.49     |
| May                                           | 00'0           | 000              | 00.0                                 | 00.00  | 27.26              | 27.26                               | 0.00         | 3.26    | 57.78        | 159.50      | 217.28                                   | 00.00  | 0.00                               | 21.81                  | 21.81              | 43.62  | 325.89   | 0.00   | 369.51    | 152.23    |
| Total                                         | 463.0          | 1489.0           | 1100.82                              | 3052.8 | 321.0              | 321.0                               | 00.00        | 31.50   | 3726.32      | 2640.0      | 5268.92                                  | 00.00  | 188.9                              | 256.80                 | 256.80             | 702.53 | 3150.00  | 578.50 | 4431.03   | -1935.29  |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 10, 10 = Colun | nn no (5+6       | +7+8+9).                             | Colun  | nn No. 12          | Column No. 12 = Column no. (10 + 11 | 10, (10 + 11 | (       | umn no. 20 : | E Column no | Column no. 20 = Column no. (13+17+18+19) |        | Column no. 21 = Column no. (20-12) | Column no              | 5.(20-12).         |        |          |        |           |           |

Table 4.10.2(a): Kabini Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                                      | -                         |            |                                      |                |                    | Water Utilisation                   | Sation      |          |            |             |                                       |        |                | 3                                | Water Availability | ility |         |           | A footbly |
|------------------------------------------------------|---------------------------|------------|--------------------------------------|----------------|--------------------|-------------------------------------|-------------|----------|------------|-------------|---------------------------------------|--------|----------------|----------------------------------|--------------------|-------|---------|-----------|-----------|
|                                                      |                           |            |                                      | Wa             | Water requirements | nents                               |             |          |            |             | Gross                                 |        |                | Regeneration from uses           | from uses          |       | Surface | Gross     | Water     |
| Month                                                | Utilisatio                | n under ir | Jilisation under irrigation projects |                | Dome-              | Indus.                              | Hydro-      | Environ- | 1          | Ехроп       | letot                                 | Import | Irriga-        | Dome                             | Inchus-            |       | water   | water     | balance   |
|                                                      | Proposed Existing Ongoing | Xisting    | Jugging                              | Total          | stic               | trial                               | DOWEL       | mental   | TENO T     |             | utilisation                           |        | tion           | stic                             | t1.2               |       | yields  | available |           |
| ε                                                    | 5                         | ε          | E                                    | 3              | (9)                | E                                   | (8)         | 6)       | (01)       | (1)         | (12)                                  | (3)    | ( <del>}</del> | (15)                             | (91)               | (L)   | (18)    | (19)      | (20)      |
| lin I                                                | 2, 20                     | 13.65      | 787                                  | 2.22           | 18.49              | 23.01                               | 0.75        | 3.67     | 8,0        | 180.77      | 279.41                                | 7.35   | 5.06           | 14,79                            | 18.41              | 38.26 | 366.65  | 412.27    | 132.86    |
| ing.                                                 | 184 50                    | 118 75     | 155 46                               | 458.71         | 19.11              | 23.78                               | 0.75        | 156      | 51186      | 469 06      |                                       | 63.99  | 44.02          | 15.29                            | 19.02              | 78.34 | 951.39  | 1093.71   | 112.79    |
| an w                                                 | 180 51                    | × 4.       | 152 10                               | 448 70         | 101                | 22.78                               | 0.75        | 196      | 502 02     | 473.72      |                                       | 62.60  | 43.07          | 15.29                            | 19.03              | 77.38 | 980.86  | 1100.85   | 125.08    |
|                                                      | 100001                    | 8          | 121 22                               | 258 15         | 16.40              | 32.01                               | 0.75        | 05 P     | 404 99     | 226 19      | 631 18                                | 49.96  | 34 37          | 14.79                            | 18.41              | 67.58 | 458.78  | 576.32    | .54 86    |
| 3 6                                                  | 26.00                     | 10.00      | 13.48                                | 30.70          | 0                  | 23.78                               | 0.75        | 3.23     | 86 66      | 159 23      | 245.88                                | 5.55   | 3.82           | 15.29                            | 19.02              | 38.13 | 322.96  | 366.64    | 120.76    |
| Nex                                                  | 47.63                     | 30,66      | \$ 14                                | 1.8.43         | 18.49              | 23.01                               | 0.75        | 2.09     | 162.78     | 103.22      | 266.00                                | 16.52  | 11.37          | 14.79                            | 18.41              | 44.57 | 209.36  | 270.45    | 4.46      |
| 1                                                    | 0418                      | 69.09      | 70 3.6                               | 734 16         | 10 11              | 27.72                               | 0.75        | 1 (16    | 278.86     | \$2.24      | 331.10                                | 32.67  | 22.48          | 15.29                            | 19.02              | 56.79 | 105.95  | 195.40    | -135.69   |
| 200                                                  | 136.42                    | 87 80      | 114.96                               | 339 19         | 16.11              | 23.78                               | 0.75        | 0.31     | 383.14     | 154         | 398.58                                | 47.32  | 32.56          | 15.29                            | 19.02              | 66.87 | 31.31   | 145.50    |           |
| ie,                                                  | 124 (30                   | 78.02      | 104 %                                | 308 52         | 17.26              | 21.48                               | 0.75        | 0.29     | 348 30     | 14,22       | 362.52                                | 43.04  | 19.62          | 13 81                            | 17.18              | 09'09 | 28.85   | 132.49    |           |
| Mar                                                  | 35                        | 41.52      | 7.33                                 | 160.37         | 10.11              | 23.78                               | 0.75        | 0.38     | 204 39     | 18.67       | 223.06                                | 22.37  | 15.39          | 15.29                            | 19.03              | 49.70 | 37.86   | 8.69      | -113.12   |
| Αm                                                   | 15.16                     | 97.6       | 12.78                                | 37.70          | 18.49              | 23.01                               | 0.75        | 0.65     | 80.61      | 31.95       | 112.55                                | 5.26   | 3.62           | 14.79                            | 18.41              | 36.82 | 64.8    | 106.88    | -5,67     |
| Ž.                                                   | 685                       | 44         | 577                                  | 17.02          | 10 11              | 23.78                               | 0.75        |          | 61.71      | 51.88       | 113.59                                | 2.37   | 1.63           | 15.29                            | 19.02              | 35.95 | 105.23  | 143.55    | 29,92     |
| Total                                                | 1035.11                   | 666.21     | 871.96                               | 871.96 2573.28 | 225.0              | 280.0                               | 9.0         | ř        | 3123.69    | 1795.1      | 4918.78                               | 359.0  | 247.0          | 180.0                            | 224.0              | 651.0 | 3641.0  | 4651.0    | .267.78   |
| Note; Column no $10 = \text{Column no}(5+6+7+8+9)$ . | 10.10 = Colum             | 9+¢) ou u  | +7+8+9).                             | Colu           | mn No. 12          | Column No. 12 = Column no. (10 + 11 | 10 + 01) of |          | uma no. 19 | = Column no | Column no. 19 = Column no. (13+17+18) |        | no.20 = Co     | Column no.20 - Column no.(19-12) | 1.12)              |       |         |           |           |

Table 4.10.2(b): Kabini Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                              |              |                                       |                |                                      | Water Indisation | sation  |          |          |              |                                        |        |                                    |                        | Water Availability | yility |         |        |                   |         |
|----------------------------------------------|--------------|---------------------------------------|----------------|--------------------------------------|------------------|---------|----------|----------|--------------|----------------------------------------|--------|------------------------------------|------------------------|--------------------|--------|---------|--------|-------------------|---------|
| · :                                          |              |                                       | W              | Water requirements                   | ments            |         |          |          |              | Gross                                  |        | R                                  | Regeneration from uses | from uses          |        | Surface | Ground | Gross             | water   |
| Month                                        | Lilisation u | Utilisation under irrigation projects | L I            | Dome-                                | Indus-           | Hydro-  | Environ- | T-401    | Export       | toral                                  | lmport | Imiga-                             | Dome-                  | Indus-             | Total  | water   |        | wates             | balence |
| Æ                                            | oposed Exis  | Proposed Existing Ongoing             | Total          | stic                                 | trial            | power   | mental   | <u></u>  |              | utilisation                            |        | non                                | stic                   | trial              |        | yiclds  | -      | available         |         |
| <u> </u>                                     | (3)          | ( <del>4</del> )                      | (S)            | (9)                                  | 6                | (61)    | 6        | (10)     | (11)         | (12)                                   | (13)   | (14)                               | (15)                   | (16)               | (13)   | (18)    | (E)    | (S)               |         |
| -                                            | 202          | 13.60 17.81                           | 1              | 23.01                                | 23.01            | 0.75    | 3,67     | 103.06   | 180.77       | 283.82                                 | 7.35   | 5.06                               | 18.41                  | 18.41              | 41.88  | 366.65  | 7.90   | 423.79            | 139.86  |
| FI                                           | ļ-           | -                                     | 14             | L                                    | 23.78            | 0.75    | 15.6     | 515.61   | 469.06       | 984.66                                 | 63.99  | 44.02                              | 19.02                  | 19.02              | 82.07  | 951.39  | 68.74  | 1166.19           | 181.53  |
| 7 100                                        | Ί            |                                       | .!_            |                                      | 23.78            | 0.75    | 9.61     | 505.80   | 473.72       | 979.53                                 | 62.60  | 43.07                              | 19.02                  | 19.03              | 81.12  | 98.096  | 67.15  | 1171.84           | 192.31  |
| 8.53                                         | Ļ.           | Ļ                                     | 1_             |                                      | 23.01            | 0.75    | 4.59     | 408 79   | 226.19       | 86 + 69                                | 49.96  | 34.37                              | 18.41                  | 18 41              | 71.19  | 458.78  | \$3.67 | 633.60            | -1.37   |
|                                              | L            | L                                     | ட              | L                                    |                  | 0.75    | 3.23     | 91 25    | 159.231      | 250.48                                 | 5.55   | 3.82                               | 19.02                  | 19.03              | 41.87  | 322.96  | 965    | 376.34            | 125.87  |
| SO Z                                         |              |                                       | 1              |                                      |                  | 0.75    | 200      | 167.06   | 103.22       | 270.28                                 | 16.52  | 11.37                              | 18.41                  | 18.41              | 61.8*  | 209.36  | 17.75  | 291,82            | 2       |
| Sec.                                         | Ш.           | Ĺ                                     | 1              | L                                    | 23.78            | 0.75    | 1.06     | 283.06   | 52.24        | 335.29                                 | 32.67  | 22.48                              | 19.02                  | 19.02              | 60.52  | 105.95  | 35.09  | 234.23            | -101,06 |
| -                                            |              |                                       | J _            | L                                    |                  | 0.75    | 0.33     | 387.13   | 15.45        | +07.56                                 | 47.32  | 32.56                              | 19.02                  | 19.02              | 70.61  | 31.31   | \$0.83 | 200.08            | -202.50 |
|                                              |              |                                       | 1              | L                                    |                  | 0.75    | 0.29     | 351.89   | 14.32        | 366.12                                 | 43.04  | 39.61                              | 17.18                  | 17.18              | 63.98  | 28.85   | 46.23  | 182.10            | 18401   |
| Mar                                          |              |                                       | 6 160.05       | 23.78                                |                  | 0.75    | 0.38     | 208.74   | 18.67        | 227.41                                 | 22.37  | 15.39                              | 19.02                  | 19.02              | 53.44  | 37.86   | 24.03  | 137.70            | 268.    |
| Anr                                          | 15.16        | 9.73 12.73                            | L              |                                      |                  | 57.0    | 0.65     | 85.05    | 31.95        | 11700                                  | 5.26   | 3.62                               | 18,41                  | 18.41              | 구<br>구 | 8.79    | 5.65   | 116.15            | 53.0-   |
| May                                          | L            |                                       | <u>1</u>       |                                      | 23.78            | 0.75    | 1.05     | 66.35    | 51.88        | 118.23                                 | 2.37.  | 1.63                               | 19.02                  | 19.02              | 39.68  | 105.23  | 2.55   | 73.6 <del>5</del> | 3161    |
|                                              | ــ           | 66621 871.9                           | 871.96 2573.28 | 280.0                                | 280.0            | 10.6    | 36.41    | 3178.7   | 1795.1       | 1973.81                                | 359.0; | 347.0                              | 224.0                  | 224.00             | 695.0  | 3641.0  | 386.4  | 50SI.4            | 107.62  |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | = Column n   | 0.(5+6+7+8+9                          |                | Column No. 12 = Column no. (10 + 11) | = Column n       | 10 + 11 |          | тп по.20 | - Column no. | Column no.20 = Column no.(13+17+18+19) |        | Column no. 21 = Column no. (20-12) | ≈ Column n             | 0.(20-12).         |        |         |        |                   |         |

Table 4.10.2(c): Kabini Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| Unit: MCM | 111                | Montraly               | Water                               | חמופונה       | (20)             | 133.63      | -245.13       | 151.59        | 269.28       | 203.77      | -38.56      | -176.32     | -268.64      | -244.36      | -131,94     | -0.41      | 444.27    | 459.87         |                                             |
|-----------|--------------------|------------------------|-------------------------------------|---------------|------------------|-------------|---------------|---------------|--------------|-------------|-------------|-------------|--------------|--------------|-------------|------------|-----------|----------------|---------------------------------------------|
| Unit      |                    | Gross                  | water                               | available     | (61)             | 413.82      | 373.52        | 1154.19       | 1228.54      | \$33.68     | 183.89      | 113.65      | 61711        | 103.64       | 72.08       | 117.48     | 977.22    | 5386.0         |                                             |
|           |                    | Surface                | water                               | yields        | (81)             | 368.2       | 231.2         | 1014          | 1111         | 490         | 122.8       | 24.2        | 0            | 0            | 0           | 75.4       | 938.9     | 4376.0         |                                             |
|           | ility              |                        | Takel                               |               | (11)             | 38.26       | 78.34         | 77.38         | 67.58        | 38.13       | 44.57       | 56.79       | 66.87        | 60.60        | 49.70       | 36.82      | 35.95     | 651.0          |                                             |
| ,         | Water Availability | from uses              | Indus.                              | trial         | (91)             | 18.41       | 19.02         | 19.02         | 18.41        | 19.02       | 18.4]       | 19.03       | 19.02        | 17.18        | 19.03       | 18.41      | 19.02     | 224.0          | 12)                                         |
| Ì         | W                  | Regeneration from uses | Dome-                               | stic          | (15)             | 14.79       | 15.29         | 15.29         | 14.79        | 15.29       | 14.79       | 15.29       | 15.29        | 13.81        | 15.29       | 14.79      | 15.29     | 180.0          | Column no. 20 = Column no. (19-12)          |
|           |                    | R                      | Imiga-                              | tion          | (14)             | 2.06        | 44.02         | 43.07         | 34.37        | 3.82        | 11.37       | 22,48       | 32.56        | 19:67        | 15.39       | 3.62       | 1.63      | 247.0          | no.20 = Cal                                 |
|           |                    |                        | Import                              |               | (13)             | 7.35        | 63,99         | 62.60         | 49.96        | 5.55        | 16.52       | 32.67       | 47.32        | 43.04        | 22.37       | 5.26       | 2.37      | 359.0          | Column                                      |
|           |                    | Gross                  | letot                               | utilisation   | (12)             | 280.19      | 618.65        | 1002.59       | 959.26       | 329.91      | 222.45      | 289.97      | 382.83       | 348.01       | 204.01      | 117.89     | 532.95    | 4926.13        | 13+17+18).                                  |
|           |                    |                        | Export                              | 7             | (11)             | 181.53      | 113.99        | 500.02        | 547.75       | 241.58      | 60.54       | 11.93       | 0.00         | 0.00         | 0.00        | 37.17      | 462.90    | 1795.1         | Column no.19 = Column no.(13+17+18).        |
| t         |                    |                        | Total                               | 200           | (10)             | 98.66       | 504.66        | 502.57        | 411.51       | 88.33       | 16191       | 278.04      | 382.83       | 348.01       | 204.01      | 80.71      | 70.05     | 3131           | = 61.0u um                                  |
|           |                    |                        | Environ-                            | mental        | (6)              | 3.68        | 2.31          | 10.14         | 11.11        | 1.90        | 1.23        | 0.24        | 0.00         | 0.00         | 000         | 0.75       | 9.39      | 43.76          |                                             |
|           | sation             |                        | Hydro                               | power         | (8)              | 0.75        | 0.75          | 0.75          | 0.75         | 0.75        | 0.75        | 0.75        | 0.75         | 0.75         | 0.75        | 0.75       | 0.75      | 9.0            | Column No. 12 = Column no. (10+11)          |
|           | Water Utilisation  | ments                  | Indus-                              | trial         | (7)              | 23.01       | 23.78         | 23.78         | 23.01        | 23.78       | 23.01       | 23.78       | 23.78        | 21.48        | 23.78       | 23.01      | 23.78     | 280.0          | = Column                                    |
|           |                    | Water requirements     | Dome                                | ≱ic           | (9)              | 18.49       | 19.11         | 19.11         | 18.49        | 19.11       | 18.49       | 19.11       | 19.11        | 17.36        | 19.11       | 18.49      | 19.11     | 225.0          | umn No. 12                                  |
|           |                    | V                      | projects                            | Total         | (5)              | 52,72       | 458.71        | 10 448.79     | 358.15       | 39.79       | 4 118.43    | 16 234.16   | 339.19       | 308.52       | 15 160.37   | 78 37.70   | 17.02     | 871.96 2573.28 |                                             |
| ,         |                    |                        | er imigation                        | ng Ongoing    | ( <del>†</del> ) | 13.65 17.87 | 75 155.46     | 18 152.10     | 71 121.38    | 30 13.48    | 40.14       | 52 79.36    | 80 114.96    | 87 104.56    | 52 54.35    | 9.76 12.78 | 11 5.77   |                | 5+6+7+8+5                                   |
|           |                    |                        | Utilisation under impation projects | osed Existing | (c)              | 21.20 13.   | 184.50 118.75 | 180.51 116.18 | 144.05 92.71 | 16.00 10.30 | 47.63 30.66 | 94.18 60.62 | 136.42 87.80 | 124.09 79.87 | 64.50 41.52 | 15.16 9.   | 6.85 4.41 | 1035.11 666.21 | Column no.(                                 |
|           |                    |                        | <u> </u>                            | Proposed      | (2)              |             | 11            | _             | <u>~</u>     |             | -           |             | <u></u>      | 1.1          | *  <br>     |            |           | 10.            | Note: Calumn no.10 = Column no.(5+6+7+8+9). |
|           |                    |                        | NIOSITY.                            |               | ε                | hил         | <u> </u>      | γng           | Sep          | Oct         | Nov         | 9<br>38     | Jan          | Feb          | \ tar       | λūť        | \lay      | Total          | Note : Calı                                 |

Table 4.10.2(d): Kabini Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

| Water Utilisation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Water Utilisation                                                              | Water Utilisation                                                              | Water Utilisation                                 | Water Utilisation                        | idion                                    |                                |                      |               |        |   |            | 1      |                        | Water Availability | bility |          |        | -             |         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|---------------------------------------------------|------------------------------------------|------------------------------------------|--------------------------------|----------------------|---------------|--------|---|------------|--------|------------------------|--------------------|--------|----------|--------|---------------|---------|
| Water requirements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                |                                                                                |                                                   |                                          | Gross                                    | Gross                          | Gross                | Gross         | Gross  |   |            | , "    | Regeneration from uses | from uses          |        | Surface  | Ground | ∤ច            | Gröss   |
| Utilisation under irrigation projects Dome- Indus- Hydro- Environ- T, Export total Import Irri                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Dome- Indus. Hydro- Environ- Export total Linport                              | Dome- Indus. Hydro- Environ- Export total Linport                              | Indus- Hydro- Environ- Export total Import        | Hydro- Environ- Export total Import      | Environ- Export total Import             | Export total Import            | Export total Import  | total Import  | Import |   | E          | Imiga- | Dome-                  | Indus-             | F      | water    | Waler  | Walcr         |         |
| utilisation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Total stic trial power mental local utilisation                                | stic trial power mental Local utilisation                                      | trial power mental total utilisation              | power mental Lotal utilisation           | mental Lotat utilisation                 | utilisation                    | utilisation          |               |        | ğ | -23        | tion   | stic                   | trial              |        | yields , | yields | available     |         |
| (4) (4) (5) (6) (7) (19) (9) (10) (10) (11) (11) (12) (14)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (4) (5) (6) (7) (19) (9) (10) (11) (12) (13)                                   | (61) (7) (11) (10) (8) (13) (13)                                               | (7) (19) (9) (10) (11) (12) (13)                  | (51) (21) (11) (11) (12)                 | (13) (11) (12) (13)                      | (10) (11) (12) (13)            | (11) (12) (13)       | (12) (13)     | (13)   | _ | (14)       |        | (5)                    | (91)               | (11)   | (81)     | (61)   | (20)          | (2)     |
| 21.20 13.60 17.81 52.61 23.01 23.01 0.75 3.68 103.07 181.53 284.60 7.35 5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 17.81 52.61 23.01 23.01 0.75 3.68 103.07 181.53 284.60 7.35                    | 23.01 23.01 0.75 3.68 103.07 181.53 284.60 7.35                                | 23.01 0.75 3.68 103.07 181.53 284.60 7.35         | 0.75 3.68 103.07 181.53 284.60 7.35      | 3.68 103.07 181.53 284.60 7.35           | 103.07 181.53 284.60 7.35      | 181.53 284.60 7.35   | 284.60 7.35   | 7.35   |   | 5.(        | 90.5   | 18.41                  | 18.41              | 41.88  | 368.2    | 7.80   | 425.34        | 140.73  |
| 184.50 118.36 154.92 457.78 23.78 23.78 0.75 2.31 508.41 113.99 622.39 63.99 44.02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 154,92 457.78 23.78 23.78 0.15 2.31 508.41 113.99 622.39 63.99                 | 23.78 23.78 0.75 2.31 508.41 113.99 622.39 63.99                               | 23.78 0.75 2.31 508.41 113.99 622.39 63.99        | 0.75 2.31 508.41 113.99 622.39 63.99     | 2.31 508.41 113.99 622.39 63.99          | 1 508.41 113.99 622.39 63.99   | 113.99 622.39 63.99  | 622.39 63.99  | 63.99  |   | 44.        | 5      | 19.05                  | 19.03              | 82.07  | 231.2    | 68.74  | 416.00        | -176.39 |
| 180.51   115.80   151.57   447.88   23.78   23.78   0.75   10.14   506.34   500.02   1006.36   62.60   43.07                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 151.57 447.88 23.78 23.78 0.75 10.14 506.34 500.02 1006.36 62.60               | 447.88 23.78 23.78 0.75 10.14 506.34 500.02 1006.36 62.60                      | 23.78 0.75 10.14 506.34 500.02 1006.36 62.60      | 0.75 10.14 506.34 500.02 1006.36 62.60   | 10.14 506.34 500.02 1006.36 62.60        | 14 506.34 500.02 1006.36 62.60 | 500.02 1006.36 62.60 | 1006.36 62.60 | 62.60  |   | 43.(       | 7,1    | 19.02                  | 19.02              | 81.12  | 1017     | 67.25  | 1225.2        | 218.82  |
| 144.05 92.42 120.96 357.42 23.01 23.01 0.75 11.11 415.31 347.75 963.06 49.96 34.37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 120.96 357.42 23.01 23.01 0.75 11.11 415.31 547.75 963.06 49.96                | 357.42 23.01 23.01 0.75 11.11 415.31 547.75 963.06 49.96                       | 23.01 0.75 11.11 415.31 547.75 963.06 49.96       | 0.75 11.11 415.31 547.75 963.06 49.96    | 11.11 415.31 547.75 963.06 49.96         | 347.75 963.06 49.96            | 347.75 963.06 49.96  | 963.06 49.96  | 96.68  |   | ¥,         | 37     | 18.41                  | 18.41              | 71.19  | Ξ        | 53.67  | 1285.8        | 322.76  |
| 16.00 10.27 13.44 39.71 23.78 23.78 0.75 4.90 92.92 241.58 334.50 5.55 3.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>13.44</b> 39.71 23.78 23.78 0.75 4.90 92.92 241.58 334.50 5.55              | 39,71 23,78 23,78 0.75 4.90 92,92 241,58 334,50 5.55                           | 23.78 0.75 4.90 92.92 241.58 334.50 5.55          | 0.75 4.90 92.92 241.58 334.50 5.55       | 4.90 92.92 241.58 334.50 5.55            | 92.92 241.58 334.50 5.55       | 241.58 334.50 5.55   | 334.50        | 5.55   |   | 3.         | 3.82   | 19.03                  | 19.02              | 41.87  | 065      | 5.96   | \$43.38       | 208.88  |
| 47.63 30.56 40.60 118.19 23.01 23.01 0.75 1.23 166.19 60.54 226,74 16.52 11.37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 40.00 118.19 23.01 23.01 0.75 1.23 166.19 60.54 226.74 16.52                   | 118.19 23.01 23.01 0.75 1.23 166.19 60.54 226.74 16.52                         | 23.01 0.75 1.23 166.19 60.54 226.74 16.52         | 0.75 1.23 166.19 60.54 226.74 16.52      | 1.23 166.19 60.54 226.74 16.52           | 166.19 60.54 226.74 16.52      | 60.54 226,74 16.52   | 226,74 16.52  | 16.52  |   | 11.3       | 7      | 18.41                  | 18.41              | 48.19  | 122.8    | 17.75  | 205.26        | -21.48  |
| 94.18 60.42 79.08 233.69 23.78 23.78 0.75 0.24 282.24 11.93 294.17 32.67 22.48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 79.08 233.69 23.78 23.78 0.75 0.24 282.24 11.93 294.17 32.67                   | 233.69 23.78 23.78 0.75 0.24 282.24 11.93 294.17 32.67                         | 23.78 0.75 0.24 282.24 11.93 294.17 32.67         | 0.75 0.24 282.24 11.93 294,17 32.67      | 0.24 282.24 11.93 294,17 32.67           | 282.24 11.93 294.17 32.67      | 11.93 294,17 32.67   | 294,17 32.67  | 32.67  |   | 22.48      | _      | 19.02                  | 19.02              | 60.52  | 24.2     | 35.09  | 152.48        | -141.69 |
| 136.42 87.52 114.55 338.50 23.78 23.78 0.75 0.00 386.81 0.00 386.81 47.32 32.56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 114.55 338.50 23.78 23.78 0.75 0.00 386.81 0.00 386.81 47.12                   | 338.50 23.78 23.78 0.75 0.00 386.81 0.00 386.81 47.32                          | 23.78 0.75 0.00 386.81 0.00 386.81 47.32          | 0.75 0.00 386.81 0.00 386.81 47.32       | 0.00 386.81 0.00 386.81 47.32            | 386.81 0.00 386.81 47.32       | 0.00 386.81 47.32    | 386.81 47.32  | 47.32  |   | 32.56      |        | 19.02                  | 19.02              | 70.61  | 0.       | 50.83  | 168.75        | -218.06 |
| 124.09 79.61 104.20 307.89 21.48 21.48 0.75 0.00 351.60 351.60 351.60 351.60 29.61                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 104.20 307.89 21.48 21.48 0.75 0.00 351.60 351.60 43.04                        | 307.89 21.48 21.48 0.75 0.00 351.60 0.00 351.60 43.04                          | 21.48 0.75 0.00 351.60 0.00 351.60 43.04          | 0.75 0.00 351.60 0.00 351.60 43.04       | 0.00 351.60  0.00 351.60  43.04          | 351.60 0.00 351.60 43.04       | 0.00 351.60 43.04    | 351.60 43.04  | 43.04  |   | 29.(       | 15     | 17.18                  | 17.18              | 63.98  | 0        | 46.23  | 153.25        | -198.35 |
| 64.50 41.38 54.16 160.05 23.78 23.78 0.75 0.00 208.36 0.00 208.36 22.37 15.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>54.16 160.05 23.78 23.78 0.75 0.00 208.36 0.00 208.36 22.37</b>             | 160.05 23.78 23.78 0.75 0.60 208.36 0.00 208.36 22.37                          | 23.78 0.75 0.60 208.36 0.00 208.36 22.37          | 0.75 0.60 208.36 0.00 208.36 22.37       | 0.00 208.36 0.00 208.36 22.37            | 208.36 0.00 208.36 22.37       | 0.00 208.36 22.37    | 208.36        | 122.37 |   | 15.        | 15.39  | 19.02                  | 19.02              | 53.44  | 0        | 24.03  | <b>\$8.66</b> | -108.52 |
| 15.16 9.73 12.73 37.63 23.01 23.01 0.75 0.75 85.16 37.17 122.33 5.26 3.62                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12.73 37.63 23.01 23.01 0.75 0.75 85.16 37.17 122.33 5.26                      | 37.63 23.01 23.01 0.75 0.75 85.16 37.17 122.33 5.26                            | 23.01 23.01 0.75 0.75 85.16 37.17 122.33 5.26     | 0.75 0.75 85.16 37.17 122.33 5.26        | 0.75 85.16 37.17 122.33 5.26             | 85.16 37.17 122.33 5.26        | 37.17 122.33 5.26    | 122.33 5.26   | 5.26   |   | 3.6        | 7      | 18.41                  | 18.41              | 40.44  | 75.4     | 5.65   | 126.75        | 4,42    |
| _                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 5.75 16.98 23.78 23.78 0.75 9.39 74.68 462.90 537.58 2.37                      | 16.98 23.78 23.78 0.75 9.39 74.68 462.90 537.58 2.37                           | 23.78 0.75 9.39 74.68 462.90 537.58 2.37          | 0.75 9.39 74.68 462.90 537.58 2.37       | 9.39 74.68 462.90 537.58 2.37            | 74.68 462.90 537.58 2.37       | 462.90 537.58 2.37   | 537.58 2.37   | 2.37   |   | 1.63       | _      | 19.021                 | 19.02              | 39.68  | 938.9    | 2.55   | 983.51        | 445.92  |
| 1035.11 666.2 871.96 2573.28 280.0 280.0 9.0 43.76 3186.0 1795.1 4981.13 359.0 247.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 871.96 2573.28 280.0 280.0 9.0 43.76 3186.0 1795.1 4981.13 359.0               | 280.0 280.0 9.0 43.76 3186.0 1795.1 4981.13 359.0                              | 280.0 280.0 9.0 43.76 3186.0 1795.1 4981.13 359.0 | 9.0 43.76 3186.0 1795.1 4981.13 359.0    | 43.76 3186.0 1795.1 4981.13 359.0        | 6 3186.0 1795.1 4981.13 359.0  | 1795.1 4981.13 359.0 | 4981.13 359.0 | 359.0  |   | 247.0      | _      | 224.0                  | 224.0              | 695.0  | 4376.0   | 386.4  | 5816.4        | 835.27  |
| Note: Column no [5+6+7+8+9]. Column No. 12 = Column no. (10 + 11) Column no. 20 = Column no. (13+17+18+19). Column no. 21 = Column no. 22 = Column no. 23 = Column no. 22 = Column no. 22 = Column no. 23 = Column no. 24 = Column no. 25 = Co | Column No. 12 * Column no. (10 + 11) Column no. 20 = Column no. (13+17+18+19). | Column No. 12 * Column no. (10 + 11) Column no. 20 = Column no. (13+17+18+19). | Column no.20 = Column no. (13+17+18+19).          | Column no.20 = Column no. (13+17+18+19). | Column no.20 = Column no. (13+17+18+19). |                                |                      |               |        |   | umn no. 21 |        | = Column no            | (20-12)            |        |          |        |               |         |

Table 4.10.2(e): Kabini Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water Unit : MCM

|                                               |                           |             |                                     |         |                    | Water Utilisation                | ation       |            |           |             |                                        |        |                | W                                  | Water Availability | llity |          |            | Monthly |
|-----------------------------------------------|---------------------------|-------------|-------------------------------------|---------|--------------------|----------------------------------|-------------|------------|-----------|-------------|----------------------------------------|--------|----------------|------------------------------------|--------------------|-------|----------|------------|---------|
| 10.7                                          |                           |             |                                     | Wate    | Water requirements | nents                            |             |            |           |             | Gross                                  |        | 14             | Regeneration from uses             | from usca          |       | Surface  | Cross      | water   |
| MOM -                                         | Utilisatic                | n under ir. | Julisation under imigation projects |         | Dome-              | Indus-                           | Hydro-      | Environ-   | 1.1.1.1   | Export      | letot                                  | Import | Irriga-        | Ооте-                              | Indus-             | -     | water    | water      | balance |
|                                               | Proposed Existing Ongoing | Existing C  | Spoing                              | Total   | stic               | trial                            | power       | mental     | 1043      |             | utilisation                            |        | tion           | stic                               | trial              | -     | yields   | available  |         |
| ε                                             | (2)                       | e           | <b> </b>                            | (S)     | 9                  | 6                                | €           | <u>(a)</u> | (OE)      | (1)         | (12)                                   | (13)   | ( <del>*</del> | (15)                               | (16)               | (11)  | (18)     | <u>(§)</u> | (R)     |
| Jun                                           | 21.20                     | 13.65       | 17.87                               | 52.72   | 18.49              | 23.01                            | 0.75        | 3.50       | 98 47     | 172.40      | 270.87                                 | 7.35   | 5.06           | 14.79                              | 18.41              | 38.26 | 349 7    | 395.30     | 124 43  |
| Jul                                           | 184.50                    | 118.75      | 155.46                              | 458.71  | 19.11              | 23.78                            | 0.75        | 492        | 507.27    | 242.61      | 749.88                                 | 63.99  | 44.02          | 15.29                              | 19.02              | 78.34 | 492.1    | 634.41     | -115.47 |
| Aug                                           | 180.51                    | 116.18      | 152.10                              | 448.79  | 19.11              | 23.78                            | 0.75        | 5.41       | 497.84    | 266.92      |                                        | 62.60  | 43.07          | 15.29                              | 19.02              | 11.38 | ¥.13     | 681.39     | -83.38  |
| , G                                           | 141.05                    | 17.00       | 121.38                              | 358.15  | 18.49              | 23.01                            | 0.75        | 2.44       | 402.84    | 120.30      |                                        | 49.96  | 34.37          | 14.79                              | 18.41              | 67.58 | 244      | 361.54     | -161.60 |
| 80                                            | 16.00                     | 10.30       | 13.48                               | 39.79   | 19.11              | 23.78                            | 0.75        | 5.98       | 89.41     | 294.85      |                                        | 5.55   | 3.82           | 15.29                              | 19.02              | 38.13 | 1.865    | 641.73     | 257.47  |
| Nov                                           | 47.63                     | 30.66       | 40.04                               | 118.43  | 18,49              | 23,01                            | 0.75        | 194        | 162.62    | 95.68       |                                        | 16.52  | 11.37          | 14.79                              | 18.41              | 44.57 | 194.1    | 255.16     | 3.14    |
| 36                                            | 81.3                      | 60.62       | 79.36                               | 234.16  | 19.11              | 23.78                            | 0.75        | 5+0        | 278.25    | 21.99       |                                        |        | 22.48          | 15.29                              | 19.02              | 56.79 | 19.4     | 134.06     | 166.18  |
| Jan                                           | 136.42                    | 87.80       | 114.96                              | 339.19  | 19,11              | 23.78                            | 0.75        | 0.13       | 387.96    | 6.36        | 389.32                                 | 47.32  | 32.56          | 15.29                              | 19.02              | 28.99 | 12.91    | 127.10     | -362.23 |
| Feb                                           | 124.09                    | 79.87       | 95 101                              | 308.52  | 17.26              | 21.48                            | 0.75        | 0.11       | 348.11    | 5.30        | 353.42                                 | 43.04  | 19.67          | 13.81                              | 17.18              | 60,60 | 10.76    | 114.40     | -239.02 |
| Mar                                           | \$4.50                    | 41.52       | 25.33                               | 160.37  | 19.11              | 23.78                            | 0.751       | 160        | 204.96    | 46.57       | 251.53                                 | 22.37  | 15.39          | 15.29                              | 19.02              | 49.70 | 7.<br>2. | 166.54     | \$4.98  |
| Aor                                           | 15.16                     | 9.76        | 12.78                               | 37.70   | 18 49              | 23.01                            | 0,75        | 1,43       | 81.39     | 70.74       |                                        | 5.26   | 3.62           | 14.79                              | 18.41              | 36.82 | 143.5    | 185.56     | 33.43   |
| May                                           | 6.85                      | 14.4        | 5.77                                | 17.02   | 19.11              | 23.78                            | 0.75        | 3.14       | 63.80     | 155.05      | 218.85                                 | 2.37   | 1.63           | 15.29                              | 19.02              | 35.95 | 314.5    | 352.81     | 133.96  |
| Total                                         | 1035.11                   | 666.21      | 871.96 2573 27                      | 2573 27 | 225.0              | 280.0                            | 0.6         | 30.40      | 3117.67   | 1795.1      | 4912.76                                | 359.0  | 247.0          | 180.0                              | 224.0              | 651.0 | 3040 0   | 4050.0     | 862.76  |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 10 = Colun                | 31 no.(5+6  | +7+8+9)                             | Colum   | n No. 12 =         | Column No. 12 = Column no. (10+1 | 7 (10 + 11) | Coli       | um no. 19 | = Column no | Column no. 19 = Column no. (13+17+18). |        | no.20 = Co     | Column no. 20 = Column no. (19-12) | (12)               |       |          |            |         |
|                                               |                           |             |                                     |         |                    |                                  |             |            |           |             | 1                                      |        |                |                                    |                    |       |          |            |         |

Table 4.10.2(f): Kabini Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

Unit: MCM

|                                              |               |                                       |              |               | 13                 | Water Utilisation                  | ntion       |          |             |           | -                                         |        |           |                                    | Water Availability | bility   | )<br>   |        |           | , touristic |
|----------------------------------------------|---------------|---------------------------------------|--------------|---------------|--------------------|------------------------------------|-------------|----------|-------------|-----------|-------------------------------------------|--------|-----------|------------------------------------|--------------------|----------|---------|--------|-----------|-------------|
| 1                                            |               |                                       |              | Wa            | Water requirements | ents                               |             |          |             |           | Gross                                     |        |           | Regeneration from uses             | from uses          |          | Surface | Ground | Gross     | water       |
| Month                                        | Utilisati     | Utilisation under irrigation projects | rigation pre | ojects        | Dome-              | Indus-                             | Hydro       | Environ- | 7,010       | Export    | total                                     | Import | frriga-   | Dome-                              | -snpul             | Total    | water   |        | water     | balance     |
|                                              | Proposed      | Proposed Existing Ongoing             | ngoing       | Total         | stic               | trial                              | power       | mental   | Teno        |           | utilisation                               |        | tion      | stic                               | F.                 |          | yields  | 30.55  | availabic |             |
| ε                                            | 3             | 9                                     | 9            | 3             | 9                  | (2)                                | (61)        | (§)      | (10)        | (E)       | (12)                                      | (13)   | (14)      | (31)                               | (91)               | (17)     | (18)    | (E)    | 9         | (21)        |
| Jun                                          | 21.20         | 13.60                                 | 17.81        | 52.61         | 23.01              | 23.01                              | 0.75        | 5.50     | 102.89      | 172.40    | 275.29                                    | 7.35   | 5.06      | 18.41                              | 18.41              | 41.88    | 349.7   | 8.     | 406.82    | 131.53      |
| 3                                            | 184.50        | 118.36                                | 154.92       | 457.78        | 23.78              | 23.78                              | 0.75        | 4.92     | 511.01      | 242.61    | 753.63                                    | 63.99  | 44.02     | 19.02                              | 19.02              | 82.07    | 492 1   | 68.74  | 706.89    | -46.74      |
| Aug                                          | 180.51        | 115.80                                | 151.57       | 447.88        | 23.78              | 23.78                              | 0.75        | 5.41     | \$01.61     | 266.92    | 768.53                                    | 62.60  | 43.07     | 19.02                              | 19.02              | 81.12    | 7.175   | 67.25  | 752.38    | -16.15      |
| Sep.                                         | 144.05        | 92.42                                 | 120.96       | 357.42        | 23.01              | 23.01                              | 0.75        | 17:      | 406.64      | 120.30    | \$26.94                                   | 49.96  | 34.37     | 18.4]                              | 18.41              | 161.15   | 45      | 53.67  | 418.83    | -108.12     |
| 130                                          | 16.00         | L                                     | 13.44        | 39.71         | 23.78              | 23.78                              | 0.75        | 5.98     | \$.00<br>\$ | 294.85    | 388.85                                    | 5.55   | 3.82      | 19.02                              | 19.02              | 41.87    | 598.1   | 5.96   | 651.43    | 262.58      |
| Nov                                          | 47.63         | 30,56                                 | 00.04        | 118.19        | 23.01              | 23.01                              | 0.75        | 16.      | 16991       | 95.68     | 262.59                                    | 16.52  | 11.37     | 18.41                              | 18.41              | 48,19    | 194,1   | 17.75  | 276.53    | 13.94       |
| 200                                          | 2             | 60.42                                 | 79.08        | 233.69        | 23.78              | 23.78                              | 0.75        | 0.45     | ( )         | 21.99     | 30.44                                     | 32.67  | 12.48     | 19.02                              | 19.02              | 60.52    | 1161    | 35.09  | 172.89    | -131.55     |
| rel.                                         | 136.42        | 87.52                                 | 114.55       | 338.50        | 23.78              | 23.78                              | 0.75        | 0.13     |             | 6.36      | 393.31                                    | 47.32  | 32.56     | 19.02                              | 19.02              | 10.01    | 12.91   | 50.83  | 181.66    | -211.64     |
| Feb                                          | 124 09        | 19.61                                 | 104.20       | 307.89        | 21.48              | 21.48                              | 0.75        | 0.11     | 351.71      | 5.30      | 357.02                                    | 43.04  | 29.61     | 17.18                              | 17.18              | 63.98    | 10.76   | 46.23  | 164.01    | .193.00     |
| Mar                                          | 64 50         | 41.38                                 | \$2.16       | 160 05        | 23.78              | 23.78                              | 0.75        | 0.94     | 209.31      | 46.57     | 255.88                                    | 22.37  | 15.39     | 19.02                              | 19.02              | 53,44    | 91.46   | 24.03  | 137       | -61.57      |
| IG X                                         | 15.16         | 9.73                                  | 12.73        | 37.63         | 23.01              | 23.01                              | 0.75        | 1.43     | 85.84       | 70.74     | 156.58                                    | 5.26   | 3.62      | 18.41                              | 18.41              | 다.<br>다. | 143.5   | 5.65   | 194.63    | 38.25       |
| May                                          | 6.85          | 4.39                                  | 5.75         | 16.98         | 23.78              | 23.78                              | 0.75        | 3.14     | 68.44       | 155.05    | 723.49                                    | 2.37   | 1.63      | 19.02                              | 19.02              | 39,68    | 3145    | 2.55   | 359.10    | 135.61      |
| Total                                        | 1035.11       | 666.2                                 | 872.0        | 872.0 2573.28 | 280.0              | 280.0                              | 0.6         | 30.40    | 3172.68     | 1795      | 4967.77                                   | 359.0  | 247.0     | 224.0                              | 224.0              | 695.0    | 3040.0  | 386.4  | 4480 +:   | -187.37     |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Colum | nn no.(5+6                            | +7+8+9)      | Colu          | Th No. 12 =        | Column No. 12 = Column no. (10 + 1 | 5. (10 + 11 | Coli     | unn no. 20  | Column no | Column no. 20 = Column no. (13+17+18+19). |        | um no. 21 | Column no. 21 = Column no (20-12). | 10.(20-12).        |          |         |        |           |             |

Table 4.10.2(g); Kabini Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

Unit: MCM

|                                              |                           |             |                                       |         |                    | Marker History                      | 10.40     |          |            |                                       |            |        |                                  | W                      | Water Availability | lity   |         |           |          |
|----------------------------------------------|---------------------------|-------------|---------------------------------------|---------|--------------------|-------------------------------------|-----------|----------|------------|---------------------------------------|------------|--------|----------------------------------|------------------------|--------------------|--------|---------|-----------|----------|
|                                              |                           |             |                                       | Wal     | Water requirements | ienis                               |           |          |            |                                       | , mee      |        | 02                               | Resenctation from uses | from uses          | -      | Surface | Gmes      | Monthly  |
| Month                                        |                           |             |                                       | - 1     |                    |                                     | Т         |          |            |                                       | 2013       | ,      | ľ                                | -                      | -                  |        |         |           | water    |
|                                              | Utilisatio                | n under in  | Utilisation under irrigation projects | ojects  | Dome-              | Indus-                              | Hydro     | Environ- | Total      | Export                                | total      | Import | Lmga-                            | Lome-                  | Indus.             | Total  | Water   | water     | balance  |
| _                                            | Proposed Existing Ongoing | Existing IC | ngoing                                | Total   | 210                | trial                               | power     | mental   |            |                                       | willsalion |        | tion                             | stic                   | trial              |        | yields  | available |          |
| ε                                            | (2)                       | 9           | €                                     | (€      | (9)                | 9                                   | (8)       | (6)      | (01)       | (11)                                  | (12)       | (13)   | (14)                             | (15)                   | (16)               | (1)    | (E)     | (61)      | (30)     |
| Jun                                          | 21.20                     | 13.65       | 17.87                                 | 52.72   | 18.49              | 23.01                               | 0.75      | 1.20     | 96.18      | 59.16                                 | 155,34     | 7,35   | 5.06                             | 14.79                  | 18.41              | 38.26  | 120     | 165.62    | 10.28    |
| 7-1                                          | 18.1.50                   | 118.75      | 155 46                                | 458.71  | 11.61              | 23.78                               | 0.75      | 3.77     | 506.12     | 185.76                                | 691.88     | 63.99  | 44.02                            | 15.29                  | 19.02              | 78.34  | 376.78  | 519.10    | .172.78  |
| Aug                                          | 180.51                    | 116.18      | 152.10                                | 418.79  | 19.11              | 23.78                               | 0.75      | 3.67     | 496.09     | 180.76                                | 676.86     | 09'29  | 43.07                            | 15.29                  | 19.02              | 77.38  | 366.64  | 506.63    | -1 70.23 |
| Sea                                          | 144.05                    | 117.20      | 121.38                                | 358.15  | 18.493             | 23.01                               | 0.75      | 2.18     | 402.58     | 107.23                                | 18.605     | 49.96  | 34.37                            | 14.79                  | 18.41              | 67.58  | 217.5   | 335.04    | -174.77  |
| Ğ                                            | 16.00                     | 10.30       | 13.48                                 | 39.79   | 19.11              | 23.78                               | 0.75      | 191      | 85.34      | 25.32                                 | 179.66     | 5.55   | 3.87                             | 15.29                  | 19.02              | 38.13  | 191.31  | 234.99    | 55.33    |
| B                                            | 47.63                     | 30.66       | 7.09                                  | 118.43  | 18.49              | 23.01                               | 0.75      | 2.82     | 163.51     | 139.24                                | 302.75     | 16,52  | 11.37                            | 14.79                  | 18.41              | 44.57  | 282.43  | 343.52    | 40.77    |
| e                                            | 81 t                      | 60.62       | 79.36                                 | 234,16  | 19.11              | 23.78                               | 0.75      | 0.32     | 278.12     | 15.83                                 | 293.95     | 32.67  | 22.48                            | 15.29                  | 19.02              | \$6.79 | 32.1    | 121.55    | .172.39  |
| Jan                                          | 136.42                    | 87.80       | 11.96                                 | 339.19  | 19.11              | 23.78                               | 0.75      | 0.15     | 382.98     | 7.43                                  | 390.41     | 47,32  | 33.56                            | 15.29                  | 19.02              | 66.87  | 15.08   | 129.27    | -261.15  |
| F.                                           | 131.09                    | 79.87       | 9.70                                  | 308.52  | 17.26              | 21.48                               | 0.75      | 0.07     | 348.08     | 3.48                                  | 351.55     | 43.04  | 29.61                            | 13.81                  | 17.18              | 60 60  | 7.05    | 110.69    | 240.86   |
| Mar                                          | 52.50                     | 41.52       | \$5.35                                | 160.37  | 19,11              | 23.78                               | 0.75      | 0.40     | 204.42     | 19.89                                 | 224.31     | 22.37  | 15.39                            | 15.29                  | 19.02              | 49.70  | 40.35   | 112.43    | 111.89   |
| 700                                          | 15.16                     | 9.76        | 12.78                                 | 37.70   | 65'81              | 23.01                               | 0.75      | 06:0     | 80.85      | 44.14                                 | 124,99     | 5.26   | 3.62                             | 14.79                  | 18.41              | 36.82  | 89.53   | 131.61    | 6.62     |
| Vav                                          | 6.85                      | 14.4        | 5.77                                  | 17.02   | 11.61              | 23.78                               | 0.75      | 2.43     | 63.09      | 120.03                                | 183,12     | 2.37   | 1.63                             | 15.29                  | 19.02              | 35.95  | 243.45  | 281.77    | 93.65    |
| Total                                        | 1035.11                   | 666.21      | 871.96 2573.28                        | 2573.28 | 225.0              | 280.0                               | 9.0       | 19.82    | 3107.1     | 1795.1                                | 4902.2     | 359.0  | 247.0                            | 180.0                  | 224.0              | 651.0  | 1982.0  | 2992.0    | -1910.2  |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | .10 = Colum               | n no.(5+6   | +7+8+9).                              | Colur   | rm No. 12          | Column No. 12 = Column no. (10 + 11 | 0. (10+11 | Celt     | mn no.19 = | Column no. 19 = Column no. (13+17+13) | (13+17+18) | Column | Column no.20 = Column no.(19-12) | umn no.(19.            | 12).               |        |         |           |          |
|                                              |                           |             |                                       |         |                    |                                     |           |          |            |                                       |            |        |                                  |                        |                    |        |         |           |          |

Table 4.10.2(h): Kabini Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                              |                           |                                       |                |         |                    | i                                   |         |          |             |             |                                          |        |               |                        |                    |        |         |          |           | MC [N   |
|----------------------------------------------|---------------------------|---------------------------------------|----------------|---------|--------------------|-------------------------------------|---------|----------|-------------|-------------|------------------------------------------|--------|---------------|------------------------|--------------------|--------|---------|----------|-----------|---------|
|                                              |                           |                                       |                |         |                    | Water Utilisation                   | sation  |          |             |             |                                          |        |               |                        | Water Availability | bility |         |          |           |         |
| -                                            |                           |                                       |                | Wat     | Water requirements | nents                               |         |          |             |             | Gross                                    |        |               | Regeneration from uses | from uses          |        | Surface | Ground   | Gross     | Maniny  |
| Monin                                        | Utilisation               | Utilisation under irrigation projects | gation pro     |         | Богле-             | -sapur                              | Hydro-  | Environ- | T of a      | Export      | total                                    | Import | Imiga-        | Dome-                  | Indus-             | Pots   | waler   | _        | water     | balance |
|                                              | Proposed Existing Ongoing | Vusting On                            | Roing          | Total   | stic               | Gial                                | power   | mental   | 1900        |             | utilisation                              |        | tion          | stic                   | ls u               | POT.   | yields  | yields a | available |         |
| ε                                            | 3                         | <u>ε</u>                              | 3              | 3       | (9)                | (7)                                 | (61)    | (6)      | (10)        | (11)        | (12)                                     | (13)   | (14)          | (15)                   | (91)               | (11)   | (81)    | (61)     | (20)      | (11)    |
| Jun                                          | 21.20                     | 13.60                                 | 17,81          | 52.61   | 23.01              | 23.01                               | 0.75    | 1.20     | 100.59      | 59.16       | 159.75                                   | 7.35   | 5.06          | 18.41                  | 18.41              | 41.88  | 120     | 7.90     | 177.14    | 17.38   |
| 3                                            | 184.50                    | 118.36                                | 154,92         | 457.78  | 23.78              | 23.78                               | 0.75    | 3.77     | 509.86      | 185.76      | 695.62                                   | 63.99  | 44.02         | 19.05                  | 19.02              | \$2,07 | 376.78  | 68.74    | 85.168    | 104.0   |
| Aus                                          | 180.51                    | 115.80                                | 151.57         | 447.88  | 23.78              | 23.78                               | 0.75    | 3.67     | 499.86      | 180.76      | 680.62                                   | 62.60  | 43.07         | 19.02                  | 19.02              | 81.12  | 366.64  | 67.25    | \$77.62   | -103.01 |
| S.S.                                         | 144.05                    | 92.42                                 | 120.96         | 357.42  | 23.01              | 23.01                               | 0.75    | 2.18     | 406.38      | 107.23      | 513.61                                   | 49.96  | 34.37         | 18.41                  | 18.41              | 71.19  | 217.5   | 53.67    | 392.32    | .121.29 |
| ő                                            | 16.00                     | 10.27                                 | 13.4           | 39.71   | 23.78              | 23.78                               | 0.75    | 191      | 89.93       | 94.32       | 184.25                                   | 5.55   | 3.82          | 19.02                  | 19.02              | 41.87  | 181,31  | 5.96     | 244.69    | 60.44   |
| ξ.                                           | 47.63                     | 30.56                                 | 90.00          | 118.19  | 23.01              | 23.01                               | 0.75    | 2.82     | 167.79      | 139.24      | 307.03                                   | 16.52  | 11.37         | 18.41                  | 18.41              | 48.19  | 282.43  | 17.75    | 364.89    | 57.86   |
| ğ                                            | 3                         | 60.42                                 | 20.02          | 233.69  | 23.78              | 23.78                               | 0.75    | 0.32     | 282.32      | 15.83       | 298.15                                   | 32.67  | 22.48         | 19.02                  | 19.02              | 60.52  | 32.1    | 35.09    | 160.38    | -137.76 |
| Jan                                          | 136.42                    | 87.52                                 | 14.55          | 338.50  | 23.78              | 23.78                               | 0.75    | 0.15     | 386.96      | 7.43        | 394.40                                   | 47.32  | 32.56         | 19.02                  | 19.02              | 70.61  | 15.08   | 50.83    | 183.83    | -210.57 |
| 5                                            | 124.09                    | 19.66                                 | 27.<br>15.     | 307.89  | 21.48              | 21.48                               | 0.75    | 0.07     | 351.67      | 3.48        | 355.15                                   | 43.04  | 29.61         | 17.18                  | 17.18              | 63.98  | 7.05    | 46.23    | 160.30    | -194.85 |
| Mar                                          | \$ 50                     | 41.38                                 | 2,7            | 160.05  | 23.78              | 23.78                               | 0.75    | 0.40     | 208.77      | 19.89       | 228.66                                   | 22.37  | 15.39         | 19.03                  | 19.02              | 53.44  | 40.35   | 24.03    | 140.19    | -88.46  |
| Ą                                            | 15,16                     | 9.73                                  | 12.73          | 37.63   | 23.01              | 23.01                               | 0.75    | 06.0     | 85.30       | 44.14       | 129.44                                   | 5.26   | 3.62          | 18.41                  | 18.41              | 40.41  | 89.53   | 5.65     | 140.88    | 11.44   |
| Velv                                         | 6.85                      | 139                                   | \$.75          | 86.9    | 23.78              | 23.78                               | 0.75    | 2,43     | 67.73       | 120.03      | 187.76                                   | 2.37   | 1.63          | 19.02                  | 19.02              | 39.68  | 243.45  | 2.55     | 288.06    | 100.30  |
| Total                                        | 1035.11                   | 12.999                                | 871.96 2573.28 | 2573.28 | 280.0              | 280.0                               | 0.6     | 19.82    | 3162.1      | 1795.1      | 4957.2                                   | 359.0  | 247.0         | 224.0                  | 224.0              | 695.0  | 1982.0  | 386.4    | 3422.4    | -1534.8 |
| Note: Column no. 10 = Column no. (3+6+7+8+9) | 10.10 = Colum             | 1 no (3+6+                            | 7+8+9)         | Colun   | nn No. 12          | Column No. 12 = Column no. (10 + 11 | 10 + 11 | ි ි      | umn no.20 · | · Column no | Column no. 20 * Column no. (13+17+18+19) |        | Column no. 21 | ≈ Column no.(20-12)    | 0.(20-12).         |        |         |          |           |         |

Table 4.10.3(a): Shimsha Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water Unit: MCM

|                                                                                  |                           |                    |                                  |                              |                    | Water Utilis | Utilisation |          |             |                                      |             |         |                                  | Y.                     | Water Availability | ility  |         |           | Monthly |
|----------------------------------------------------------------------------------|---------------------------|--------------------|----------------------------------|------------------------------|--------------------|--------------|-------------|----------|-------------|--------------------------------------|-------------|---------|----------------------------------|------------------------|--------------------|--------|---------|-----------|---------|
| Water requirements                                                               | Water requirements        | Water requirements | Water requirements               | iter requirements            | nents              | 1 1          |             |          |             |                                      | Gross       |         |                                  | Regeneration from uses | from uses          |        | Surface | Gross     | water   |
| Utilisation under irrigation projects Dome- Indus. Hi                            | Dome- Indus-              | Dome- Indus-       | Dome- Indus-                     | Indus-                       |                    | Í,           | Hydro-      | Environ- |             | Export                               | total       | Import  | Irriga-                          | Dome-                  | Indus-             | 1      | water   | water     | balance |
| Proposed Existing Ongoing Total stic trial power                                 | Total stic trial          | Total stic trial   | stic trial                       | trial                        | -                  | Mod          | 13          | mental   | 10001       |                                      | utilisation |         | tion                             | Slic                   | Lish               | leno!  | yields  | available |         |
| (3) (4) (5) (6) (7) (8)                                                          | (4) (5) (6) (7)           | (3) (6) (7)        | (4) (5)                          | 6)                           |                    | (8)          |             | (6)      | (10)        | (1)                                  | (21)        | (13)    | (14)                             | (51)                   | (91)               | (17)   | (18)    | (19)      | (20)    |
| 4.21 29.29 16.90 50.42 21.29 28.69 0                                             | 16.90 50.42 21.29 28.69   | 50.42 21.29 28.69  | 21.29 28.69                      | 28.60                        |                    | 9            | 0.00        | 0.15     | 100.47      | 0.37                                 | 100.84      | 39.85   | 5.36                             | 17.03                  | 22.88              | 45.27  | 15.47   | 100.59    | -0.25   |
| 27.84 193.74 111.80 333.56 22.00 29.56 0.0                                       | 111.80 333.56 22.00 29,56 | 333.56 22.00 29.56 | 22.00 29.56                      | 29.56                        |                    | 0.0          | 0.00        | 0.10     | 385.21      | 0.23                                 | 385.44      | 263.61  | 35.47                            | 17.60                  | 23.64              | 76.71  | 9.65    | 349.97    | -35.47  |
| 31.23 217.29 125.39 374.10 22.00 29.56 0.00                                      | 125.39 374.10 22.00 29.56 | 374.10 22.00 29.56 | 22.00 29.56                      | 29.56                        |                    | 0.0          | 3           | 0.12     | 425.78      | 0:30                                 | 426.07      | 295.65  | 39.78                            | 17.60                  | 23.64              | 81.02  | 12.25   | 388.92    | -37.15  |
| 23.75 165.23 95.35 284.48 21.29 28.60 0.00                                       | 95.35 284.48 21.29 28.60  | 284.48 21.29 28.60 | 21.29 28.60                      | 28.60                        |                    | 0.00         | =           | 68'0     | 335.26      | 2.16                                 | 337.42      | 224.82  | 30.25                            | 17.03                  | 22.88              | 70.16  | 81.68   | 384.16    | 46.74   |
| 3.50 24.33 14.04 41.88 22.00 29.56 0.00                                          | 14.04 41.88 22.00 29.56   | 41.88 22.00 29.56  | 22.00 29,56                      | 29,56                        |                    | 0.00         |             | 3.20     | 98.64       | 7.76                                 | 104.40      | 33.10   | 4.45                             | 17.60                  | 23.64              | 45.70  | 320.33  | 399.12    | 294.72  |
| 19.55 136.05 78.51 234.23 21.29 28.60 0.00                                       | 78,51 234,23 21.29 28,60  | 234,23 21.29 28,60 | 21.29 28.60                      | 28.60                        |                    | 00.0         |             | 1.27     | 285.39      | 3.08                                 | 288.48      | (85,11) | 24.90                            | 17.03                  | 22.88              | 64.82  | 127.2   | 377.13    | 88.65   |
| 36.00 250.49 144.54 431.25 22.00 29.56 0.00                                      | 144.54 431.25 22.00 29.56 | 431,25 22.00 29.56 | 22.00 29.56                      | 29.56                        |                    | 00.0         | _           | 0.16     | 482.97      | 0.39                                 | 483.36      | 340.82  | 45.85                            | 17.60                  | 23.64              | 87.10  | 16.1    | 444 02    | -39.34  |
| 47.68 331.75 191.43 571.15 22.00 29.56 0.00                                      | 191.43 571.15 22.00 29.56 | 571.15 22.00 29.56 | 22.00                            | 29.56                        |                    | 00'0         | -           | 0.0      | 622.71      | 0.01                                 | 622,72      | 451.38  | 60.73                            | 17.60                  | 23.64              | 161.97 | 0.5     | 553.86    | -68.87  |
| 37.61 261.71 151.02 450.57 19.87 26.70 0.00                                      | 151.02 450.57 19.87 26.70 | 450.57 19.87 26.70 | 19.87 26.70                      | 26.70                        |                    | 0.00         | =           | 0.00     | 497.14      | 000                                  | 197.14      | 356.09  | 47.91                            | 15.89                  | 21.36              | 85.16  | 0.12    | 441.37    | -55.77  |
| 20.30 141.25 81.51 243.19 22.00 29.56 0.00                                       | 81.51 243.19 22.00 29.56  | 243.19 22.00 29.56 | 22.00 29.56                      | 29.56                        |                    | 0.00         | -           | 00.0     | 294.75      | 100                                  | 294,75      | 192.19  | 25.86                            | 17.60                  | 23,64              | 67.10  | 60.0    | 259.54    | -35.21  |
| 7.87 54.74 31.59 94.24 21.29 28.60 0.00                                          | 31.59 94.24 21.29 28.60   | 94.24 21.29 28.60  | 21.29 28.60                      | 28.60                        |                    | 00.0         |             | 0.04     | 144.17      | 600                                  | 144.36      | 74,48   | 10.02                            | 17.03                  | 22.88              | 49.93  | 3.65    | 138 06    | -16.19  |
| 3.54 24.62 14.21 42.39 22.00 29.56 0.00                                          | 14.21 42.39 22.00 29.56   | 42.39 22.00 29.56  | 22.00 29.56                      | 29.56                        |                    | 00.0         | _           | 0.24     | 94.18       | 0.59                                 | 94.78       | 33.50   | 4.51                             | 17.60                  | 23.64              | 45.75  | 24.39   | 103 64    | 8.86    |
| 263.00 1830 1056 3150.7 259.0 348.0 0.00                                         | 3056 3150.7 259.0 348.0   | 3150.7 259.0 348.0 | 3150.7 259.0 348.0               | 348.0                        |                    | 0.0          | 힞           | 619      | 3763.9      | 14.9                                 | 3778.8      | 2490.0  | 335.0                            | 207.2                  | 278.4              | 820.6  | 0.619   | 39296     | 150.81  |
| Note: Column no.10 = Column no.(5+6+7+8+9). Column No. 12 = Column no. (10 + 11) |                           |                    | Column No. 12 = Column no. (10 + | mn No. 12 = Column no. (10 + | = Column no. (10 + | +010         |             |          | : 61 on non | Column no. 19 = Column no (13+17+18) | (13+17+18)  | Colum   | Column no 20 = Culumn no (19-12) | Pl) on main            | 17.                |        |         |           |         |

Table 4.10.3(b): Shimsha Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                              | _              |                                       |              |              | jab                | Water Utilisation                    | sation   |          |            |           |                                        |         |        |                                    | Water Availability | bility       |          |        |           | 1                  |
|----------------------------------------------|----------------|---------------------------------------|--------------|--------------|--------------------|--------------------------------------|----------|----------|------------|-----------|----------------------------------------|---------|--------|------------------------------------|--------------------|--------------|----------|--------|-----------|--------------------|
| ) County                                     |                |                                       |              | Wa           | Water requirements | nents                                |          |          |            |           | Gross                                  |         |        | Regeneration from uses             | from uses          |              | Surface  | Ground | Grass     | Montrily           |
| EINDIN                                       | Utilisatic     | Utilisation under irrigation projects | rigation pri | ojects       | Dome-              | Indus-                               | Hydro-   | Environ- | 1          | Export    | total                                  | Ітроп   | Imiga- | Dome-                              | Indus-             | -<br>-<br>-  | Water    | waler  | water     | Palance<br>Palance |
|                                              | Proposed       | Existing Ongoing                      | Pagoing      | Total        | stic               | trial                                | POWCI    | mentai   | 9          |           | utilisation                            |         | tion   | stic                               | trial              | <br>180<br>1 | yields   | yields | available | 3                  |
| (1)                                          | (2)            | (3)                                   | (4)          | (S)          | (9)                | 6                                    | (61)     | (6)      | (10)       | Œ         | (12)                                   | (13)    | (14)   | (31)                               | (91)               | (17)         | (18)     | (61)   | (20)      | (12)               |
| lun                                          | 4.21           | 29.30                                 | 16.90        | 50.41        | 28.60              | 28.60                                | 00.0     | 0.15     | 77.701     | 0.37      | 108.14                                 | 39.85   | 5.36   | 22.88                              | 22.88              | 51.13        | 15 47    | 01 3   | 114.54    | 6.40               |
| Ju.                                          | 27.84          | 193.83                                | 111.77       | 333.44       | 29.56              | 29.56                                | 00.0     | 01.0     | 392.65     | 0.23      | 392.88                                 | 263.61  | 35.47  | 23.64                              | 23.64              | 82.76        | 3.65     | 53.57  | 409.59    | 16.71              |
| Aug                                          | 31.23          | 217.38                                | 125.35       | 373.97       | 29.56              | 29.56                                | 00.0     | 0.12     | 433.20     | 9.30      | 433.50                                 | 295.65  | 39.78  | 23.64                              | 23.64              | 87.07        | 12.25    | 60.08  | +55.05    | 21.55              |
| Sep                                          | 23.75          | 165.30                                | 95.32        | 284.37       | 28.60              | 28.60                                | 00.00    | 68.0     | 342.47     | 2.16      | 344.63                                 | 224.82  | 30.25  | 22.88                              | 22.88              | 76.01        | 89.18    | 45.69  | 435, 70   | 91.07              |
| Oct                                          | 3.50           | 24.34                                 | 14.03        | 41.87        | 29.56              | 29.56                                | 00.0     | 3 20     | 104.18     | 7.76      | 11.2                                   | 33.10   | 4.45   | 23.64                              | 23.64              | 51.74        | 320.33   | 6.73   | 411.90    | 399.95             |
| Nov                                          | 19.55          | 136.11                                | 78.49        | 234.15       | 38.60              | 28.60                                | 00.0     | 1.27.    | 297.62     | 3.08      | 295.71                                 | 185.11  | 24.90  | 22.88                              | 22.88              | 70.67        | 127.2    | 37.62  | 420.60    | 124.89             |
| Sec<br>D                                     | 36.00          | 250.59                                | 144.50       | 431.10       | 29.56              | 29.56                                | 000      | 0.16     | 490.37     | 0.39      | 490.76                                 | 3-10.82 | 45.85  | 23.64                              | 23.64              | 93.14        | <u>~</u> | 69.26  | 519.32    | 28.56              |
| Jan                                          | 47.68          | 331.89                                | 191.38       | 570.95       | 29.56              | 29.56                                | 00.0     | 10:0     | 630.06     | 10.0      | 630.08                                 | 451.38  | 60.73  | 23.64                              | 23.64              | 108.02       | 0.5      | 91.73  | 651 63    | 21,55              |
| Feb                                          | 37.61          | 261.82                                | 150.98       | 450.41       | 26.70              | 26.70                                | 8.0      | 00.0     | 503.80     | 00:0      | 503.80                                 | 356.09  | 16.74  | 21.36                              | 21.36              | 90.62        | 0.12     | 72.36  | 519,19    | 15.39              |
| Mar                                          | 20.30          | 141.31                                | 81 49        | 243.10       | 29.56              | 29.56                                | 00.0     | 00'0     | 302.22     | 0.01      | 302.22                                 | 192.19  | 25.86  | 23.64                              | 23,64              | 73.15        | 0.25     | 39.06  | 304.65    | 2.42               |
| Apr                                          | 7.87           | 54.76                                 | 31.58        | 94.21        | 28.60              | 28.60                                | 00:0     | 0.04     | 151.45     | 60.0      | 151.54                                 | 74.48   | 10.02  | 22.88                              | 22.88              | 55.78        | 3.65     | 15.13  | 149.05    | -2.49              |
| May                                          | 3.54           | 24.63                                 | 14.20        | 42.37        | 29.56              | 29.56                                | 0.00     | 0.24     | 101.73     | 0.59      | 102.32                                 | 33.50   | 4.51   | 23.64                              | 23.64              | 51.80        | 24.39    | 18.9   | 116.49    | 14.17              |
| Total                                        | 263.00         | 1831                                  | 1056         | 1056 3149.55 | 348.0              | 348,0                                | 0.00     | 61.9     | 3851.74    | 14.91     | 3866.64                                | 2490.0  | 335.0  | 278,4                              | 278.4              | 8,168        | 619,0    | \$06.0 | 4506.8    | 640.15             |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | no. 10 = Colun | n no.(5+6                             | +7+8+9)      | Colu         | . 12 oN un         | Column No. 12 = Column no. (10 + 11) | 0 (10+11 |          | 102 on ami | Column no | Column no 20 = Column no (13+17+18+19) |         | 100000 | Column no $21 = Column no (20-12)$ | (01707)            |              |          |        |           |                    |

Table 4.10.3(c): Shimsha Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| M         | -                  | <u> </u>               | و ي                                 | <u></u>                   |      | 3.26     | -33.28 | 34.37  | 8,93    | 367.44  | 117.53 | .35.69 | -68.76 | -55.75    | -35.15  | -15.37  | 14.40   | 294.81   |                                              |
|-----------|--------------------|------------------------|-------------------------------------|---------------------------|------|----------|--------|--------|---------|---------|--------|--------|--------|-----------|---------|---------|---------|----------|----------------------------------------------|
| Unit: MCM |                    | Monthly                | Water                               | 1                         | (32) |          |        |        |         |         |        |        |        |           |         |         |         |          |                                              |
| Unit      |                    | Gross                  | water                               | available                 | (61) | 104.19   | 352.22 | 391.77 | 16.19   | 473.62  | 406.72 | 447.76 | 553.97 | 41.39     | 259.60  | 128.91  | 109.31  | 4073.6   |                                              |
|           |                    | Surface                | water                               | yields                    | (81) | 19.07    | 11.89  | 15.10  | 109.93  | 394.85  | 156.79 | 19.85  | 0.62   | 0.15      | 0.31    | 4.50    | 30.06   | 763.00   |                                              |
|           | ility              | ·                      | 1                                   |                           | (11) | 45.27    | 76.71  | 81.02  | 20.16   | 45.70   | 64.82  | 87.10  | 101 97 | 85.16     | 67.10   | 49.93   | 45.75   | 820.6    |                                              |
|           | Water Availability | from uses              | Indus-                              | Fig                       | (16) | 22.88    | 23.64  | 23.64  | 22.88   | 23.64   | 22.88  | 23.64  | 23.64  | 21.36     | 13.61   | 22.88   | 13.E    | 178.4    | (2)                                          |
|           | 13                 | Regeneration from uses | Dome-                               | stic                      | (15) | 17.03    | 17.60  | 17.60  | 17.03   | 17.60   | 17.03  | 17.60  | 17.60  | 18.89     | 17.60   | 17.03   | 17.60   | 207.7    | Column no. 20 = Column no. (19-12)           |
|           |                    | H                      | Imiga-                              | tion                      | (14) | 5.36     | 35.47  | 39.78  | 30.25   | 4.45    | 24.90  | 45.85  | 60.73  | 47.91     | 25.86   | 10.02   | 4.51    | 335.0    | t no. 20 = Co                                |
| 4         |                    |                        | Import                              |                           | (13) | 39.85    | 263.61 | 295.65 | 234.82  | 33.10   | 185.11 | 340.82 | 451.38 | 356.09    | 192.19  | 74.48   | 33.50   | 2490.0   | Column                                       |
|           |                    | Gross                  | total                               | utilisation               | (12) | 100.93   | 385.50 | 426.14 | 337.92  | 106.21  | 289.19 | 483.45 | 622.73 | 497.14    | 294.75  | 144.28  | 24.91   | 3778.8   | (13+17+18)                                   |
|           |                    |                        | Export                              |                           | (11) | 0.46     | 0.29   | 0.37   | 2.66    | 9.57    | 3.80   | 0.48   | 0.01   | 0.00      | 0.01    | 0.11    | 0.73    | 14.9     | Column no.                                   |
|           |                    |                        | Total                               | 1 0141                    | (10) | 100.47   | 385.21 | 425.78 | 335.26  | 96.64   | 285.39 | 482,97 | 622.71 | 497.14    | 294.75  | 144.17  | ¥.      | 3763.9   | Column no.19 = Column no.(13+17+18)          |
|           |                    |                        | Environ-                            | mental                    | (6)  | 0.00     | 0.00   | 0.00   | 0.00    | 00.00   | 000    | 00:00  | 000    | 0000      | 0.00    | 00.00   | 0.00    | 00.0     |                                              |
|           | isation            |                        | Hydro-                              | power                     | (8)  | 0.15     | 01.0   | 0.13   | 0.89    | 3.20    | 1.27   | 0.16   | 0.01   | 0.00      | 0.00    | 300     | 0.24    | 61.9     | Column No. 12 = Column no. (10 + 11)         |
|           | Water Utilisation  | ments                  | -snpu]                              | trial                     | (C)  | 28.60    | 29.56  | 29.56  | 28.60   | 29.56   | 28.60  | 29.56  | 29.56  | 26.70     | 29.56   | 28.60   | 29.56   | 348.0    | = Column                                     |
|           |                    | Water requirements     | Dome-                               | žtić.                     | (9)  | 31.29    | 22.00  | 22.00  | 21.29   | 22.00   | 21.29  | 22.00  | 22.00  | 19.87     | 22.00   | 21.29   | 22.00   | 259.0    | lumn No. 17                                  |
|           |                    | V                      | rojects                             | Total                     | (5)  | 50.42    | 333.56 | 374.10 | 284.48  | 41,88   | 234.23 | 431.25 | 571.15 | 450.57    | 243.19  | 25.24   | 42.39   | 3150.7   |                                              |
|           |                    |                        | Utilisation under impation projects | Ongoing                   | (4)  | 16.90    | 111.80 | 125.39 | 3 95.35 | 14.04   | 78.51  | 144.54 | 191.43 | 151.02    | \$ 1.51 | 31.59   | 14.21   | 1056.0   | +6+7+8+9)                                    |
|           |                    |                        | stion under                         | Proposed Existing Ongoing | (3)  | 13 29.29 | 193.74 | 217.29 | 165.23  | 6 24.33 | 136.05 | 250.49 | 331.75 | 11 261.71 | 141.25  | 7 54.74 | 4 24.62 | 0.0830.0 | umn no.(5                                    |
|           |                    |                        | Utilis                              | Propose                   | (2)  | 4.21     | 27.84  | 31.23  | 23.75   | 3.50    | 19.35  | 36.00  | 47.68  | 37.61     | 20.30   | 7.87    | 3.54    | 263.00   | 0.10 = Col                                   |
|           |                    | Yearh                  | Monin                               |                           | (ı)  | Jun      | Jul    | Aug    | Sep     | Oct     | Nov    | Dec    | Jan    | Feb       | Mar     | Apr     | May     | Total    | Note: Column no. 10 = Column no. (5+6+7+8+9) |

Table 4.10.3(d): Shimsha Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                                |             |                                       |            |        | 14                 | Water Utilisation                    | ation       |          |             |             |                                           |        |             |                                    | Water Availability | bility |         |         |                     |         |
|------------------------------------------------|-------------|---------------------------------------|------------|--------|--------------------|--------------------------------------|-------------|----------|-------------|-------------|-------------------------------------------|--------|-------------|------------------------------------|--------------------|--------|---------|---------|---------------------|---------|
| Manh                                           |             |                                       |            | Wak    | Water requirements | hents                                |             |          |             |             | Gross                                     |        |             | Regeneration from uses             | from uses          |        | Surface | Ground  | Gross               | Nioniny |
| Mothi                                          | Utilisatio  | Utilisation under irrigation projects | gation pro | -      | Dome-              | Indus-                               | Hydro       | Environ- | F C         | Ехроп       | total                                     | Import | Imiga-      | Dome-                              | Indus-             |        | water   | Waler   | water               | water   |
|                                                | Proposed    | Proposed Existing Ongoing             |            | Total  | stic               | trial                                | power       | mental   | 1 0621      |             | utilisation                               |        | tion        | stic                               | त्यं               | 1003   | yields  | yields  | available           | Danance |
| (1)                                            | (2)         | (3)                                   | €          | (5)    | (9)                | (1)                                  | (61)        | (6)      | (10)        | (11)        | (12)                                      | (13)   | (14)        | (12)                               | (10)               | (71)   | (81)    | <u></u> | <u>શ</u>            | (21)    |
| lun                                            | 4.21        | 29.30                                 | 16.90      | 50.41  | 28.60              | 38.60                                | 0.19        | 00.00    | 107.80      | 0.46        | 108.26                                    | 39.85  | 5.36        | 22.88                              | 22.88              | \$1.13 | 19.07   | 8.10    | 118.14              | 9.88    |
| lul                                            | 27.84       | 193.83                                | 111.77     | 333.44 | 29.56              | 29.56                                | 34 0.12     | 00:00    | 392.67      | 0.29        | 392.96                                    | 263.61 | 35.47       | 23.64                              | 23,64              | 82.76  | 11.89   | 53.57   | 411.83              | 18.88   |
| Aug                                            | 31.23       | 217.38                                | 125.35     | 373.97 | 29.56              | 29.56                                | 0.15        | 00.00    | 433.23      | 0.37        | 433.60                                    | 295.65 | 39.78       | 23.64                              | 23.64              | 87.07  | 15.10   | 80.09   | 457.90              | 24.31   |
| Sep                                            | 23.75       | 165.30                                | 95.32      | 284.37 | 28.60              | 28.60                                | 1.10        | 00.0     | 342.68      | 2.66        | 345.34                                    | 224.82 | 30.25       | 22.88                              | 22.88              | 76.01  | 109.93  | 45.69   | 456.45              | 11.11   |
| Oct                                            | 3.50        | 24,34                                 | 14.03      | 41.87  | 29.56              | 29.56                                | 3.95        | 00.0     | 104.93      | 9.57        | 114.49                                    | 33.10  | 4.45        | 23.64                              | 23.64              | 51.74  | 394.85  | 6.73    | 486.42              | 371.92  |
| Nov                                            | 19.55       | 136.11                                | 78.49      | 234.15 | 28.60              | 28.60                                | 1.57        | 00.00    | 292.92      | 3.80        | 296.72                                    | 185.11 | 24.90       | 22.88                              | 22.88              | 70.67  | 156.79  | 37.62   | 450.19              | 153.47  |
| Dec                                            | 36.00       | 250.59                                | 144.50     | 431.10 | 29.56              | 29.56                                | 0.20        | 00.00    | 490,41      | 0.48        | 490.89                                    | 340.82 | 45.85       | 23.64                              | 23.64              | 93.14  | 19.85   | 69.26   | 523.07              | 32.18   |
| Jan                                            | 47.68       | 331.89                                | 191.38     | 570.95 | 29.56              | 29.56                                | 0.01        | 0.00     | 630.07      | 0.01        | 630.08                                    | 451.38 | 60.73       | 23.64                              | 23.64              | 108.02 | 0.62    | 91,73   | 651.75              | 21.67   |
| Fcb                                            | 37.61       | 28.192                                | 150.98     | 450.41 | 26.70              | 26.70                                | 0.00        | 00.00    | 503.80      | 00.00       | 503.81                                    | 356.09 | 47.91       | 21.36                              | 21.36              | 90.62  | 0.13    | 72.36   | \$19.22             | 15.41   |
| Mar                                            | 20.30       | 141.31                                | 81.49      | 243.10 | 29.56              | 29.56                                | 0.00        | 0.00     | 302.22      | 0.01        | 302.22                                    | 192.19 | 25.86       | 23.64                              | 23.64              | 73.15  | 0.31    | 39.06   | 24.2                | 2.48    |
| Apr                                            | 7.87        | St. 76                                | 31.58      | こま     | 38.60              | 28.60                                | <u>0</u>    | 00.00    | 151.46      | 0.11        | 151.57                                    | 74.48  | 10.02       | 22.88                              | 22.88              | 55.78  | 4.50    | 15.13   | 149.90              | 1911    |
| May                                            | 3.54        | 2+63                                  | 14.20      | 42.37  | 29.56              | 29.56                                | 0.30        | 00.0     | 101.78      | 0.73        | 102.51                                    | 33.50  | 4.51        | 23.64                              | 23.64              | 51.80  | 30.06   | 6.81    | 122.17              | 19.65   |
| Total                                          | 263.00      | 1830.8                                | 1055.7     | 3149.5 | 348.0              | 348.0                                | 7.63        | 0.00     | 3853.18     | 14.91       | 3868.10                                   | 2490.0 | 335.0       | 278.4                              | 278.4              | 891.8  | 763.00  | 506.0   | \$059 <del>\$</del> | 782.71  |
| Note: Column no. 10 = Column no. (\$+6+7+8+9). | .10 = Colum | m no.(\$+6+                           | 7+8+9).    | Colum  | n No. 12=          | Column No. 12 = Column no. (10 + 11) | 5.(10 + 11) |          | umn no.20 : | = Column no | Column no. 20 = Column no. (13+17+18+19). |        | lumn no. 23 | Column no. 21 = Column no. (20-12) | 0.(20-12).         |        |         |         |                     |         |

Table 4.10.3(e): Shimsha Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                                              | _                         |             |                                     |        | X                                  | Water Utilisation | ation      |          |             |             |                                     |        |                  | ž                                  | Water Availability | lity   |         |           | Monshin |
|----------------------------------------------|---------------------------|-------------|-------------------------------------|--------|------------------------------------|-------------------|------------|----------|-------------|-------------|-------------------------------------|--------|------------------|------------------------------------|--------------------|--------|---------|-----------|---------|
| :                                            |                           |             |                                     | Wat    | Water requirements                 | ents              |            |          |             |             | Gross                               |        |                  | Regeneration from uses             | from uses          |        | Surface | Grass     | water   |
| Mozith                                       | Utilisatio                | n under in  | Utilisation under impation projects |        | Dome-                              | Indus-            | Hydro      | Environ- | 17.0        | Export      | total                               | Import | Irriga-          | Dortle-                            | lpdus-             | Total  | water   | Water     | balance |
|                                              | Proposed Existing Ongoing | Existing 10 | ngoing                              | Total  | stic                               | frial             | power      | mental   | 100         |             | ctilisation                         |        | tion             | stic                               | rial               |        | yiclds  | available |         |
| ε                                            | 2                         | <u> </u>    | €                                   | (5)    | (9)                                | 6                 | (8)        | (6)      | (01)        | (33)        | (13)                                | (13)   | ( <del>1</del> ) | (15)                               | (16)               | (LI)   | (18)    | (19)      | (00)    |
| lan.                                         | 4.21                      | 20.20       | 16.90                               | 50.42  | 21.29                              | 28.60             | 0.15       | 000      | 100.47      | 0.31        | 100.78                              | 39.85  | 5.36             | 17.03                              | 22.88              | 45.27  | 12.64   | 97.76     | -3.01   |
| 1                                            | 27.84                     | 193.74      | 111.80                              | 333.56 | 22.00                              | 29.56             | 01.0       | 00.00    | 385.21      | 0.19        | 385.40                              | 263.61 | 35.47            | 17.60                              | 23.64              | 16.71  | 7.89    | 348.21    | -37.19  |
| Aus                                          | 31 23                     | 1.          | 125.39                              | 374.10 | 22.00                              | 29.56             | 0.12       | 000      | 425.78      | 0.24        | 426.02                              | 295.65 | 39.78            | 17.60                              | 23,64              | 81.02  | 10.01   | 386.68    | -39.34  |
| es.                                          | 23.75                     |             | 95.35                               | 284.48 | 21.29                              | 28 60             | 0.89       | 000      | 335.26      | 1.77        | 337.02                              | 224.82 | 30.25            | 17.03                              | 22.88              | 70.16  | 72.89   | 367.87    | 30.85   |
| Č                                            | 3.50                      | Ī           | 4 0.4                               | 41 88  | 22 00                              | 95 02             | 3.20       | 000      | 1998        | 634         | 102.98                              | 33.10  | 4.45             | 17.60                              | 23.64              | 45.70  | 261.81  | 340.60    | 237.62  |
| Nov                                          | 19.55                     | 136.05      | 78.51                               | 234 23 | 21.29                              | 28 60             | 1.27       | 000      | 285.39      | 2.52        | 287.91                              | 185.11 | 24.90            | 17.03                              | 22.88              | 64.83  | 103.96  | 353.89    | 65.98   |
| ځا                                           | 36.00                     |             | 4                                   | 431 25 | 22 00                              | 29 46             | 910        | 000      | 482.97      | 0.32        | 483.29                              | 340.82 | 45.85            | 17.60                              | 23.64              | 87.10  | 13.16   | 441.08    | 42.21   |
| Jan                                          | 47.68                     | 1           | 191.43                              | 571.15 | 22.00                              | 29.56             | 0.0        | 00.0     | 622.71      | 0.01        | 622.72                              | 451.38 | 60.73            | 17.60                              | 23.64              | 76,101 | 0.41    | 553.77    | -68.96  |
| Fcb                                          | 37.61                     | 261.71      | 151.02                              | 450.57 | 19.87                              | 26,70             | 000        | 00.0     | 497,14      | 0.00        | 497.14                              | 356.09 | 47.91            | 15.89                              | 21.36              | 91 \$8 | 0.1     | 41.35     | -55.79  |
| Mar                                          | 20.30                     | 141.25      | 81.51                               | 243.19 | 22.00                              | 29.56             | 0.00       | 00.0     | 294.75      | 0.00        | 294,75                              | 192.19 | 25.86            | 17.60                              | 23.64              | 67.10  | 0.5     | 259.49    | -35.26  |
| Apr                                          | 7.87                      | Z           | 31.59                               | 17.7   | 21.29                              | 28 60             | 300        | 000      | 144.17      | 0.07        | 144.34                              | 74.48  | 10.02            | 17.03                              | 22.88              | 49.93  | 2.98    | 127.39    | -16.85  |
| May                                          | 3.54                      | 24.62       | 14.21                               | 42.39  | 32.00                              | 29.56             | 0.24       | 000      | 81 1%       | 0.48        | 19.2                                | 33.50  | 4.51             | 17.60                              | 23,64              | 45.75  | 19.93   | 99.18     | 4.51    |
| Total                                        | 263.00                    | 1830.0      | 1056.0                              | 3150.7 | 259.0                              | 348.0             | 619        | 000      | 3763.9      | 14.9        | 3778.8                              | 2490.0 | 335.0            | 207.2                              | 278.4              | 820.6  | \$06.0  | 3816.6    | 37.79   |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colum             | n no.(5+6-  | +7+8+9)                             | Colun  | Column No. 12 = Column no. (10+11) | Column            | 0. (10+11) |          | rnn na.19 * | · Column no | Column no.19 * Column no.(13+17+18) |        | 1 no.20 = Co     | Column no. 20 = Column no. (19-12) | 12).               |        |         |           |         |
|                                              |                           |             |                                     |        |                                    |                   |            |          |             |             |                                     |        |                  |                                    |                    |        |         |           |         |

Table 4.10.3(f): Shimsha Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|               | ١.     |                                              |            |        | ٠                  | Water Utilisation | Sation                               | !        |           |             |                                         |         |                                    |                        | Water Availability | bility |         |                                              |           | Acomple |
|---------------|--------|----------------------------------------------|------------|--------|--------------------|-------------------|--------------------------------------|----------|-----------|-------------|-----------------------------------------|---------|------------------------------------|------------------------|--------------------|--------|---------|----------------------------------------------|-----------|---------|
|               |        |                                              |            | E.M.   | Water requirements | nents             |                                      |          |           |             | Gross                                   |         | 1                                  | Regeneration from uses | from uses          |        | Surface | Ground                                       | Gross     | water   |
| Utilisa       | ŀ₫     | Itilisation under imigation projects         | gation pro | _      | Dome-              | Indus-            | Hydro-                               | Environ- | Total     | Ехроп       | total                                   | Import  | Lmiga-                             | Dome-                  | Indus-             | Total  | water   |                                              | water     | balance |
| Propose       | 뿝      | Proposed Existing Ongoing                    | guiogr     | Total  | stic               | trial             | power                                | mental   | i o       |             | utilisation                             |         | tion                               | stic                   | trial              |        | yields  | <u>,                                    </u> | available |         |
| 3             | H      | (E)                                          | €          | (5)    | 9                  | 3                 | (61)                                 | 6        | (01)      | (1)         | (13)                                    | (13)    | (14)                               | (15)                   | (16)               | (17)   | (18)    | 6)                                           | (S)       | <u></u> |
| 4             | 421    | 29.30                                        | 16.90      | 50.41  | 28.60              | 28.60             | 0.13                                 | 000      | 107.74    | 0.31        | 108.04                                  | 39.85   | 5.36                               | 22.88                  | 22.88              | 51.13  | 12.64   | 9.70                                         | 113,31    | 5.17    |
| 12            | 27.84  | 193.83                                       | 111.77     | 333.44 | 29.56              | 29.56             | 0.08                                 | 00.0     | 392.63    | 61.0        | 392.82                                  | 263.61  | 35.47                              | 23.64                  | 33.64              | 82.76  | 7.89    | £.16                                         | 418 47    | 25.59   |
| <u> </u>      | 31.23  | 217.38                                       | 125.35     | 373.97 | 29.56              | 29.56             | 01.0                                 | 000      | 433.18    | 0.24        | 433.42                                  | 295.65  | 39.78                              | 23.64                  | 23.64              | 87.07  | 10.01   | 71.95                                        | 461.68    | 31.26   |
| 60<br>        | 23.75  | 165.30                                       | 95.32      | 284.37 | 28.60              | 28.60             | 0,73                                 | 000      | 342.31    | 1.771       | 344.07                                  | 224.82  | 30.25                              | 22.88                  | 22 88              | 10.97  | 72.89   | \$4.72                                       | 428.4     | £ 37    |
|               | 3,50   | 24.34                                        | 14.03      | 41.87  | 29.56              | 29.56             | 2.62                                 | 0.00     | 103.60    | 6.34        | 109.94                                  | 33.10   | 4.45                               | 33.64                  | 23,64              | 51.74  | 261.81  | 8.06                                         | 354.71    | 24.7    |
| -             | 19.55  | 136.11                                       | 78.49      | 234.15 | 28.60              | 28.60             | 3.                                   | 00:0     | 292.39    | 2.52        | 294.91                                  | 185.11  | 24.90                              | 22.88                  | 22.88              | 70.67  | 103.96  | 45.05                                        | \$<br>5   | 109.88  |
| J.            | 36,00  | 250.59                                       | 144.50     | 431.10 | 29.56              | 29.56             | 0.13                                 | 00.0     | 490.34    | 0.32        | 490.66                                  | 340.82  | 45.85                              | 23.64                  | 23.64              | 93.14  | 13.161  | 82.95                                        | 530.07    | 39.41   |
| 4             | 47.68  | 331.89                                       | 191.38     | 570.95 | 29.56              | 29.56             | 0.00                                 | 000      | 630.06    | 10.0        | 630.07                                  | 451.38  | 60.73                              | 23.64                  | 23.64              | 108.02 | 0.41    | 109.86                                       | 29.699    | 39.59   |
| \<br> ``'     | 37.61  | 261.82                                       | 150.98     | 450.41 | 26.70              | 26.70             | 0.00                                 | 00.00    | 503.80    | 00.00       | 503.80                                  | 3\$6.09 | 17.91                              | 21.36                  | 21.36              | 50.62  | 0.1     | 86.66                                        | 533.47    | 29.67   |
| (''           | 20.30  | 141.31                                       | 81.49      | 243.10 | 29.56              | 29.56             | 0.00                                 | 00.00    | 302,22    | 00.00       | 302.22                                  | 192.19  | 25.86                              | 23.64                  | 23.64              | 73.15  | 0.3     | 46.77                                        | 312.32    | 10.09   |
|               | 7.87   | 54.76                                        | 31.58      | 94.21  | 28.60              | 28.60             | 0.03                                 | 00.0     | 151.44    | 0.07        | 151.51                                  | 74.48   | 10.02                              | 22.88                  | 22.88              | 55.78  | 2.98    | 18.13                                        | 151.37    | 7.0     |
| ["            | 3.54   | 24.63                                        | 14.20      | 42.37  | 29.56              | 29.56             | 0.20                                 | 000      | 101.68    | 0.48        | 102.17                                  | 33.50   | 4.51                               | 23.64                  | 23.64              | 51.80  | 19.93   | 8.15                                         | 113.38    | 11.21   |
| 263           | 263.00 | 1830.8                                       | 1055.7     | 3149.5 | 7.8°0              | 348.0             | 5.06                                 | 000      | 3850.6    | 14.91       | 3865.5                                  | 2490.0  | 335.0                              | 278.4                  | 278.4              | 891.8  | \$06.0  | 0.909                                        | 1193 8    | 628.26  |
| )<br> 2<br> 2 | - LIN  | Note: Column no. 10 = Column no. (5+6+7+8+9) | 7+8+9)     | Colur  | nn No. 12          | = Column n        | Column No. 12 = Column no. (10 + 11) |          | umn no.20 | = Column no | Column no.20 = Column no.(13+17+18+19). |         | Column no. 21 = Column no. (20-12) | = Column               | 10.(20-12).        |        |         |                                              |           |         |
| ١             |        |                                              |            |        |                    | -                 |                                      |          |           |             |                                         |         |                                    |                        |                    |        |         |                                              |           |         |

Unit: MCM Table 4.10.3(g): Shimsha Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                                               |                           |           |                                       |        | -                  | Water Utilisation                    | sation     |          |                                       |             |             |        |             | 14                               | Water Availability | ility  |         |           | 7 (a-a)-10 |
|-----------------------------------------------|---------------------------|-----------|---------------------------------------|--------|--------------------|--------------------------------------|------------|----------|---------------------------------------|-------------|-------------|--------|-------------|----------------------------------|--------------------|--------|---------|-----------|------------|
|                                               |                           |           |                                       | Wa     | Water requirements | ments                                |            |          |                                       |             | Gross       |        |             | Regeneration from uses           | from uses          |        | Surface | Gross     | Montraly   |
| Monin                                         | Utilisation               | under in  | Utilisation under irrigation projects | ojects | Боте-              | Indus-                               | Hydro-     | Environ- | T                                     | Export      | total       | lmport | Imiga-      | Dome-                            | Indus              | Total  | water   | water     | halonce    |
|                                               | Proposed Existing Ongoing | sisting C | Ingoing,                              | Total  | stic               | trial                                | power      | mental   | 1001                                  |             | utilisation |        | tion        | stic                             | trial              | LOUG   | yields  | available |            |
| Ξ                                             | <u> </u>                  | <u>ε</u>  | €                                     | (S)    | 9                  | (7)                                  | (8)        | (6)      | (01)                                  | (11)        | (12)        | (13)   | (14)        | (15)                             | (10)               | (17)   | (81)    | (61)      | (20)       |
| unf                                           | 4.21                      | 29.29     | 06'91                                 | 50.42  | 21.29              | 28.60                                | 0.15       | 00.0     | 100.47                                | 0.19        | 100.66      | 39.85  | 5.36        | 17.03                            | 22.88              | 45.27  | 7.92    | 93.04     | -7.62      |
| Z                                             | 27.84                     | 193.74    | 111.80                                | 333.56 | 22.00              | 29.56                                | 010        | 00.00    | 385.21                                | 0.12        | 385.33      | 263.61 | 35.47       | 17.60                            | 23.64              | 76.71  | 4.94    | 345.36    | -40.07     |
| Aug                                           | 31.23                     | 217.29    | 125.39                                | 374.10 | 22.00              | 29.56                                | 0.12       | 00.00    | 425.78                                | 0.15        | 425.93      | 295.65 | 39.78       | 17.60                            | 23.64              | 81.02  | 6.27    | 382.94    | 42.99      |
| Sep                                           | 23.75                     | 165.23    | 95.35                                 | 284.48 | 21.29              | 28.60                                | 0.89       |          | 335.26                                | 1.11        | 336.36      | 224.82 | 30.25       | 17.03                            | 22.88              | 70.16  | 45.66   | 340.64    | 4.28       |
| Oct                                           | 3.50                      | 24.33     | 14.04                                 | 41.88  | 22.00              | 29.56                                | 3.20       |          | 96.64                                 | 3.97        | 19001       | 33.10  | 4.45        | 17.60                            | 23.64              | 45.70  | 164.02  | 242.81    | 142.20     |
| Nov                                           | 19.55                     | 136.05    | 78.51                                 | 234.23 | 21.29              | 28.60                                | 1.27       |          | 285.39                                | 1.58        | 286.97      | 185.11 | 24.90       | 17.03                            | 22.88              | 64.82  | 65.13   | 315.06    | 28.09      |
| Dec                                           | 36.00                     | 250.49    | 14.54                                 | 431.25 | 22.00              | 29.56                                | 0.16       | 0.00     | 482.97                                | 0.20        | 483.17      | 340.82 | 45.85       | 17.60                            | 23.64              | 87,10  | 8.24    | 436.16    | 47.01      |
| Jan                                           | 17.68                     | 331.75    | 191,43                                | 571.15 | 22.00              | 29.56                                | 0.01       | 00.00    | 622.71                                | 0.01        | 622.72      | 451.38 | 60.73       | 17.60                            | 23.64              | 101.97 | 0.26    | 553.62    | -69.10     |
| Feb                                           | 37.61                     | 261.71    | 151.02                                | 450.57 | 19.87              | 26.70                                | 0.00       |          | 497.14                                | 00.00       | 197.14      | 356.09 | 47.91       | 15.89                            | 21.36              | 85.16  | 90.0    | 441.31    | -55.83     |
| Mar                                           | 20.30                     | 141.25    | 15.18                                 | 243.19 | 22.00              | 29.56                                | 0.00       | 00.00    | 294.75                                | 00.00       | 294.75      | 192.19 | 25.86       | 17.60                            | 23.64              | 67.10  | 0.13    | 259.42    | -35.33     |
| Apr                                           | 7.87                      | 54.74     | 31.59                                 | 94.24  | 21.29              | 28.60                                | 0.04       | 00'0     | 144.17                                | 0.05        | 144.21      | 74.48  | 10.02       | 17.03                            | 22.88              | 49.93  | 1.87    | 126.28    | -17.93     |
| May                                           | 3.54                      | 24.62     | 14.21                                 | 42.39  | 22.00              | 29.56                                | 0.24       | 0.00     | 24.18                                 | 0.30        | 94.49       | 33.50  | 4.51        | 17.60                            | 23.64              | 45.75  | 12.49   | 91.74     | -2.75      |
| Total                                         | 263.00                    | 1830.0    | 1056.0                                | 3150.7 | 259.0              | 348.0                                | 61.9       | 0.00     | 3763.9                                | 14.9        | 3778.8      | 2490.0 | 335.0       | 207.2                            | 278.4              | 820.6  | 317.0   | 3627.6    | -151.2     |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 10 = Colum                | 3 no.(5+6 | +7+8+9).                              | Colu   | mn No. 12          | Column No. 12 = Column no. (10 + 11) | 10. (10+11 | _        | Column no. 19 = Column no. (13+17+18) | - Column no | (13+17+18). | Colum  | 1no.20 = Co | Column no.20 = Column no.(19-12) | 1-12).             |        |         |           |            |

Table 4.10.3(h): Shimsha Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                               |              |                  |                                     |         |                    |                                     |              |          |             |             |                                          |        |                                   |                        |                    |        | j       |        | Unit: 1   | MCM     |
|-----------------------------------------------|--------------|------------------|-------------------------------------|---------|--------------------|-------------------------------------|--------------|----------|-------------|-------------|------------------------------------------|--------|-----------------------------------|------------------------|--------------------|--------|---------|--------|-----------|---------|
|                                               |              |                  |                                     |         | 2                  | Water Utilisation                   | ation        |          |             |             |                                          |        |                                   |                        | Water Availability | bility |         |        |           |         |
| 17.54                                         |              |                  |                                     | Wat     | Water requirements | ents                                |              |          |             |             | Gross                                    |        | I                                 | Regeneration from uses | from uses          |        | Surface | Ground | Gross     | Monthly |
| חזויסואי                                      | Utilisatio   | n under in       | Utilisation under impation projects | yects . | Dome-              | Indus-                              | Hydro        | Environ- | L open      | Expart      | total                                    | Impart | Smigas                            | Dome-                  | -snpu]             |        | water   | Walcr  | water     | halane  |
|                                               | Proposed E   | Existing Ongoing | ngoing                              | Total   | stic               | trial                               | power        | mental   | LOCAL       |             | utilisation                              |        | tron                              | stic                   | lein               | I Oral | yields  | yields | available |         |
| ε                                             | <u>0</u>     | 3                | €                                   | (S)     | (9)                | (1)                                 | (61)         | (6)      | (10)        | (11)        | (12)                                     | (E1)   | (14)                              | (15)                   | (16)               | (17)   | (81)    | (61)   | (20)      | (21)    |
| in in                                         | 4.21         | 29.30            | 16.90                               | 50.41   | 28.60              | 28.60                               | 80.0         | 0.00     | 107.69      | 61.0        | 107.88                                   | 39.85  | 5.36                              | 22.88                  | 22.88              | 51.13  | 7.92    | 8.10   | 106.99    | -0.89   |
| Pi                                            | 27.84        | 193.83           | 111.77                              | 333.44  | 29.56              | 29.56                               | 0.05         | 00:0     | 392.60      | 0.12        | 392.72                                   | 263.61 | 35.47                             | 13.64                  | 23.64              | 82.76  | 4.94    | \$3.57 | 404.88    | 12.16   |
| Aug                                           | 31.23        | 217.38           | 125.35                              | 373.97  | 29.56              | 29.56                               | 0.08         | 0.00     | 433.14      | 0.15        | 433.29                                   | 295.65 | 39.78                             | 23.64                  | 23.64              | 87.07  | 6.27    | 80.08  | 449.07    | 15.78   |
| Sep.                                          | 13.75        | 165.30           | 95.32                               | 284.37  | 28.60              | 28.60                               | 97.0         | 0.00     | 342.03      | =           | 343.14                                   | 224.82 | 30.25                             | 22.88                  | 22.88              | 76.01  | 45.66   | 45.69  | 392.18    | 49.04   |
| Og                                            | 3.50         | ж.<br>ж.         | 14.03                               | 41.87   | 29.56              | 29.56                               | 1.64         | 0.00     | 102.62      | 3.97        | 106.59                                   | 33.10  | 4.45                              | 23.64                  | 23.64              | 51.74  | 164.02  | 6.73   | 255.59    | 148.99  |
| Nov                                           | 19.55        | 136.11           | 78.49                               | 234.15  | 28.60              | 28.60                               | 0.65         | 0.00     | 292.00      | 1.58        | 293.58                                   | 185.11 | 24.90                             | 22.88                  | 22.88              | 70.67  | 65.13   | 37.62  | 358.53    | 64.95   |
| ğ                                             | 36.00        | 250.59           | 141.50                              | 431.10  | 29.56              | 29.56                               | 0.08         | 00.00    | 490.29      | 0.20        | 490.49                                   | 340.82 | 45.85                             | 23.64                  | 23.64              | 93.14  | 8.24    | 69.26  | 511.46    | 20.97   |
| Jan                                           | 47.68        | 331.89           | 191.38                              | 570,95  | 29.56              | 29.56                               | 0.00         | 0.00     | 630.06      | 10.01       | 630.07                                   | 451.38 | 60.73                             | 23.64                  | 23.64              | 108.02 | 0.26    | 91.73  | 651.39    | 21.32   |
| Feb                                           | 37.61        | 361.82           | 150.98                              | 450.41  | 26.70              | 26.70                               | 0.00         | 0.00     | 503.80      | 0.00        | 503.80                                   | 356.09 | 47.91                             | 21.36                  | 21.36              | 90.62  | 0.06    | 72.36  | 519.13    | 15.33   |
| Mar                                           | 20.30        | 141.31           | 81.49                               | 243.10  | 39.56              | 29.56                               | 0.00         | 0.00     | 302.22      | 0.00        | 302.22                                   | 192.19 | 25.86                             | 23.64                  | 23.64              | 73.15  | 0.13    | 39.06  | 304.53    | 2.31    |
| γĎι                                           | 7.87         | 91.1S            | 31.58                               | 94.21   | 28.60              | 28.60                               | 0.03         | 000      | 151.43      | 0.05        | 151.48                                   | 74.48  | 10.02                             | 22.88                  | 22.88              | 55.78  | 1.87    | 15.13  | 147.27    | 4.21    |
| May                                           | 3.54         | 24.63            | 14.20                               | 42.37   | 29.56              | 29.56                               | 0.12         | 0.00     | 101.61      | 0.30        | 101.91                                   | 33.50  | 4.51                              | 23.64                  | 23.64              | 51.80  | 12.49   | 6.81   | 104.59    | 2.68    |
| Total                                         | 263.00       | 263.00[ 1830.8]  | 1055.7                              | 3149.5  | 348.0              | 348.0                               | 3.17         | 0.00     | 3848.7      | 14.91       | 3863.6                                   | 2490.0 | 335.0                             | 278.4                  | 278.4              | 891.8  | 317.0   | 506.0  | 4204.8    | 341.17  |
| Note : Column no. 10 = Column no. (5+6+7+8+9) | . 10 = Colum | n no.(5+6        | 17+8+9).                            | Colun   | nn No. 12 =        | Column No. 12 = Column no. (10 + 11 | o. (10 + 11) | Coli     | um: no.20 - | - Column no | Column no. 20 = Column no. (13+17+18+19) | ,      | Column no. 21 = Column no.(20-12) | = Column n             | 0.(20-12).         |        |         |        |           |         |

Table 4.10.4(a): Arkavathi Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water Unit: MCM

|                                            |                   |             |                                     |        | 2                  | Water Utilisation                   | ation       |          |           |                                     |             |        |             | ×                                | Water Availability | ility    |         |             | Monthly |
|--------------------------------------------|-------------------|-------------|-------------------------------------|--------|--------------------|-------------------------------------|-------------|----------|-----------|-------------------------------------|-------------|--------|-------------|----------------------------------|--------------------|----------|---------|-------------|---------|
| 4                                          |                   |             |                                     | Wat    | Water requirements | rents                               |             |          |           |                                     | Gross       |        | Æ           | Regeneration from uses           | from uses          | _        | Surface | Gross       | water   |
| Monta                                      | Utilisati         | on under in | Utilisation under impation projects | H      | Dome-              | Indus-                              | Hydro       | Environ- | ļ         | Export                              | latot       | Import | Imga-       | роше-                            | Indus-             | <br><br> | water   | water       | balance |
|                                            | Proposed Existing | Existing C  | Ongoing                             | Total  | Stic               | trial                               | DOWCI       | mental   | local     |                                     | utilisation |        | tion        | stic                             | rial               | 3        | yiclds  | available   |         |
| Ξ                                          | 8                 | (3)         | €                                   | (5)    | 9                  | 8                                   | (8)         | (6)      | (01)      | ε                                   | (12)        | (13)   | (14)        | (15)                             | (91)               | (t)      | (18)    | (19)        | (20)    |
| Ju.                                        | 22                | 4.80        | 3.23                                | 13.16  | 39.37              | 45.95                               | 0.00        | 0.10     | 98.65     | 28.52                               | 127.16      | 10.85  | 0.56        | 31.50                            | 36.76              | 18.89    | 10.1    | 89.76       | -37.40  |
| 12.                                        | 12.66             | 11.67       | 7.84                                | 31.97  | 40.68              | 47.48                               | 00.0        | 0.07     | 120.30    | 21.15                               | 141.45      | 26.35  | 1.35        | 32.55                            | 37.98              | 71.88    | 7.49    | 105.72      | -35.73  |
| Aug                                        | 17.02             | 15.68       | 10.54                               | 42.98  | 40.68              | 47.48                               | 0.00        | 0.14     | 131.31    | 38.96                               | 170.27      | 35.42  | 1.82        | 32.55                            | 37.98              | 72.35    | 13.8    | 121.57      | 48.70   |
| Sep                                        | 19.60             | 18.06       | 12.14                               | 49.49  | 39.37              | 45.95                               | 000         | 660      | 134.98    | 280.75                              | 415.73      | 40.79  | 5.09        | 31.50                            | 36.76              | 70.35    | 99.44   | 210.57      | -205.15 |
| S                                          | 14.16             | 13.05       | 8 77                                | 35.76  | 40.68              | 47.48                               | 000         | 060      | 124 (90   | 254.75                              | 378 83      | 29.47  | 1.51        | 32.55                            | 37.98              | 72.04    | 90.23   | 191.74      | -187.09 |
| Nov                                        | 16.33             | 15.05       | 10.12                               | 41.25  | 39.37              | 45.95                               | 00.0        | 0.37     | 126.73    | 104.29                              | 231.03      | 34.00  | 1.75        | 31.50                            | 36.76              | 00.07    | 36.94   | 140 93      | -90.09  |
| ä                                          | 31 80             | 28.57       | 19.21                               | 78 31  | 40.68              | 47.48                               | 00.0        | 0.10     | 166.64    | 28.20                               | 194.84      | 64.54  | 3.31        | 32.55                            | 37.98              | 73.84    | 66.6    | 148.37      | ₩9.43   |
| Lil                                        | 7,                | 31.68       | 21.30                               | 86.85  | 40.68              | 47.48                               | 000         | 100      | 175.18    | 11.10                               | 186.27      | 71.57  | 3.67        | 32.55                            | 37.98              | 74.20    | 3.93    | 149.71      | -36 57  |
| -G                                         | 22.15             | ŀ           | 13.72                               | 55.94  | 36,75              | 42.88                               | 000         | 0.03     | 135.73    | 7.20                                | 142.93      | 98.10  | 2.37        | 29.40                            | 18.4%              | 66.07    | 2.55    | 114.72      | -28 21  |
| /Jac                                       | 13.74             | 12.67       | 8.53                                | Z<br>Z | 40.68              | 47.48                               | 0.00        | 0.02     | 123.03    | 5.42                                | 128.45      | 28.60  | 1.47        | 32.55                            | 37.98              | 72.00    | 1.92    | 102.52      | -25 94  |
| Apr                                        | 6.53              | 6.02        | 4.04                                | 16.49  | 39.37              | 45.95                               | 9.0         | 0.031    | 101.97    | 7.93                                | 109.90      | 13.59  | 0.70        | 31.50                            | 36.76              | 68.95    | 2.81    | 85.35       | -24 56  |
| May                                        | 3.71              | 3.42        | 230                                 | 9.36   | 40.68              | 47.48                               | 000         | 80.0     | 69 76     | 22 02                               | 119.71      | 7,72   | 0,40        | 32.55                            | 37.98              | 70.92    | 7.8     | \$\$<br>\$4 | -33.27  |
| Total                                      | 196.48            | 1.181       | 121.73                              | 496.3  | 479.0              | 559.0                               | 000         | 2.87     | 1536.30   | 810.29                              | 2346.6      | 0.604  | 21.00       | 383.2                            | 417.2              | 851.4    | 287.0   | 1547.4      | 799.19  |
| Note: Column no.10 = Column no.(5+6+7+8+9) | 3.10 = Colur      | nn no.(5+6  | +7+8+9)                             | Colun  | S No. 12           | Column No. 12 = Column no. (10 + 11 | 0. (10 + 11 | <br> -~  | чтп по.19 | Column no.19 = Column no.(13+17+18) | (13+17+18). |        | πo. 20 = Co | Column no.20 = Column no.(19-12) | .(2).              |          |         |             |         |

Table 4.10.4(b): Arkavathi Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                             |                           |             |                                       |         |                                      |                   |        |          |            |                                          |             |        |                                    |                        | Maria or Secretary |        |         |             |           |          |
|---------------------------------------------|---------------------------|-------------|---------------------------------------|---------|--------------------------------------|-------------------|--------|----------|------------|------------------------------------------|-------------|--------|------------------------------------|------------------------|--------------------|--------|---------|-------------|-----------|----------|
|                                             |                           |             |                                       |         | *                                    | Water Utilisation | sation |          |            |                                          |             |        |                                    |                        | water Availability | DILICY |         |             | Ì         | Monthly  |
| •                                           |                           |             |                                       | Wa      | Water requirements                   | rents             |        |          |            |                                          | Gross       |        |                                    | Regeneration from uses | from uses          |        | Surface | Ground      | Gross     | diago.   |
| Month                                       | Utilisation               | n under irr | Utilisation under irrigation projects | yects } | Dome-                                | Indus-            | Hydro- | Environ- | ·          | Export                                   | total       | Import | Imiga-                             | Dome-                  | -snpu]             | 1,001, | water   |             | w.ater    | halance  |
|                                             | Proposed Existing Ongoing | visting O   | proing                                | Total   | stic                                 | trial             |        | mental   | 1001       |                                          | utilisation |        | tion                               | stic                   | trial              |        | yields  | yields      | available |          |
| ε                                           | (2)                       | (E)         | (4)                                   | (5)     | 9                                    | 8                 | (61)   | (6)      | (01)       | Œ                                        | (12)        | (13)   | (14)                               | (13)                   | (16)               | (11)   | (81)    | <u>(6</u> ) | (20)      | <u>E</u> |
| mn                                          | 5.21                      | 08.4        | 323                                   | 13.16   | 45.95                                | 45.95             | 000    | 0.10     | 105.16     | 28.52                                    | 133.67      | 10.85  | 0.56                               | 36.76                  | 36.76              | 74.07  | 1.01    | 2.75        | 97.76     | -35.91   |
| 3                                           | 12.66                     | 11.67       | 7.83                                  | 31.97   | 47.48                                | 47.48             | 000    | 0.07     | 127.00     | 21.15                                    | 148.15      | 26.35  | 1.35                               | 37.98                  | 37.98              | 77.32  | 7.49    | 6.67        | 117.82    | -30.33   |
| Aue                                         | 17.02                     | 15.68       | 10.53                                 | 42.98   | 47.48                                | 47.48             | 00:00  | 0.14     | 138.07     | 38.96                                    | 177.03      | 35.42  | 1.82                               | 37.98                  | 37.98              | 17.78  | 13.8    | 8.96        | 135.96    | 41.07    |
| Sep.                                        | 19.60                     | 18.06       | 12.13                                 | 49 49   | 45.95                                | 45.95             | 000    | 660      | 142.38     | 280.75                                   | 423.13      | 40.79  | 500                                | 36.76                  | 36.76              | 75.61  | 99.44   | 10.32       | 226.16    | 196.97   |
| ŏ                                           | 14.16                     | 13.05       | 8.76                                  | 35.76   | 47.48                                | 47.48             | 000    | 060      | 131.62     | 254.75                                   | 386.36      | 29.47  | 1.51                               | 37.98                  | 37.98              | 77.48  | 90.23   | 7.46        | 304.63    | -181.73  |
| Nov                                         | 16.33                     | 15.05       | 10.11                                 | 41.25   | 45.95                                | 45.95             | 00'0   | 0.37     | 133.51     | 104.29                                   | 237.80      | 34.00  | 1.75                               | 36.76                  | 36.76              | 75.26  | 36.94   | 8.60        | 154.80    | -83.01   |
| 20                                          | 31.00                     | 28.58       | 19.19                                 | 78.31   | 47.48                                | 47.48             | 000    | 010      | 173.37     | 28.20                                    | 201.57      | 64.54  | 3.31                               | 37.98                  | 37.98              | 79.28  | 66'6    | 16.33       | 170.14    | -31.4    |
| Jan                                         | 34.38                     | 31.69       | 21.28                                 | 86.85   | 47,48                                | 47.48             | 000    | 0.04     | 181.84     | 11.10                                    | 192.91      | 71.57  | 3.67                               | 37.98                  | 37.98              | 79.64  | 3.93    | 18.11       | 173.25    | -19.7    |
| Feb                                         | 22.15                     | 20.41       | 13.71                                 | 55.94   | 42.88                                | 42.88             | 000    | 0.03     | 141.73     | 7.20                                     | 148.93      | 46.10  | 2.37                               | 16.21                  | 34,31              | 36.02  | 2.55    | 11.67       | 131.29    | -17.6    |
| Mar                                         | 13.74                     | 12.66       | 8.50                                  | 17.14   | 47,48                                | 47.48             | 0.00   | 0.02     | 129.68     | 5,42                                     | 135.10      | 28.60  | 1.47                               | 37.98                  | 37.98              | 77.43  | 1.92    | 7.24        | 115.19    | 16.61-   |
| Apr                                         | 6.53                      | 6.02        | 4.04                                  | 16.49   | 45.95                                | 45.95             | 0.00   | 0.03     | 108.40     | 7.93                                     | 116.34      | 13.59  | 0.70                               | 36.76                  | 36.76              | 74.21  | 2.81    | #           | さま        | .22.29   |
| May                                         | 3.71                      | 3.42        | 2.29                                  | 9.36    | 47.48                                | 47.48             | 000    | 80.0     | 104.39     | 22.02                                    | 126.42      | 7.72   | 0.40                               | 37.98                  | 37.98              | 76.36  | 7.8     | <u>8</u> .  | 93.83     | .32.59   |
| Total                                       | 196.48                    | 181         | 121.6                                 | 496.3   | 559.0                                | 939.0             | 00.0   | 2.87     | 1617.2     | 810.29                                   | 2427.46     | 409.0  | 21.0                               | 447.2                  | 447.2              | 915.4  | 287.0   | 103.5       | 1714.9    | .713     |
| Note: Column no.10 = Column no.(5+6+7+8+9). | 2.10 = Colum              | n no.(5+6-  | 17+8+6)                               | Colum   | Column No. 12 = Column no. (10 + 11) | Column            | (10+1) |          | orna no.20 | Column no. 20 = Column no. (13+13+18+19) | (13+13+18+  |        | Column no. 21 a Column no. (20-12) | ■ Column r             | 10.(20-12)         |        |         |             |           |          |
|                                             |                           |             |                                       |         |                                      |                   |        |          |            |                                          |             | l      |                                    |                        |                    |        |         |             |           |          |

Table 4.10.4(c): Arkavathi Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

|            | ,                                             |             |                    |                                      |            |          |                                     |           |             |        |                                    |                        | .                  |        |         | Unit:     | : MCM   |
|------------|-----------------------------------------------|-------------|--------------------|--------------------------------------|------------|----------|-------------------------------------|-----------|-------------|--------|------------------------------------|------------------------|--------------------|--------|---------|-----------|---------|
|            |                                               |             |                    | Water Utilisation                    | ation      |          |                                     |           |             |        |                                    | 22                     | Water Availability | elity  |         |           | Marchin |
|            |                                               | n l         | Water requirements | ments                                |            |          |                                     |           | Gross       |        |                                    | Regeneration from uses | from uses          |        | Surface | Gross     | water   |
|            | Utilisation under irrigation projects         | n projects  | Dome-              | Lichus-                              | Hydro E    | Environ- | 1000                                | Export    | total       | Import | lrriga-                            | Dome-                  | Indus              | Loto   | water   | water     | halance |
| 1.≅        | Existing Ongoing                              | Total       | stic               | trial                                | рожег      | mental   | Lorai                               |           | utilisation |        | tion                               | stic                   | tra                | Lorgi  | yields  | available |         |
| le         | €                                             | (5)         | (9)                | (I)                                  | (8)        | (6)      | (10)                                | (11)      | (13)        | (13)   | (14)                               | (15)                   | (91)               | (L1)   | (18)    | (61)      | (30)    |
| <b>∤</b> → | 4.80                                          | 3.23 13.16  | 39.37              | 45.95                                | 0.10       | 0.17     | 98.65                               | 38.65     | 137.30      | 10.85  | 0.56                               | 31.50                  | 36.76              | 68.81  | 13.69   | 93.35     | 43.95   |
| \=         | 7 7                                           | 7.84 31.97  | 40.68              | 47.48                                | 0.07       | 0.17     | 120.30                              | 28.66     | 148.96      | 26.35  | 1.35                               | 32.55                  | 37.98              | 71.88  | 10.15   | 108.38    | -40.58  |
| ∖≃ٰ        | 15.68 10.                                     | 10.54 42.98 | 89:07              | 47.48                                | 0.14       | 0.17     | 131.31                              | 52.81     | 11.481      | 35.42  | 1.82                               | 32.55                  | 37.98              | 72.35  | 18.70   | 126.47    | -57.64  |
| ļœ.        | 18.06                                         | 12 14 49.49 | 39.37              | 45.95                                | 0.99       | 0.17     | 134.98                              | 380.53    | 515.50      | 40.79  | 2.09                               | 31.50                  | 36.76              | 70.35  | 134.78  | 245.91    | -269.59 |
| 드          | 13.05 8.                                      | 8.77 35.76  | 40.68              | 47.48                                | 06.0       | 0.17     | 124.09                              | 345.28    | 469.37      | 29.47  | 1.51                               | 32.55                  | 37.98              | 72.04  | 122.30  | 223.81    | -245.56 |
| 12         | 15.05                                         | 10.12 41.25 | 39.37              | 45.95                                | 0.37       | 0.17     | 126.73                              | 141.36    | 268.09      | 34.00  | 1.75                               | 31.50                  | 36.76              | 70.00  | \$0.07  | 154.06    | -114.03 |
| 25         | 28.57 19.21                                   | 21 78.31    | 40.68              | 47.48                                | 0.10       | 0.171    | 166.64                              | 38.23     | 204.87      | 64.54  | 3.31                               | 32.55                  | 37.98              | 73.84  | 13.54   | 151.92    | . 52.95 |
| l.         | 31.68 21.                                     | 21.30 86.85 | 40.68              | 47.48                                | 0.04       | 0.17     | 175.18                              | 15.04     | 190.21      | 71.57  | 3.67                               | 32.55                  | 37.98              | 74.20  | 5.33    | 151.10    | -39.11  |
| 20.41      | _                                             | 13.72 55.94 | 36.75              | 42.88                                | 0.03       | 0.17     | 135.73                              | 91.6      | 145.49      | 46.10  | 2.37                               | 29.40                  | 34.31              | 66.07  | 3.46    | 115.62    | -29.87  |
| 먇          | 12.67 8.                                      | 8.51        | 89.04              | 47.48                                | 0.02       | 0.17     | 123.03                              | 7.35      | 130.38      | 28.60  | 1.47                               | 32.55                  | 37.98              | 72.00  | 2.60    | 103.20    | 27.18   |
| œ          | 6.02                                          | 1.04 16.49  | 39.37              | 45.95                                | 0.03       | 0.17     | 101.97                              | 10.75     | 112.72      | 13.59  | 0.70                               | 31.50                  | 36.76              | 68.95  | 3.81    | 86.34     | -26.38  |
| m <br>     | 3.42 2.                                       | 2.30 9.36   | 40.68              | 47.48                                | 80.0       | 0.17     | 69.66                               | 29.85     | 127.54      | 7.72   | 0.40                               | 32.55                  | 37.98              | 70.92  | 10.57   | 89.31     | -38.33  |
| 181.07     | 07 121.73                                     | 73 496.3    | 479.0              | \$59.0                               | 2.87       | 2.00     | 1536.30                             | 810.29    | 2346.6      | 409.0  | 21.00                              | 383,20                 | 447.20             | 851.40 | 389.00  | 1649.4    | -697.19 |
| ᅙ          | Note: Column no. 10 = Column no. (5+6+7+8+9). |             | tumn No. 12        | Column No. 12 = Column no. (10 + 11) | 5. (10+11) | S        | Column no.19 = Column no (13+17+18) | Column no | (13+17+18). | Column | Column no. 20 = Column no. (19-12) | Jumin no.(19           | -12).              |        |         |           |         |

Table 4.10.4(d): Arkavathi Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

| ı                                             | !             | i                |                                       |        |                    |                                    |              |          |            |             |                                        |        |             |                                    |                    |        |         |        | Unit: MCM | MCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------|---------------|------------------|---------------------------------------|--------|--------------------|------------------------------------|--------------|----------|------------|-------------|----------------------------------------|--------|-------------|------------------------------------|--------------------|--------|---------|--------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                               |               |                  |                                       |        | 2                  | Water Utilisation                  | ation        |          |            |             |                                        |        |             |                                    | Water Availability | bility |         |        |           | 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                               |               |                  |                                       | Wat    | Water requirements | nents                              |              |          |            |             | Gross                                  |        |             | Regeneration from uses             | 1 from uses        |        | Surface | Ground | Gross     | Nonthry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Menin                                         | Utilisati     | ion under it     | Jtilisation under irrigation projects | jects  | Dome-              | Indus-                             | Hydro-       | Emviron- | Total      | Export      | total                                  | Import | briga-      | Ботс-                              | Indus-             | 12041  | water   | Water  | water     | halance<br>halance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                               | Proposed      | Fxisting Ongoing | SuioguC                               | Total  | Stic               | trial                              | power        | mental   | 1 and      |             | utilisation                            |        | tion        | ştùc                               | trìal              | 100    | yields  | yields | available | Dai de la companya da |
| €                                             | 2             | 3                | Ŧ                                     | (5)    | (9)                | (2)                                | (61)         | (6)      | (10)       | ((1)        | (12)                                   | ((3)   | (14)        | (15)                               | (91)               | (17)   | (81)    | (61)   | (20)      | (21)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Jun                                           | 5.21          | 08.4             | 3.23                                  | 13.16  | 45.95              | 45.95                              | 01.0         | 0.17     | 98.65      | 38.65       | 120.14                                 | 10.85  | 0.56        | 31.50                              | 36.76              | 68.81  | 13.69   | 2.75   | 60.96     | -24.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Jac                                           | 12.66         | 11.67            | 7.83                                  | 31.97  | 47.48              | 47.48                              | 0.07         | 0.17     | 120.30     | 28.66       | 172.50                                 | 26.35  | 1.35        | 32.55                              | 37.98              | 71.88  | 10.15   | 6.67   | 115.05    | -57.45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Aug                                           | 17.02         | 15.68            | 10.53                                 | 42.98  | 47.48              | 47.48                              | 0.14         | 0.17     | 131.31     | 52.81       | 201.48                                 | 35.42  | 1.82        | 32.55                              | 37.98              | 72.35  | 18.70   | 8.96   | 135.43    | -66.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Sep                                           | 19.60         | 18.06            | 12.13                                 | 49.49  | 45.95              | 45.95                              | 66'0         | 0.17     | 134.98     | 380.53      | 215.78                                 | 40.79  | 2.09        | 31.50                              | 36.76              | 70.35  | 134.78  | 10.32  | 256.24    | 40.45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ő                                             | 14,16         | 13.05            | 8.76                                  | 35.76  | 47.48              | 47.48                              | 0.90         | 0.17     | 124.09     | 345.28      | 182.47                                 | 29.47  | 15.1        | 32.55                              | 37.98              | 7.0    | 122.30  | 7.46   | 231.27    | 48.79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Nov                                           | 16.33         | 15.05            | 10.11                                 | 41.25  | 45.95              | 45.95                              | 0.37         | 0.17     | 126.73     | 141.36      | 194.08                                 | 34.00  | 1.75        | 31.50                              | 36.76              | 70.00  | 50.07   | 8.60   | 162.66    | -31.42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Š                                             | 31.90         | 38.58            | 19.19                                 | 78.31  | 47.48              | 47.48                              | 0.10         | 0.17     | 166.64     | 38.23       | 294.50                                 | まる     | 3.31        | 32.55                              | 37.98              | 73.84  | 13.54   | 16.33  | 168.25    | -126.25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Jan                                           | 34.38         | 31.69            | 21.28                                 | 86.85  | 47.48              | 47.48                              | 0.04         | 0.17     | 175.18     | 15.04       | 316.97                                 | 71.57  | 3.67        | 32.55                              | 37.98              | 74.20  | 5.33    | 18.11  | 169.21    | -147.76                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Fcb                                           | 22.15         | 20.41            | 13.71                                 | \$5.94 | 42.88              | 42.88                              | 0.03         | 0.17     | 135.73     | 9.76        | 227.06                                 | 16.10  | 2.37        | 29.40                              | 34.31              | 66.07  | 3.46    | 11.67  | 127.29    | 77.66.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Mar                                           | 13.74         | 12.66            | 8.50                                  | 34.71  | 47.48              | 47.48                              | 0.05         | 0.17     | 123.03     | 7.35        | 179.70                                 | 28.60  | 1.47        | 32.55                              | 37.98              | 72.00  | 2.60    | 7.24   | 110.44    | -69.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Apr                                           | 6.53          | 6.02             | 3                                     | 16.49  | 45.95              | \$6.2t                             | 0.03         | 0.17     | 101.97     | 10.75       | 128.88                                 | 13.59  | 0.70        | 31.50                              | 36.76              | 68.95  | 3.81    | 3.44   | 87.68     | -39.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| May                                           | 3.71          | 3.42             | 2.29                                  | 9.36   | 17.48              | 47.48                              | 0.08         | 0.17     | 69.76      | 29.85       | 112.98                                 | 7.72   | 0.40        | 32.55                              | 37.98              | 70.92  | 10.57   | 1.95   | 91.16     | -21.81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Total                                         | 196.48        | 121.60           | 121.6                                 | 496.3  | 559.0              | 559.0                              | 2.87         | 2.00     | 1619.17    | 810.29 2429 | 2429                                   | 409.0  | 21.0        | 383.2                              | 447.2              | 851.4  | 389.00  | 103.5  | 1752.9    | -676.56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Note : Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Colui | nn no (S+6       | (6+8+2+                               | Colun  | nn No. 12          | Column No. 12 = Column no. (10 + 1 | 5. (10 + 11) | Colt     | mn no.20 = | Column no   | Column no.20 = Column no.(13+17+18+19) |        | lumn no. 21 | Column no. 21 = Column no. (20-12) | 0.(20-12).         |        |         |        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

Table 4.10.4(e): Arkavathi Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                                               |                |                           |                                     |       |                    | Water Utilisation                   | sation    |          |             |           |                                       |        |              | 23                                 | Water Availability | ılıty  |         |           | 111111  |
|-----------------------------------------------|----------------|---------------------------|-------------------------------------|-------|--------------------|-------------------------------------|-----------|----------|-------------|-----------|---------------------------------------|--------|--------------|------------------------------------|--------------------|--------|---------|-----------|---------|
|                                               |                |                           |                                     | Wa    | Water requirements | nents                               |           |          |             |           | Gross                                 |        |              | Regeneration from uses             | i from uses        |        | Surface | Gross     | Monthly |
| Month                                         | Utilisan       | ion under i               | Utilisation under impation projects |       | Dome               | Indus-                              | Hydro-    | Environ- | 1           | Export    | total                                 | Import | Irriga-      | Dome                               | Indus-             | 1,44,1 | water   | walcr     | balance |
|                                               | Proposed       | Proposed Existing Ongoing | Ongoing                             | Total | stic               | fr.a                                | power     | mental   | 101         |           | utilisation                           |        | tion         | stic                               | trial              |        | yields  | available |         |
| Ξ                                             | (2)            | Θ                         | €                                   | (5)   | 9                  | 6                                   | (8)       | (6)      | (01)        | (1)       | (12)                                  | (13)   | (14)         | (51)                               | (16)               | (11)   | (18)    | (61)      | (20)    |
| Jun                                           | 5.21           | 7.80                      | 3.23                                | 13.16 | 39.37              | 45.95                               | 000       | 0.07     | 98.65       | 20.16     | 118.80                                | 10.85  | 0.56         | 31.50                              | 36.76              | 68.81  | 7.14    | 86.80     | -32.01  |
| Jul                                           | 12 66          | 11.67                     | 7.84                                | 31.97 | 40.68              | 47,48                               | 00.0      | 0.05     | 120.36      | 14.96     | 135.26                                | 26.35  | 1.35         | 32.55                              | 37.98              | 71.88  | 5.3     | 103,53    | -31,73  |
| Aue                                           | 17.02          | 15.68                     | 10.54                               | 42.98 | 40.68              | 47.48                               | 000       | 0.10     | 131.31      | 27.56     | 158.86                                | 35.42  | 1.82         | 32.55                              | 37.98              | 72.35  | 9.76    | 117.53    | 41.34   |
| Sep                                           | 19.60          | L                         | 12.14                               | 49.49 | 39.37              | 45.95                               | 000       | 0.70     | 134.98      | 198.59    | 333.57                                | 40.79  | 2.09         | 31.50                              | 36.76              | 70.35  | 70.34   | 181.47    | 152.09  |
| Ö                                             | 14.16          | 13.05                     | 8.77                                | 35.76 | 40.68              | 47.48                               | 00.0      | 0.64     | 124.00      | 180,18    | 304,27                                | 79.47  | 151          | 32.55                              | 37.98              | 72.04  | 63.82   | 165.33    | -138.91 |
| Nov                                           | 16.33          | 15.05                     | 10.12                               |       | 39.37              | 45.95                               | 00.0      |          | 126.73      | 73.77     | 200.51                                | 34 00  | 1.75         | 31.50                              | 36.76              | 70.00  | 26.13   | 130.12    | - 70.38 |
| Š                                             | 31.00          | 28.57                     | 19.21                               | 78.31 | 40.68              | 47.48                               | 000       | 0.07     | 166.64      | 19.96     | 186.60                                | 45.54  | 3.31         | 32.55                              | 37.98              | 73.84  | 7.07    | 145.45    | 41.15   |
| Jan                                           | 34.38          | 31.68                     | 21.30                               | 86.85 | 40.68              | 47.48                               | 0.00      | 0.03     | 175.18      | 7.85      | 183.02                                | 71.57  | 3.67         | 32.55                              | 37.98              | 74.20  | 2.78    | 148.56    | -34.47  |
| Fcb                                           | 22.15          | 20.41                     | 13.72                               | 55.94 | 36.73              | 42.88                               | 000       | 0.02     | 135.73      | 5.08      | 140.81                                | 16.10  | 237          | 29.40                              | 34.31              | 66 07  | 1.8     | 113.97    | -26.85  |
| Mar                                           | 13,74          | 12.67                     | 8.51                                | 77.72 | 40.68              | 47.48                               | 000       | 0.01     | 123.03      | 3.84      | 126.87                                | 28.60  | 1.47         | 32.55                              | 37.98              | 72.00  | 1.36    | 101.96    | .24.91  |
| Apr                                           | 6.53           | 6.02                      | 404                                 | 16.49 | 39.37              | 45.95                               | 000       | 0.02     | 101.97      | 5.62      | 107.59                                | 13.59  | 0.70         | 31.50                              | 36.76              | 68.95  | 1 99    | 84.53     | -23.06  |
| May                                           | 3.71           | 3.42                      | 2.30                                | 9.36  | 40.68              | 47,48                               | 0.00      | 90.0     | 69.76       | 15.58     | 113.27                                | 7.72   | 0.40         | 32.55                              | 37.98              | 70.92  | 5.52    | 84.16     | -29.11  |
| Fotal                                         | 196 48         | 96 48 181.07              | 121.73                              | 496.3 | 479.0              | 559.0                               | 00.0      | 2.03     | 1536.30     | 810.29    | 2346.6                                | 0.60+  | 21.00        | 383.20                             | 447.20             | 0+ 158 | 203.0   | [463.4]   | -883,19 |
| Note : Column no. 10 = Column no (5+6+7+8+9). | no. 10 = Colur | mn no (5+¢                | 5+7+8+9).                           | Colui | mn No. 12          | Column No. 12 = Column no. (10 + 11 | 0, (10+11 |          | - 61.0u uur | Column no | Column no. 19 = Column no. (13+17+18) |        | 1 no.20 = Co | Column no. 20 = Column no. (19-12) | L12).              |        |         |           |         |
|                                               |                |                           |                                     |       |                    |                                     |           |          |             |           |                                       | ١      |              | 1                                  |                    |        |         |           |         |

Table 4.10.4(f): Arkavathi Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                               | ļ<br>             |            |                                    |       | 25                                   | Water Utilis | Utilisation |          |           |             |                                        |        |                                   |                        | Water Availability | ability |         |        |           | 1       |
|-----------------------------------------------|-------------------|------------|------------------------------------|-------|--------------------------------------|--------------|-------------|----------|-----------|-------------|----------------------------------------|--------|-----------------------------------|------------------------|--------------------|---------|---------|--------|-----------|---------|
|                                               |                   |            |                                    | Wa    | Water requirements                   | cnts         |             |          |           |             | Gross                                  |        | ~ ·                               | Regeneration from uses | from uses          |         | Surface | Ground | Gross     | Menting |
| a stonin                                      | Utilisatio        | n under in | Julisation under imgation projects | jects | Dome-                                | -sripuj      | Hydro-      | Environ- | F         | Export      | total                                  | Import | Irriga-                           | Dome-                  | -snpuj             | 70.0    | water   | water  | water     | halance |
|                                               | Proposed Existing | O gritting | Ongoing                            | Total | stic                                 | tria         | power       | mental   | Torg      |             | utilisation                            |        | tion                              | stic                   | trial              | 1001    | yields  | yields | availab!c |         |
| Ξ                                             | (2)               | (3)        | (4)                                | (5)   | (9)                                  | 8            | (61)        | (6)      | (10)      | (11)        | (12)                                   | (13)   | (14)                              | (15)                   | (16)               | (11)    | (81)    | (61)   | (30)      | (31)    |
| Jun                                           | 5.21              | 4.80       | 3.23                               | 13.16 | 45.95                                | 45.95        | 00:0        | 0.07     | 105.13    | 28.52       | 133.64                                 | 10.85  | 0.56                              | 36.76                  | 36.76              | 74.07   | 7.14    | 2.75   | 24.80     | -38.84  |
| Jo.                                           | 12.66             | 11.67      | 7.83                               | 31.97 | 47.48                                | 47.48        | 0.00        | 0.05     | 126.93    | 21.15       | 148.07                                 | 26.35  | 1.35                              | 37.98                  | 37.98              | 77.32   | 5.3     | 6.67   | 115.63    | -37.44  |
| Aug                                           | 17.02             | 15.68      | 10.53                              | 42.98 | 47.48                                | 47.48        | 000         | 0.10     | 138.03    | 38.96       | 176.99                                 | 35.42  | 1.82                              | 37.98                  | 37.98              | 77.78   | 9.76    | 8.96   | 131.92    | 45.07   |
| Sep                                           | 19.60             | 18.06      | 12.13                              | 49.49 | 45.95                                | 45.95        | 000         | 0.70     | 142,09    | 280.75      | 422,84                                 | 40.79  | 2.09                              | 36.76                  | 36.76              | 15.61   | 70.34   | 10.32  | 197.06    | -225.78 |
| Oct                                           | 14.16             | 13.05      | 8.76                               | 35.76 | 47.48                                | 47.48        | 000         | 0.64     | 131.35    | 254.75      | 386.10                                 | 29.47  | 1.51                              | 37.98                  | 37.98              | 77,48   | 63.82   | 7.46   | 178.22    | .207.88 |
| Nov.                                          | 16.33             | 15.05      | 10.01                              | 41.25 | 45.95                                | 45.95        | 000         | 0.26     | 133.40    | 104.29      | 237.70                                 | 37.30  | 1.75                              | 36.76                  | 36.76              | 75.26   | 36.13   | 8.60   | 143.99    | 93.7    |
| ě                                             | 31,00             | 28.58      | 19.19                              | 78.31 | 47.48                                | 47.48        | 00.0        | 0.07     | 173.34    | 28.20       | 201.52                                 | 64.54  | 3.31                              | 37.98                  | 37.98              | 79.28   | 707     | 16.33  | 167.22    | -34.3   |
| Jen                                           | 34.38             | 31.69      | 21.28                              | 86.85 | 47.48                                | 47.48        | 00.0        | 0.03     | 181.83    | 11.10       | 192.93                                 | 71.57  | 3.67                              | 37.98                  | 37.98              | 79.64   | 2.78    | 18.11  | 172,10    | .20.82  |
| Feb                                           | 22.15             | 20.41      | 13.71                              | 55.94 | 42.88                                | 42.88        | 0.00        | 0.02     | 141.72    | 7.20        | 148.92                                 | 16.10  | 2.37                              | 34.31                  | 34.31              | 70.98   | 8.      | 11 67  | 130.54    | -18.38  |
| Mar                                           | 13.74             | 12.66      | 8.50                               | 17 X  | 47.48                                | 47.48        | 00.0        | 0.01     | 129.67    | 5.42        | 135.09                                 | 38.60  | 1,47                              | 37.98                  | 37,98              | 77.43   | 1.36    | 7.24   | 114.63    | -20.46  |
| Αpr                                           | 6.53              | 6.02       | +0.+                               | 16.49 | 45.95                                | 45.95        | 00'0        | 0.02     | 108.40    | 7.93        | 116.33                                 | 13.59  | 0.70                              | 36.76                  | 36.76              | 74.21   | 66:     | 3,44   | 93.22     | -23.1   |
| May                                           | 3.71              | 3.42       | 2.29                               | 9.36  | 47.48                                | 47.48        | 90.0        | 90.0     | 104.37    | 22.02       | 126.39                                 | 7.72   | 0.40                              | 37.98                  | 37.98              | 76.36   | 5.52    | 1,95   | 91.55     | -34.83  |
| Total                                         | 196.48            | 181.1      | 121.6                              | 496.3 | 559.0                                | 559.0        | 00.00       | 2.03     | 1616.33   | 810.29      | 24266                                  | 0.60t  | 21.0                              | 447.20                 | 417.2              | 915.4   | 203.0   | 103.5  | 1630.9    | -795.T  |
| Note : Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colum     | n no.(5+6- | (6+8+4                             | Colui | Column No. 12 = Column no. (10 + 11) | Column       | 10. (10+11  |          | umn no.20 | - Column no | Column no.20 = Column no.(13+17+18+19) |        | Column no. 21 = Column no (20-12) | = Column no            | 0.(20-12).         |         |         |        |           |         |

Table 4.10.4(g): Arkavathi Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                                               |                           |                                     |                  |          |                    |                                      |           |          |             |                                      |             |        |              |                                  | •                  |       |         | Unit      | Unit: MCM |
|-----------------------------------------------|---------------------------|-------------------------------------|------------------|----------|--------------------|--------------------------------------|-----------|----------|-------------|--------------------------------------|-------------|--------|--------------|----------------------------------|--------------------|-------|---------|-----------|-----------|
|                                               |                           |                                     |                  |          | Wa                 | Water Utilisation                    | tron      |          |             |                                      |             |        |              | 7                                | Water Availability | ility |         |           |           |
| 1.7.1                                         |                           |                                     |                  | Water    | Water requirements | nts                                  |           |          |             |                                      | Gross       |        |              | Regeneration from uses           | n from uses        |       | Surface | Gross     | Monthly   |
| นาเมอนง                                       | Utilisation               | Utilisation under impation projects | ation projes     |          | Dome- In           | Indus-                               | Hydro- I  | Environ- | I was       | Export                               | total       | Import | Imga-        | Dome-                            | !supul             | <br>  | waler   | water     | Water     |
| 1                                             | Proposed Existing Ongoing | usting On                           | Н                | Total st | stic               | trial                                | power     | mental   | Ipm 1       |                                      | utilisation |        | tion         | stic                             | trial              | logi  | yields  | available | Oalunce   |
| Ê                                             | (2)                       | (3)                                 | ( <del>+</del> ) | (5)      | (9)                | 3                                    | (8)       | (6)      | (10)        | (11)                                 | (12)        | (13)   | (14)         | (15)                             | (16)               | (17)  | (81)    | (61)      | (50)      |
| Jun                                           | 5.21                      | 4.80                                | 3.23             | 13.16    | 39.37              | 45.95                                | 01.0      | 0.17     | 98.65       | 12.22                                | 110.87      | 10.85  | 0.56         | 31.50                            | 36.76              | 68.81 | 4.33    | 83.99     | -26.88    |
| FE.                                           | 12.66                     | 11.67                               | 7.84             | 31.97    | 40.68              | 47.48                                | 0.07      | 0.17     | 120.30      | 90.6                                 | 129.36      | 26.35  | 1.35         | 32.55                            | 37.98              | 71.88 | 3.21    | 101.44    | -27.92    |
| Aug                                           | 17.02                     | 15.68                               | 10.54            | 42.98    | 40.68              | 47.48                                | 0.14      | 0.17     | 131.31      | 16.69                                | 147.99      | 35,42  | . 1.82       | 32.55                            | 37.98              | 72.35 | 16.8    | 113,68    | -34.32    |
| ş                                             | 19.60                     | 18.06                               | 12.14            | 49.49    | 39.37              | 45.95                                | 0.99      | 0.17     | 134.98      | 120.33                               | 255.30      | 40.79  | 5.09         | 31.50                            | 36.76              | 70.35 | 42.62   | 153.75    | .101.55   |
| 8                                             | 14.16                     | 13,05                               | 8.77             | 35.76    | 40.68              | 17.18                                | 0.90      | 0.17     | 124.09      | 109.18                               | 233.26      | 29.47  | 1.51         | 32.55                            | 37.98              | 72.04 | 38.67   | 140.18    | .93.08    |
| No.                                           | 16.33                     | 15.05                               | 10.12            | 41.25    | 39.37              | 45.95                                | 0.37      | 0.17     | 126.73      | 44.69                                | 171.43      | 34.00  | 1.75         | 31.50                            | 36.76              | 70.00 | 15.83   | 119.82    | .51.60    |
| Dec                                           | 31.00                     | 28.57                               | 19.21            | 78.31    | 40.68              | 47,48                                | 0.10      | 0.17     | 166.64      | 12.08                                | 178.72      | 2.2    | 331          | 32.55                            | 37.98              | 73.84 | 4.28    | 142.66    | .36.06    |
| Jan                                           | 34.38                     | 31.68                               | 21.30            | 86.85    | 40.68              | 47,48                                | <u>ਤ</u>  | 0.17     | 175.18      | 4.74                                 | 179.92      | 71.57  | 3,67         | 32.55                            | 37.98              | 74.20 | 1.68    | 147.46    | -32.46    |
| Feb                                           | 22.15                     | 30.41                               | 13.72            | 55.94    | 36.75              | 42.88                                | 0.03      | 017      | 135.73      | 3.08                                 | 138.81      | 46.10  | 2.37         | 29.40                            | 34.31              | 66.07 | 1.09    | 113.26    | .25.55    |
| Mar                                           | 13.74                     | 12.67                               | 8.51             | 17.12    | 40.68              | 47.48                                | 0.02      | 0.17     | 123.03      | 2.32                                 | 125.35      | 28.60  | 1.47         | 32.55                            | 37.98              | 72.00 | 0.82    | 101.42    | -23.93    |
| Apr                                           | 6.53                      | 6.02                                | 404              | 16.49    | 39.37              | 45.95                                | 0.03      | 0.17     | 101.97      | 3.39                                 | 105.36      | 13.59  | 0.70         | 31.50                            | 36.76              | 68.95 | 1.2     | 83.74     | -21.62    |
| May                                           | 3.71                      | 3.42                                | 2.30             | 9.36     | 40.68              | 47.48                                | 0.08      | 0.17     | 697.6       | 9.43                                 | 107.12      | 7.72   | 0.40         | 32.55                            | 37.98              | 70.92 | 3.34    | 81.98     | -25.14    |
| Total                                         | 196.48                    | 181.07                              | 121.73           | 196.3    | 479.0              | 559.0                                | 2.87      | 2.00     | 1536.30     | 347.21                               | 1883.5      | 409.0  | 21.00        | 383.20                           | 147.20             | 851.4 | 123.0   | 1383.4    | -500.11   |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | ). 10 = Column            | no.(5+6+7                           | +8+9).           | Column   | No. 12 = (         | Column No. 12 = Column no. (10 + 11) | (10 + 11) | Colu     | mn no. 19 = | Column no.19 = Column no.(13+17+18). | (13+17+18). | Colum  | 1 no.20 = Cc | Column no.20 = Column no.(19-12) | ٠-12).             |       |         |           |           |

Table 4.10.4(h): Arkavathi Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

| MCM       | -                  | Monthly                | Waller                                | oalinoc<br>oalinoc        | (21) | -25.55   | -22.69 | -26.85 | -93.54   | -87.89 | 44.69  | -21.19   | -15.75 | -15.14  | -18.07    | -19.53  | -24.62       | 415.48    |                                              |
|-----------|--------------------|------------------------|---------------------------------------|---------------------------|------|----------|--------|--------|----------|--------|--------|----------|--------|---------|-----------|---------|--------------|-----------|----------------------------------------------|
| Unit: MCM |                    | Sioss                  | water                                 | available                 | (20) | 91.99    | 13.52  | 128.07 | 169.34   | 153.07 | 133.69 | 164.43   | 171.00 | 129.83  | 114.09    | 92.43   | 89.37        | 1550.9    |                                              |
|           |                    | Ground                 | water                                 | yields                    | (61) | 2.75     | 6.67   | 8.96   | 10.32    | 7.46   | 3.60   | 16.33    | 18.11  | 11.67   | 7.24      | 3.44    | 1.95         | 103.5     |                                              |
|           |                    | Surface                | water                                 | yields                    | (81) | 4.33     | 3.21   | 16.5   | 42.62    | 38.67  | 15.83  | 4.28     | 1.68   | 1.09    | 0.82      | 1.2     | 334          | 123.0     |                                              |
|           | bility             |                        | 1000                                  | DO I                      | (11) | 74.07    | 77.32  | 77.78  | 75.61    | 77.48  | 75.26  | 79.28    | 79.64  | 70.98   | 77.43     | 74.21   | 76.36        | 915.4     |                                              |
|           | Water Availability | from uses              | Indus-                                | trial                     | (16) | 36.76    | 37.98  | 37.98  | 36.76    | 37.98  | 36,76  | 37,98    | 37.98  | 34.31   | 37.98     | 36.76   | 37.98        | 447.2     | 2(20-12).                                    |
|           |                    | Regeneration from uses | Dome-                                 | stic                      | (15) | 36.76    | 37.98  | 37.98  | 36.76    | 37.98  | 36.76  | 37.98    | 37.98  | 34.31   | 37.98     | 36.76   | 37.98        | 417.20    | = Column no                                  |
|           |                    | R                      | Imiga.                                | tion                      | (14) | 0.56     | 1.35   | 1.82   | 2.09     | 1.5.1  | 1.75   | 3.31     | 3.67   | 2.37    | 1.47      | 0.70    | 0.40         | 21.0      | Column no. 21 = Column no.(20-12)            |
|           |                    |                        | Import                                |                           | (13) | 10.85    | 26.35  | 35.42  | 40.79    | 29.47  | 34.00  | 64.54    | 71.57  | 46.10   | 28.60     | 13.59   | 7.72         | 409.0     |                                              |
|           |                    | Gross                  | total                                 | utilisation               | (12) | 117.55   | 136.23 | 154.92 | 262.87   | 240.96 | 178.37 | 185.62   | 186.75 | 141.97  | 132.16    | 111.96  | 113.99       | 1966.4    | 3+17+18+1                                    |
|           |                    |                        | Ехроп                                 | 5                         | (11) | 12.22    | 90.6   | 16.69  | 120.33   | 109.18 | 44.69  | 12.08    | 4.74   | 3.08    | 2.32      | 3.39    | 9.43         | 347.21    | Column no.20 = Column no.(13+17+18+19)       |
|           |                    |                        | Loto                                  | 100                       | (10) | 105.32   | 127.17 | 138.24 | 142.54   | 131.78 | 133.68 | 173.53   | 182.01 | 141.89  | 129.85    | 108.57  | 194.56<br>26 | 1619.17   | nn no.20 = (                                 |
|           |                    |                        | Environ-                              | mental                    | (6)  | 0.17     | 0.17   | 0.17   | 0.17     | 0.17   | 0.17   | 0.17     | 0.17   | 0.17    | 0.17      | 0.17    | 0.17         | 2.00      | Colu                                         |
|           | ation              |                        | Hydro E                               | power                     | (61) | 01.0     | 0.07   | 0.14   | 0.99     | 0.00   | 0.37   | 0.10     | 0.0    | 0.03    | 0.03      | 0.03    | 0.08         | 7.87      | 5.(10+11)                                    |
|           | Water Utilisation  | rents                  | Indus-                                | trial                     | 9    | 45.95    | 47.48  | 47.48  | 45.95    | 47.48  | 45.95  | 47.48    | 47.48  | 42.88   | 47.48     | 45.95   | 47.48        | 559.0     | Column No. 12 = Column no. (10 + 11          |
|           | 7                  | Water requirements     | Dome-                                 | stic                      | (9)  | 45.95    | 47.48  | 47.48  | 45.95    | 47.48  | 45.95  | 47.48    | 47.48  | 42.88   | 47.48     | 45.95   | 47.48        | 559.0     | m.n No.12 ≖                                  |
|           |                    | Wa                     | rojects                               | Total                     | (5)  | 13,16    | 31.97  | 42.98  | 49.49    | 35.76  | 41.25  | 78.31    | 86.85  | 55.94   | ヹ         | 16.49   | 9.36         | 496.3     | Colu                                         |
|           |                    |                        | Utilisation under irrigation projects | Ongoing                   | (f)  | 3.23     | 7.83   | 10.53  | 12.13    | 8.76   | 10.11  | 19.19    | 21.28  | 13.71   | 8.50      | 3       | 2.29         | 121.6     | 16+8+1+9+                                    |
|           |                    |                        | ation under                           | Proposed Existing Ongoing | (3)  | 21] 4.80 | 11,67  | 15.68  | 90'81 09 | 13.05  | 15.05  | 30 28.58 | 31.69  | 5 20.41 | 74, 12.66 | 63 6.02 | 71 3.42      | 181 181.1 | ותנות 10.(5                                  |
|           |                    |                        | Utilisa                               | Propose                   | (2)  | 5.2]     | 12.66  | 17.02  | 09.61    | 14.16  | 16.33  | 31.00    | 34.38  | 22.15   | 13.74     | 6.53    | 3.71         | 196.48    | no. 10 = Cal                                 |
| [         |                    | 1,11,1                 | naiora                                |                           | (1)  | านก      | Jul    | Aug    | Sep      | Ö      | Nov    | Ç        | Jan    | Feb     | Mar       | Apr     | May          | Total     | Note: Column no. 10 = Column no. (5+6+7+8+9) |

Table 4.10.5(a): Middle Cauvery Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

27.10 -1.63 3.10 67.42 Unit: MCM Monthly water balance 108.00 242.50 217.00 154.42 62.08 23.25 2263.9 available Gross water 81.78 72.69 71.73 21.86 8.14 17.69 30 94 71 water yields 39.48 Total Water Availability 7.41 7.41 Regeneration from uses Indus-trial 9 Column no.20 = Column no.(19-1 2 2 3 5.64 5.65 5.05 5.05 5.05 2 3 3 3 Dome 36.0 16.80 23.99 Imga. tion 220.85 19.85 66.94 138.15 197.32 124.21 43.26 7.95 (1) 356.49 186.31 244.13 219.41 Gross total willsation Column no. 19 = Column no. (13+17+18) 29.51 52.29 46.48 45.87 5.20 3.01 0.82 Export 33.70 326.98 39.43 238.93 353.68 156.41 64.58 25.29 Total 0 02 0.022 Environтепа 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 0 0000 000 Hydropower Water Utilisation Indus-5 Water requirements 7.05 6.82 6.82 7.05 7.05 7.05 Dome-Column No. Stic 337.20 75.39 75.49 155.81 222.54 201.62 140.08 249.08 Utilisation under irrigation projects 21.66 110.57 33.51 98.79 89.50 69.17 149.69 794.71 Note: Column no. 10 = Column no. (5+6+7+8+9) Proposed Existing Ongoing 136.98 98.26 109.98 68.80 89.03 51.85 205.00 790.48

28.52

2.56 8.65 17.84

Sch Sch Jan Feb

38.61

Month

5.59

.03

23.09 25.48

Table 4.10.5(b): Middle Cauvery Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                             |               |                           |                                     |        |                    | Water Utilisation | sation.                              |          |            |            |                                                   |        |             |                                    | Water Availability | ability |         |             |           |         |
|---------------------------------------------|---------------|---------------------------|-------------------------------------|--------|--------------------|-------------------|--------------------------------------|----------|------------|------------|---------------------------------------------------|--------|-------------|------------------------------------|--------------------|---------|---------|-------------|-----------|---------|
| ) foreh                                     |               |                           |                                     | Wat    | Water requirements | nents             |                                      |          |            |            | Gross                                             |        |             | Regeneration from uses             | n from uses        |         | Surface | Ground      | Gross     | Monthly |
| Month                                       | Utilisati     | on under ir               | Utilisation under imgalion projects |        | Dome-              | Indus-            | Hydro-                               | Environ- | í          | Export     | total                                             | Import | Imga.       | Боте.                              | Indus-             | 1,000   | water   | water       | woler     | halance |
|                                             | Proposed      | Proposed Existing Ongoing | Sniogal                             | Total  | Stic               | -E-5              | power                                | mental   | 100        |            | utilisation                                       |        | tion        | Stic                               | trial              | 16%     | yields  | yields      | available |         |
| Ξ                                           | (2)           | ල                         | ₹                                   | (5)    | 9                  | 6                 | (61)                                 | <u>@</u> | (10)       | (11)       | (12)                                              | (13)   | (14)        | (15)                               | (91)               | (11)    | (81)    | <u>(6</u> ) | (05)      | (21)    |
| շու                                         | 2.05          | 7.91                      | 7.94                                | 17.89  | 8.96               | 8.96              | 00.0                                 | 0.01     | 35.82      | 0.61       | 36.44                                             | 15.88  | 1.93        | 7.17                               | 7.17               | 16.26   | 0.96    | 2.06        | 35.16     | .1 28   |
| - F                                         | 38.61         | 148.89                    | 149.48                              | 336.99 | 9.26               | 9.36              | 00:0                                 | 0.18     | 355.68     | 11.31      | 366.99                                            | 298.99 | 36.35       | 7.41                               | 7.41               | 51.17   | 17.69   | 38.73       | 4)6.57    | 39.58   |
| Aug                                         | 35.52         | 136.98                    | 137.52                              | 310.01 | 9.26               | 9.26              | 00.00                                |          | 328,99     | 29.51      | 358.50                                            | 275.06 | 33,44       | 7.41                               | 7.41               | 48.26   | 46.15   | 35.63       | 405.09    | 46.59   |
| Sep                                         | 28.52         | 109.98                    | 110.42                              | 248,92 | 8.96               | 8.96              | 00.0                                 | 0.82     | 367.66     | \$2.29     |                                                   | 220.85 | 26.85       | 7.17                               | 7.17               | 41.19   | 81.78   | 28.61       | 372.43    | 52.48   |
| Oct                                         | 2.56          | 68.6                      | 9.93                                | 22.38  | 9.36               | 9.36              | 000                                  | 0.73     | 41.62      | 46.48      | 88.10                                             | 19.85  | 2.41        | 7.41                               | 7.41               | 17.23   | 72.69   | 2.57        | 112.31    | 24.24   |
| Nov                                         | 8.65          | 33.34                     | 33.47                               | 75.45  | 8.96               | 8.96              | 00.0                                 | 0.72     | %<br>₹     | 45.87      | 139.95                                            | 26.99  | 8.14        | 7.17                               | 7.17               | 22.47   | 71.73   | 8.57        | 18.691    | 29.87   |
| Dec                                         | 17.84         | 68.80                     | 69.07                               | 155.71 | 9.26               | 9.76              | 00.00                                | 0.32     | 174.45     | 13.98      | 188.42                                            | 138.15 | 16.80       | 7.41                               | 7.41               | 31.61   | 21.86   | 17.89       | 209.52    | 21.09   |
| Jan                                         | 25.48         | 98.36                     | 59.86                               | 222.40 | 9.26               | 9.26              | 00.0                                 | 0.08     | 240.99     | 5.20       | 246.20                                            | 197.32 | 23.99       | 7.41                               | 7.41               | 38.80   | 8,14    | 25.56       | 289.82    | 23.62   |
| Feb                                         | 23.09         | 89.03                     | 86.38                               | 201.49 | 8.36               | 8.36              | 00.00                                | 0.05     | 218.26     | 3.01       | 221.27                                            | 178.77 | 21.74       | 69.9                               | 69.9               | 35.12   | 4.71    | 23.16       | 241.75    | 20.48   |
| Mar                                         | 16.04         | 61.85                     | 62.10                               | 139.99 | 9.26               | 9.26              | 00:00                                | 0.02     | 158.53     | 1.32       | 159.85                                            | 12+21  | 15.10       | 7.41                               | 14.7               | 16.62   | 2.06    | 16.09       | 172.27    | 달       |
| Apr                                         | 5.59          | 21.54                     | 21.63                               | 48.75  | 8.96               | 8.96              | 00:0                                 | 0.0      | 89.99      | 09.0       | 67.28                                             | 43.26  | 5.26        | 7.17                               | 7.17               | 19.59   | 0.94    | 9.60        | 66,69     | 2.11    |
| May                                         | 1.03          | 3.96                      | 3.98                                | 8.97   | 9.26               | 9.76              | 00.0                                 | 0.01     | 27.49      | 0.82       | 28.31                                             | 7.95   | 16.0        | 741                                | 7,41               | 15.78   | 1.28    | 1.03        | 26.04     | -2.27   |
| Total                                       | 205.00        | 790.48                    | 793.59                              | 1.6871 | 109.0              | 109.0             | 00.0                                 | 3.3      | 2010.4     | 211.0      | 2221.4                                            | 1587.3 | 193.0       | 87.2                               | 87.2               | 367.4   | 330     | 205.60      | 2490.3    | 268.94  |
| Note: Column no. 10 = Column no (5+6+7+8+9) | 10.10 = Colun | Thu no.(5+6               | +7+8+9)                             | Colun  | nn No. 12 -        | - Column n        | Column No. 12 = Column no. (10 + 11) | ľ        | umn no. 20 | = Column p | Column no. $20 = \text{Column no.} (13+17+18+19)$ |        | lump po. 21 | Column no. 21 = Column no. (20-12) | 10 (20-12)         |         |         |             |           |         |

Table 4.10.5(c): Middle Cauvery Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| Unit: MCM | -                  | Monthly                | Water                              | parance           | (20) | -2.85  | 2.28      | 14.33     | 29.68     | 27.02   | 26 44   | 5.02     | -1.08    | -2.09    | -3.17    | -3.03   | -2.78  | 129.43   |                                                     |
|-----------|--------------------|------------------------|------------------------------------|-------------------|------|--------|-----------|-----------|-----------|---------|---------|----------|----------|----------|----------|---------|--------|----------|-----------------------------------------------------|
| Unit      |                    | Gross                  | Water                              | available         | (61) | 31.57  | 369.40    | 376.37    | 357.48    | 121.66  | 172.91  | 193.97   | 244.02   | 217.89   | 154.80   | 62.26   | 23.49  | 2325.9   |                                                     |
|           |                    | Surface                | water                              | yields            | (81) | 1.14   | 21.01     | \$4.82    | 97.15     | 86.35   | 85.21   | 25.97    | 19.6     | 2,60     | 2.45     | 1.12    | 1.52   | 392.00   |                                                     |
|           | ility              |                        | F                                  | - E01             | (1)  | 14.56  | 49.40     | 46.49     | 39.48     | 15.46   | 20.76   | 29.84    | 37.04    | 33.52    | 28.15    | 17.88   | 14.01  | 346.6    |                                                     |
|           | Water Avaitability | from uses              | Indus-                             | trial             | (91) | 71.7   | 7,41      | 7.41      | 7.17      | 7.41    | 7.17    | 7.41     | 7.41     | 6.69     | 7.41     | 7.17    | 7.41   | 87.2     | .12).                                               |
|           | H                  | Regeneration from uses | Dome-                              | stic              | (15) | 5.46   | 5.64      | 5.64      | 5.46      | 5.64    | 5.46    | 5.64     | 5.64     | 5.09     | 5.64     | 5.46    | 5.64   | 66.4     | Column no. 20 = Column no. (19.12)                  |
|           |                    |                        | Linga-                             | tion              | (14) | 1.93   | 36.35     | 33.44     | 26.85     | 2.41    | 8 14    | 16.80    | 23.99    | 21.74    | 15.10    | 5.26    | 1.0    | 193.0    | n no.20 = Cc                                        |
| d         |                    |                        | Import                             |                   | (13) | 15.88  | 298.99    | 275.06    | 220.85    | 19.85   | 66.94   | 138.15   | 197.32   | 178.77   | 124.21   | 43.26   | 7.95   | 1587.3   |                                                     |
|           |                    | Gross                  | total                              | utilisation       | (12) | 34.43  | 367.12    | 362.03    | 327.79    | 3       | 146.48  | 188.94   | 245.11   | 219.97   | 157.97   | 65.29   | 26.26  | 2196.5   | (13+17+18)                                          |
| 7         |                    |                        | Export                             |                   | (11) | 0.73   | 13.44     | 35.05     | 62.12     | 55.21   | 87.75   | 16.60    | 6.18     | 3.58     | 1.56     | 0.71    | 0.97   | 211.0    | Column no. 19 = Column no. (13+17+18)               |
|           |                    |                        |                                    | 1001              | (10) | 33.70  | 353.68    | 326.98    | 265.68    | 39.43   | 66.19   | 172.34   | 238.93   | 216.40   | 156.41   | 64.58   | 25.29  | 1985.5   | umn no. 19 =                                        |
|           |                    |                        | Environ-                           | mental            | (9)  | 0.01   | 0.18      | 0.46      | 0.82      | 0.73    | 0.72    | 0.22     | 0.08     | 0        | 0.02     | 0       | 0.01   | 3,30     |                                                     |
|           | lisation           |                        | Hydro                              | power             | (8)  | 0.00   | 000       | 0.00      | 0.00      | 00.00   | 00:00   | 0.00     | 00:00    | 00.0     | 0.00     | 000     | 0.00   | 0.00     | Column No. 12 = Column no. (10 + 11)                |
|           | Water Utilisation  | ements                 | Indus-                             | trial             | (3)  | 8.96   | 9.76      | 9.76      | 8.96      | 9.76    | 8.96    | 9.36     | 9.26     | 8.36     | 9.26     | 96.80   | 9.76   | 109.0    | 2 = Column                                          |
|           |                    | Water requirements     | Боте-                              | stic              | (9)  | 6.82   | 7.05      | 7.05      | 6.82      | 7.05    | 6.82    | 7.05     | 7.05     | 6.37     | 7.03     | 6.82    | 7.05   | 83.0     | lumn No. 1                                          |
|           |                    | 1                      | projects                           | Total             | (5)  | 17.91  | 9 337.20  | 1 310.21  | 7 249.08  | 4 22.39 | 1 75.49 | 7 155.81 | 9 222.54 | 0 201.62 | 9 140.08 | 6 48.79 | 8 8.97 | 1 1790.2 |                                                     |
|           |                    |                        | Julisation under impation projects | Ongoing           | €    | 1 7.95 | 9 149.69  | 137.71    | 8 110.57  | 9.94    | 33.51   | 0 69.17  | 6 98.79  | 3 89.50  | 5 62,19  | 4 21.66 | 3.98   | 8 794.71 | 6+8+2+9+                                            |
|           |                    |                        | ation under                        | Proposed Existing | (3)  | 191    | 51 [48.89 | 52 136.98 | 52 109.98 | 98.6    | 33.34   | 14 68.80 | 18 98.26 | 99 89.03 | 11 61.85 | 21.5.   | 3.96   | 790.48   | luma no.(5                                          |
|           |                    |                        | Utilisa                            | Propose           | (2)  | 2.05   | 38.61     | 35.52     | 28.52     | 2.56    | 8.65    | 17.84    | 25.48    | 23.09    | 16.04    | 5.59    | ),[    | 205.00   | 10 = Co.                                            |
|           |                    | 40000                  | MIDIMI                             |                   | (1)  | Jun    | Juf       | Aug       | Sep       | Oct     | Nov     | ಕ್ಷ      | Jan      | Fcb      | Mar      | Apr     | May    | Total    | Note: Column no $10 = \text{Column no.}(5+6+7+8+9)$ |

Table 4.10.5(d): Middle Cauvery Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                            |                           |            |                                     |        |                    | Water Utilisation                    | sation       |          |            |           |                                           |        |             |                                    | Water Availability | bility |         |        |           |         |
|--------------------------------------------|---------------------------|------------|-------------------------------------|--------|--------------------|--------------------------------------|--------------|----------|------------|-----------|-------------------------------------------|--------|-------------|------------------------------------|--------------------|--------|---------|--------|-----------|---------|
| Manth                                      |                           |            |                                     | Wa     | Water requirements | nents                                |              |          |            |           | Gross                                     |        |             | Regeneration from uses             | from uses          |        | Surface | Ground | Gross     | Monthly |
| Noni                                       | Utilisatio                | n under in | Utilisation under impation projects | ojects | Боте-              | -subuj                               | Hydro-       | Environ- | ŀ          | Export    | total                                     | Import | Imiga-      | Dome-                              | Indus-             |        | water   | water  | water     | waler   |
|                                            | Proposed Existing Ongoing | Skisting C | )ngoing                             | Total  | stic               | tria                                 | power        | mental   | 1001       |           | unisation                                 |        | tion        | stic                               | triat              | lego!  | yields  |        | available | parance |
| (1)                                        | (2)                       | (3)        | ( <del>+</del> )                    | (5)    | (9)                | (J)                                  | (61)         | (6)      | (10)       | (11)      | (12)                                      | (13)   | (14)        | (15)                               | (16)               | (1.)   | (81)    | (61)   | (07)      | (17)    |
| unf                                        | 2.05                      | 167        | 7.94                                | 17.89  | 8.96               | 8.96                                 | 0.00         | 0.01     | 35.82      | 0.73      | 36.55                                     | 15.88  | 1.93        | 71.7                               | 7.17               | 16.26  | 1.14    | 2.06   | 35.34     | -1.2    |
| Jul                                        | 38.61                     | 148.89     | 149.48                              | 336.99 | 9.26               | 9.26                                 | 0.00         | 0.18     | 355.68     | 13.44     | 369.11                                    | 298.99 | 36.35       | 7.41                               | 7.41               | 51.17  | 21.01   | 38.73  | 409.89    | 40.78   |
| Aug                                        | 35.52                     | 136.98     | 137.52                              | 310.01 | 9.26               | 9.26                                 | 000          | 0.46     | 328.99     | 35.05     | 364.05                                    | 275.06 | 33.44       | 7.41                               | 7.41               | 48.26  | 54.82   | 35.63  | 413.76    | 49.72   |
| Sep                                        | 28.52                     | 109.98     | 110.42                              | 248.92 | 8.96               | 96'8                                 | 000          | 0.82     | 267.66     | 62.12     | 329.78                                    | 220.85 | 26.85       | 7.17                               | 7.17               | 41.19  | 97.15   | 28.61  | 387.79    | 58.02   |
| Oct                                        | 2.56                      | 68.6       | 9.93                                | 22.38  | 9.26               | 9.26                                 | 00.00        | 0.73     | 41.62      | 55.21     | 96.83                                     | 19.85  | 2.41        | 7.41                               | 7.41               | 17.23  | 86.35   | 2.57   | 126.00    | 29.17   |
| Nov                                        | 8.65                      | 33.34      | 33.47                               | 75.45  | 8.96               | 96.8                                 | 00:0         | 0.72     | 90,08      | 54.48     | 148.57                                    | 66.94  | 8.14        | 7.17                               | 7.17               | 22.47  | 85.21   | 8.67   | 183.29    | 14.73   |
| Dec                                        | 17.84                     | 08.89      | 69.07                               | 155.71 | 9.26               | 9.26                                 | 0.00         | 0.22     | 174.45     | 16.60     | 191.05                                    | 138.15 | 16.80       | 7.41                               | 7.41               | 31.61  | 25.97   | 17.89  | 213.63    | 22.58   |
| Jan                                        | 25.48                     | 98.20      | 98.65                               | 222.40 | 9.26               | 9.26                                 | 0.00         | 0.08     | 240.99     | 6.18      | 247.18                                    | 197.32 | 23.99       | 7.41                               | 7.41               | 38.80  | 19.6    | 25.56  | 271.35    | 24.17   |
| Fcb                                        | 23.09                     | 89.03      | 86.33                               | 201.49 | 8.36               | 8.36                                 | 0.00         | 0.05     | 218.26     | 3.58      | 221.84                                    | 178.77 | 21.74       | 69.9                               | 69.9               | 35.12  | 2.60    | 23.16  | 342.65    | 20.80   |
| Mar                                        | 16.04                     | 61.85      | 62.10                               | 139.99 | 9.36               | 9.26                                 | 0.00         | 0.02     | 158.53     | 1.56      | . 160.09                                  | 124.21 | 15.10       | 7.41                               | 7.41               | 18.81  | 2.45    | 16.09  | 172.66    | 12.56   |
| Apr                                        | 5.59                      | 21.54      | 21.63                               | 48.75  | 8.96               | 8,96                                 | 00:0         | 0.01     | 66.68      | 0.71      | 67.40                                     | 43.26  | 5.26        | 7.17                               | 71.7               | 19.59  | 1.12    | 2.60   | 69.57     | 2.17    |
| May                                        | 1.03                      | 38         | 3.98                                | 8.97   | 9.36               | 9.26                                 | 0.00         | 0.01     | 27.49      | 0.97      | 28.47                                     | 7.95   | 0.97        | 7.41                               | 7.41               | 15.78  | 1.52    | 1.03   | 26.28     | -2.18   |
| Total                                      | 205.00                    | 790.48     | 793.59                              | 1789.1 | 109.0              | 109.0                                | 0.00         | 3.3      | 2010.4     | 211.0     | 2221.4                                    | 1587.3 | 193.0       | 87.2                               | 87.2               | 367.4  | 392.00  | 205.60 | 2552.3    | 330.95  |
| Note: Column no.10 = Column no.(5+6+7+8+9) | no.10 = Colum             | n no.(5+6  | +7+8+9).                            | Colu   | mn No. 12          | Column No. 12 = Column no. (10 + 11) | o. (10 + 11) | _        | mn no.20 = | Column no | Column no. 20 = Column no. (13+17+18+19). |        | lumn no. 21 | Column no. 21 = Column no.(20-12). | 0.(20-12).         | 1      |         |        |           |         |

Table 4.10.5(e): Middle Cauvery Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water Unit : MCM

| \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ |                        |                                       |                           | _    | -2.97 | 0.05   | 8.51   | 19 36  | 17.85 | 17.39  | 2.27   | : :<br>:: | -2.68  | -3.43  | -3 15 | -2.94 | 12.98  |                                               |
|---------------------------------------|------------------------|---------------------------------------|---------------------------|------|-------|--------|--------|--------|-------|--------|--------|-----------|--------|--------|-------|-------|--------|-----------------------------------------------|
|                                       | VIONIN                 | 117 A                                 |                           | (02) |       |        |        |        |       |        |        |           |        |        |       |       |        |                                               |
|                                       | Gross                  | water                                 | available                 | (19) | 31.23 | 363.12 | 360.00 | 328.48 | 95.89 | 147.48 | 186.22 | 241.14    | 216.22 | 154 08 | 61.92 | 23.04 | 2208.9 |                                               |
|                                       | Surface                | water                                 | yields                    | (18) | 0.8   | 14.74  | 38,46  | 68.15  | 86.08 | \$9.78 | 18.22  | 6.78      | 3.93   | 1.72   | 0.78  | 1.07  | 375    |                                               |
| ility                                 |                        | -                                     | ğ                         | (1)  | 14.56 | 49.40  | 46,49  | 39.48  | 15.46 | 20.76  | 29.84  | 37.0      | 33.52  | 28.15  | 17.88 | 14.01 | 3466   |                                               |
| Water Availability                    | from uses              | Indus-                                | E L                       | (16) | 7.17  | 7,41   | 7,41   | 71.7   | 7,41  | 7.17   | 7.41   | 7.41      | 6.69   | 7,41   | 7.17  | 7.41  | 87.2   | -12)                                          |
| W                                     | Regeneration from uses | Боле.                                 | stic                      | (15) | 5.46  | 5.64   | ×.     | 2.46   | 2.64  | 5.46   | 20.0   | 25.5      | \$.09  | 20.5   | 5.46  | 5.64  | 66.4   | June 10.(19                                   |
|                                       | 1                      | Jrriga.                               | Lion                      | (†i) | 1.93  | 36.35  | 33.44  | 26.85  | 2.41  | 90     | 16 80  | 23.99     | 21.74  | 15.10  | 5.26  | 0     | 193.0  | Column ps. 20 = Column ps. (19-12)            |
|                                       |                        | Import                                |                           | (13) | 15.88 | 598,99 | 275.06 | 220.85 | 19.85 | 66.93  | 138.15 | 197.32    | 178.77 | 124.21 | 43.26 | 7.95  | 1587.3 | Column                                        |
|                                       | Gross                  | total                                 | utilisation               | (12) | 34.21 | 363.08 | 351.49 | 309.12 | 78.04 | 130.10 | 183.95 | 243.25    | 218.90 | 157.51 | 65.07 | 25.97 | 2195.9 | 13+17+18)                                     |
|                                       |                        | Export                                | Ť                         | (3)  | 0.51  | 9.42   | 24.59  | 43.58  | 38.74 | 38.22  | 11.65  | 4.34      | 2.511  | 1.10   | 0.50  | 99.0  | 211.0  | Column no. 19 = Column no. (13+17+18)         |
|                                       |                        |                                       | 100                       | (01) | 33.69 | 353.65 | 326.90 | 265.54 | 39.30 | 91.87  | 172.30 | 238.91    | 216.39 | 156.41 | 64.57 | 25.29 | 1984.9 | = 61.on una                                   |
|                                       |                        | Environ-                              | mental                    | 6    | 0.01  | 0.15   | 0.38   | 0.68   | 0.61  | 09.0   | 0.18   | 0.07      | 0.04   | 0.02   | 0.01  | 10'0  | 2.75   | Colu                                          |
| sation                                |                        | Hydro-                                | power                     | (8)  | 0.00  | 00:0   | 00:0   | 0.00   | 000   | 000    | 0.00   | 000       | 00.0   | 000    | 0.00  | 000   | 00.0   | 0.(10+11)                                     |
| Water Utilisation                     | ments                  | Indus.                                | tr's t                    | (1)  | 96'8  | 9.26   | 9.26   | 8.96   | 9.26  | 8.96   | 9.20   | 9.26      | 8.36   | 9.26   | 8,96  | 9.56  | 0.601  | Column No. 12 = Column no. (10 + 11           |
|                                       | Water requirements     | <b>Боте</b>                           | S S                       | (9)  | 6.87  | 7.05   | 7.05   | 6.82   | 7.05  | 6.82   | 7.05   | 7.05      | 6.37   | 7.05   | 6.82  | 7.05  | \$3.0  | um No. 12                                     |
|                                       | W                      | ojects                                | Total                     | (5)  | 15.91 | 337.20 | 310.21 | 249.08 | 22.39 | 75.49  | 155.81 | 222.54    | 201.62 | 140.08 | 48.79 | 8.97  | 1790.2 | Colt                                          |
|                                       |                        | Utilisation under irrigation projects | Ongoing                   | €    | 7.95  | 149.69 | 137.71 | 110.57 | 9.94  | 33.51  | 69.17  | 62.86     | 89.50  | 62.19  | 21.66 | 3.98  | 794.71 | 5+7+8+9).                                     |
|                                       |                        | ion under i                           | Proposed Existing Ongoing | (3)  | 7.91  | 148.89 | 136.98 | 86.601 | 9.89  | 33.34  | 68.80  | 98.26     | 89.03  | 61.85  | 21.54 | 3.96  | 790.48 | mn no.(5+                                     |
|                                       |                        | Unlisa                                | Proposed                  | (2)  | 2.05  | 38.61  | 35.52  | 28.52  | 2.56  | 8.65   | 17.84  | 25,48     | 23.09  | 16.04  | 5.59  | 1.03  | 205.00 | 10 = Colu                                     |
|                                       | h doneh                | Month                                 |                           | (1)  | Jun   | Jul    | Aug    | Sep    | Oct   | Nov    | ≫त     | Jan       | Peb    | Mar    | Apr   | May   | Total  | Note: Column no. 10 = Column no. (5+6+7+8+9). |

Table 4.10.5(f): Middle Cauvery Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

| ĺ                                           |                           |            |                                       |        |                    |                                      |           |          |             | ķ         |                                         |        | į                                  |                        | i                  |         |         |        | Unit: MCM | MCM            |
|---------------------------------------------|---------------------------|------------|---------------------------------------|--------|--------------------|--------------------------------------|-----------|----------|-------------|-----------|-----------------------------------------|--------|------------------------------------|------------------------|--------------------|---------|---------|--------|-----------|----------------|
|                                             |                           |            |                                       |        | A                  | Water Utilisation                    | sation    |          |             |           |                                         |        |                                    |                        | Water Availability | thility |         |        |           | 1              |
| Month                                       |                           |            |                                       | Wal    | Water requirements | nents                                |           |          |             |           | Gross                                   |        |                                    | Regeneration from uses | I from uses        |         | Surface | Ground | Gross     | National N     |
|                                             | Unlisatio                 | n under it | Utilisation under irrigation projects | jects  | Dome-              | Indus-                               | Hydro-    | Environ- | ŀ           | Export    | total                                   | Import | Imiga.                             | Dome-                  | Indus-             | -       | water   | water  | water     | halanna        |
| į                                           | Proposed Existing Ongoing | Existing ( | Pagoing                               | Total  | stic               | ĮŽ,                                  | power     | mental   | 10001       |           | utilisation                             |        | Ç,                                 | stic                   | trial              | - 0131  | yields  | yelds  | available | 1              |
| (1)                                         | 3                         | (6)        | (4)                                   | (5)    | (9)                | 0                                    | (19)      | (6)      | (01)        | Ê         | (12)                                    | (13)   | (14)                               | (51)                   | (16)               | (17)    | (81)    | (61)   | (20)      | (31)           |
| Jun                                         | 2.05                      | 7.91       | 7.94                                  | 17.89  | 8.96               | 8.96                                 | 00.00     | 10.0     | 35.82       | 0.51      | 36.33                                   | 15.88  | 1.93                               | 7.17                   | 7.17               | 16.26   | 3.0     | 2.06   | 35.00     | -1.33          |
| <u>∫</u> 4]                                 | 38.61                     | 148.89     | 149.48                                | 336.99 | 9.26               | 9.26                                 | 00.0      | 0        | 355.65      | 9.42      | 365.07                                  | 298.99 | 36.35                              | 7.41                   | 7.41               | 51.17   | 14.74   | 38.73  | 403.62    | 3.<br>8.<br>8. |
| Aug                                         | 35.52                     | 136.98     | 137.52                                | 310.01 | 9.26               | 9.26                                 | 00.0      | 0.38     | 328.91      | 24.59     | 353.51                                  | 275.06 | 33,44                              | 7.41                   | 7.41               | 48.26   | 38.46   | 35.63  | 397.40    | 43.89          |
| Sep                                         | 28.52                     | 109.98     | 110.42                                | 248.92 | 8.96               | 8.96                                 | 00.0      | 89.0     | 267.52      | 43.58     | 311.10                                  | 220.85 | 26.85                              | 7.17                   | 7.17               | 41.19   | 68.15   | 28.61  | 358.80    | 47,70          |
| ರ                                           | 2.56                      | 68.6       | 9.93                                  | 22.38  | 9.26               | 9.56                                 | 00.0      | 19.0     | 41.50       | 38.74     | 80.23                                   | 19.85  | 2.41                               | 7.41                   | 7.41               | 17.23   | 95.09   | 2.57   | 100.23    | 20.00          |
| Nov                                         | 8.65                      | 33.34      | 33,47                                 | 75.45  | 8.96               | 8.96                                 | 00.0      | 09'0     | 93.96       | 38.22     | 132.19                                  | 66.94  | 8.14                               | 717                    | 7.17               | 22.47   | 87.65   | 8.67   | 157.86    | 25.68          |
| 3<br>G                                      | 17.84                     | 68.80      | 69.07                                 | 155.71 | 9.26               | 97.5                                 | 00.0      | 0.18     | 174.41      | 11.65     | 186.06                                  | 138.15 | 16.80                              | 7.41                   | 7.41               | 31.61   | 18.22   | 17.89  | 205.88    | 19 82          |
| Jan                                         | 25.48                     | 98.26      | 98.65                                 | 222.40 | 9.26               | 97.6                                 | 00.0      | 0.07     | 240.98      | 4.32      | 245.32                                  | 197.32 | 23.99                              | 7.41                   | 7.41               | 38.80   | 87.9    | 25.56  | 268.46    | 23.14          |
| Feb                                         | 23.09                     | 89.03      | 86.38                                 | 201.49 | 8.36               | 8.36                                 | 00:0      | 0.04     | 218.26      | 2.51      | 220.77                                  | 178.77 | 21.74                              | 69'9                   | 69.9               | 35.12   | 3.93    | 23.16  | 240.97    | 30.30          |
| Mar                                         | 16.04                     | 61.85      | 62.10                                 | 139.99 | 9.26               | 97.6                                 | 000       | 0.02     | 158.53      | 1.10      | 159.63                                  | 124.21 | 15.10                              | 7.41                   | 7.41               | 16:62   | 1.72    | 16.09  | 171.93    | 5.<br>5.       |
| Apr                                         | 5.59                      | 21.54      | 21.63                                 | 48.75  | 8.96               | 8.96                                 | 00:0      | 0.01     | 89.99       | 0.50      | 67.18                                   | 43.26  | 5.26                               | 717                    | 7.17               | 19.59   | 0.78    | \$.60  | 69.23     | 2.05           |
| Мау                                         | 1.03                      | 3.96       | 3.98                                  | 8.97   | 9.76               | 9.26                                 | 00:0      | 0.01     | 27.49       | 89.0      | 28.18                                   | 7.95   | 0.97                               | 7.41                   | 7.41               | 15.78   | 1.07    | 1.03   | 25.83     | 7,0            |
| Total                                       | 205.00                    | 790.48     | 793.59                                | 1789.1 | 109.0              | 109.0                                | 00:0      |          | 2009.8      | 211.0     | 2220.8                                  | 1587.3 | 193.0                              | 87.2                   | 87.2               | 367.4   | 275     | 205.60 | 2435.3    | 214.50         |
| Note: Column no. 10 = Column no.(5+6+7+8+9) | o. 10 = Colum             | m no.(5+6  | +7+8+9)                               | Colum  | in No. 12 =        | Column No. 12 = Column no. (10 + 11) | 0. (10+11 |          | umn no.20 : | Column no | Column no.20 = Column no.(13+17+18+19). |        | Column no. 21 = Column no. (20-12) | = Column r             | 0.(20-12).         |         |         |        |           |                |

Table 4.10.5(g): Middle Cauvery Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

Unit: MCM

|                                               |                           |            |                                     |        | =                  | Water Utilisation                    | ration      |          |           |                                     |             |        |                                  | ======================================= | Water Availability | idity |         |           |         |
|-----------------------------------------------|---------------------------|------------|-------------------------------------|--------|--------------------|--------------------------------------|-------------|----------|-----------|-------------------------------------|-------------|--------|----------------------------------|-----------------------------------------|--------------------|-------|---------|-----------|---------|
|                                               |                           |            |                                     | Wate   | Water requirements | ichts                                |             |          |           |                                     | Gross       |        |                                  | Regeneration from uses                  | from uses          |       | Surface | Gmss      | Monthly |
| Month                                         | Utilisation               | n under in | Utilisation under imgation projects | -      | Dorne.             | Indus-                               | Hydro-      | Environ- | F         | Export                              | total       | Import | Irriga-                          | Вошс-                                   | -snpu]             | E     | water   | Waler     | water   |
|                                               | Proposed Existing Ongoing | Systing O  | Н                                   | Total  | stic               | trial                                | power       | mental   | Por       |                                     | utilisation |        | tion                             | Stic                                    | lrial              |       | yields  | available | Daranoc |
| Θ                                             | (2)                       | (3)        | (4)                                 | (5)    | (9)                | (j)                                  | (8)         | (6)      | (01)      | (11)                                | (12)        | (13)   | (14)                             | (15)                                    | (16)               | (17)  | (18)    | <u>6</u>  | (30)    |
| Jun                                           | 2.05                      | 167        | 7.95                                | 17.91  | 6.82               | 8.96                                 | 00.0        | 10.0     | 33.70     | 0.35                                | 34.05       | 15.88  | 1.93                             | 5.46                                    | 7.17               | 14.56 | 0.55    | 30.98     | -3.07   |
| <u>-</u>                                      | 38.61                     | 148.89     | 149.69                              | 337.20 | 7.05               | 9.36                                 | 00.0        | 0.18     | 353.68    | 6.48                                | 360.16      | 298.99 | 36.35                            | 5.64                                    | 7.41               | 49.40 | 10.13   | 358.51    | 75      |
| Aug                                           | 35.52                     | 136.98     | 137.71                              | 310.21 | 7.05               | 9.36                                 | 00.0        | 0.46     | 326.98    | 16.90                               | 343.88      | 275.06 | 33.44                            | 5.64                                    | 7.41               | 46.49 | 26.43   | 19.714    | 4.10    |
| Š                                             | 28.52                     | 109.98     | 110.57                              | 249.08 | 6.82               | 8.96                                 | 00.00       | 0.82     | 265.68    | 29.95                               | 295.63      | 220.85 | 26.85                            | 5.46                                    | 7.17               | 39.48 | 46.84   | 307.17    | 11.54   |
| ğ                                             | 2.56                      | 68.6       | 9.94                                | 22.39  | 7.05               | 9.26                                 | 00.00       | 0.73     | 39.43     | 26.62                               | 66.04       | 19.85  | 2.41                             | 5.64                                    | 7.41               | 15.46 | 41.63   | 76.94     | 10.90   |
| Nov                                           | 8.65                      | 33.34      | 33.51                               | 75.49  | 6.82               | 96.8                                 | 00.0        | 0.72     | 91.99     | 26.27                               | 118.26      | 66.94  | 8.14                             | 5.46                                    | 7.17               | 20.76 | 41.08   | 128.78    | 10.52   |
| ă                                             | 17.84                     | 08.89      | 69.17                               | 155.81 | 7.05               | 9.26                                 | 00.0        | 0.22     | 172.34    | 10.8                                | 180.34      | 138.15 | 16.80                            | 5.64                                    | 7.41               | 29.84 | 12.52   | 180.52    | 81.0    |
| Jan                                           | 25.48                     | 98.26      | 62.86                               | 222.54 | 7.05               | 97.6                                 | 00.00       | 0.08     | 238.93    | 2.98                                | 241.90      | 197.32 | 23.99                            | 20.5                                    | 7,41               | 37,04 | 4.66    | 239.02    | -2.89   |
| is.                                           | 23.09                     | 89.03      | 89.50                               | 201.62 | 6.37               | 8.36                                 | 00.0        | 0.05     | 216.40    | 1.73                                | 218.12      | 178.77 | 21.74                            | \$ 09                                   | 69.9               | 33.52 | 2.7     | 214.99    | -3.13   |
| Mar                                           | 16 (34                    | 61.85      | 65.19                               | 140.08 | 7.05               | 9.26                                 | 000         | 0.02     | 156 41    | 0.75                                | 157.16      | 124.21 | 15.10                            | 5.64                                    | 7.41               | 28.15 | 1.18    | 153.54    | -3.63   |
| νbι                                           | 5.59                      | 21.54      | 21.66                               | 48.79  | 6.82               | 8.96                                 | 00.00       | 0.01     | 64.58     | 0.35                                | 64.92       | 43,26  | 5.26                             | 5,46                                    | 7.17               | 17.88 | 0.54    | 89.19     | +3.24   |
| May                                           | 1.03                      | 3.96       | 3.98                                | 8.97   | 7.05               | 9.26                                 | 0.00        | 0.01     | 25.29     | 0.47                                | 25.76       | 7.95   | 1.0                              | 5.64                                    | 7.41               | 14.03 | 0.73    | 22.70     | -3.06   |
| Тона                                          | 205.00                    | 790.48     | 14.<br>17.                          | 1790.2 | 83.0               | 109.0                                | 00.00       |          | 1985.5    | 211.0                               | 2196.5      | 1587.3 | 193.0                            | 66.4                                    | 87.2               | 346.6 | 681     | 2122.9    | -73.57  |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 10 = Colum                | n no.(5+6- | -7+8+9).                            | Colum  | n No. 12 =         | Column No. 12 = Column no. (10 + 11) | a. (10 + 11 | ı        | umn no.19 | Column no.19 = Column no.(13+17+18) | (13+17+18). | Colum  | Column no.20 = Column no.(19-12) | lumn no.(19                             | -12)               |       |         |           |         |

Table 4.10.5(h): Middle Cauvery Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

II-:+ MCM

|                                              |               | ì                                   |             |        |                    |                                     |              |          |             |                                        |             |        |                                    |                        |                    |        |         |        |           | Z<br>Z   |
|----------------------------------------------|---------------|-------------------------------------|-------------|--------|--------------------|-------------------------------------|--------------|----------|-------------|----------------------------------------|-------------|--------|------------------------------------|------------------------|--------------------|--------|---------|--------|-----------|----------|
|                                              |               |                                     |             |        | -                  | Water Utilisation                   | sation       |          |             |                                        |             |        |                                    |                        | Water Availability | bility |         |        |           |          |
| 41000                                        | :             |                                     |             | Wat    | Water requirements | cnts                                |              |          |             |                                        | Gross       |        | ₩.                                 | Regeneration from uses | from uses          | -      | Surface | Ground | Gress     | Monthly  |
| INCOM.                                       | Utilisatio    | Utilisation under impation projects | ngation pro | jects  | Dome-              | -snpu]                              | Hydro-       | Environ- | T C T C     | Export                                 | total       | Import | Imga-                              | Dome-                  | Indus-             | 1      | water   | water  | Waler     | Water    |
|                                              | Proposed      | Proposed Existing Ongoing           | Meoing      | Total  | stic               | lrial                               | power        | mental   | LOUI        |                                        | utilisation |        | tion                               | stic                   | trial              | 1001   | yields  | yields | available | Catality |
| (1)                                          | (2)           | (3)                                 | (-)         | (5)    | (9)                | (3)                                 | (61)         | 6        | (10)        | (11)                                   | (12)        | (13)   | (14)                               | (15)                   | (16)               | (1)    | (81)    | (61)   | (50)      | (17)     |
| ung                                          | 2.05          | 167                                 | 7.94        | 17.89  | 8.96               | 8.96                                | 00:0         | 0.01     | 35.82       | 0.35                                   | 36.17       | 15.88  | 1.93                               | 7.17                   | 71.7               | 16.26  | 0.55    | 50Z    | 34.75     | 1.43     |
| <b>1</b> 1                                   | 38.61         | 148.89                              | 149.48      | 336.99 | 9.26               | 9.26                                | 0.00         | 0.18     | 355.68      | 6.48                                   | 362.16      | 298.99 | 36.35                              | 7.41                   | 7.41               | 51.17  | 10.13   | 38.73  | 399.01    | 36.85    |
| Aug                                          | 35.52         | 136.98                              | 137.52      | 310.01 | 9.36               | 9.26                                | 0.00         | 0.46     | 328.99      | 16.90                                  | 345.89      | 275.06 | 33.44                              | 7.41                   | 7.41               | 48.26  | 26.43   | 35.63  | 385.37    | 39.48    |
| Sep                                          | 28.52         | 109.98                              | 110.42      | 248.92 | 8.96               | 8.96                                | 0.00         | 0.82     | 267.66      | 29.95                                  | 297.61      | 220.85 | 26.85                              | 7.17                   | 7.17               | 41.19  | 46.84   | 28.61  | 337.49    | 39.88    |
| Od                                           | 2.56          | 68'6                                | 9.93        | 22.38  | 9.26               | 9.26                                | 00:0         | 0.73     | 41.62       | 26.62                                  | 68.24       | 19.85  | 2.41                               | 7.41                   | 7.41               | 17.23  | 41.63   | 2.57   | 81.28     | 3.04     |
| Nov                                          | 8.65          | 33.34                               | 33.47       | 75.45  | 8.96               | 8.96                                | 0.00         | 0.72     | 94.08       | 26.27                                  | 120.35      | 66.94  | 8.14                               | 7.17                   | 7.17               | 22.47  | 41.08   | 8.67   | 139.16    | 18.81    |
| Dec                                          | 17.84         | 08.89                               | 20.69       | 155.71 | 9.26               | 9.26                                | 000          | 0.22     | 174.45      | 8.01                                   | 182.45      | 138.15 | 16.80                              | 7.41                   | 7.41               | 31.61  | 12.52   | 17.89  | 200.18    | 17.73    |
| Jan                                          | 25.48         | 98.76                               | 98.65       | 222.40 | 9.26               | 9.26                                | 0.00         | 0.08     | 240.99      | 2.98                                   | 243.97      | 197.32 | 23.99                              | 7.41                   | 7.41               | 38.80  | 4.66    | 25.56  | 266.34    | 22.37    |
| Feb                                          | 23.09         | 89.03                               | 89.38       | 201.49 | 8.36               | 8.36                                | 000          | 0.05     | 218.26      | 1.73                                   | 219.99      | 178.77 | 21.74                              | 69.9                   | 6.69               | 35.12  | 2.7     | 23.16  | 239.74    | 19.75    |
| Mar                                          | 16.04         | 61.85                               | 62.10       | 139.99 | 9.26               | 9.26                                | 0.00         | 0.02     | 158.53      | 0.75                                   | 159.28      | 124.21 | 15.10                              | 7.41                   | 7.41               | 16.62  | 1.18    | 16.09  | 171.39    | 12.11    |
| Apr                                          | 5.59          | 21.54                               | 21.63       | 48.75  | 8.96               | 8.96                                | 0.00         | 0.01     | 66.68       | 0.35                                   | 67.03       | 43.26  | 5.26                               | 7.17                   | 7.17               | 19.59  | 0.54    | \$60   | 88        | 1.97     |
| May                                          | 1.03          | 3.96                                | 3.98        | 8.97   | 9.26               | 9.36                                | 00.0         | 0.01     | 27.49       | 0.47                                   | 27.96       | 7.95   | 0.97                               | 7.41                   | 7.41               | 15.78  | 0.73    | 1.03   | 25.49     | -2.47    |
| Total                                        | 205.00        | 790.48                              | 793.59      | 1789.1 | 109.0              | 109.0                               | 0.00         | 3.3      | 2010.4      | 211.0                                  | 2221.4      | 1587.3 | 193.0                              | 87.2                   | 87.2               | 367.4  | 189     | 205.60 | 2349.3    | 127.95   |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Colun | nn no.(5+6                          | +7+8+9)     | Colun  | nn No. 12 -        | Column No. 12 = Column no. (10 + 11 | 0. (10 + 11) |          | unn no.20 = | Column no.20 = Column no.(13+17+18+19) | (13+17+18+  | _      | Column no. 21 = Column no. (20-12) | = Column n             | 0.(20-12).         |        |         |        |           |          |

Unit: MCM Table 4.10.6(a): Suvarnavathi Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                              |                   |             |                                     |        |                    | Water Utilisation                   | salton    |              |          |                                     |             |                    |                                    | 11                     | Water Availability | ility |         |           | 1.61.   |
|----------------------------------------------|-------------------|-------------|-------------------------------------|--------|--------------------|-------------------------------------|-----------|--------------|----------|-------------------------------------|-------------|--------------------|------------------------------------|------------------------|--------------------|-------|---------|-----------|---------|
| , Contract                                   |                   |             |                                     | Wa     | Water requirements | nents                               |           |              |          |                                     | Gross       |                    | 4                                  | Regeneration from uses | from uses          |       | Surface | Gross     | Monthly |
| Modelli                                      | Utilisatio        | ii under ii | Utilisation under imgation projects | ojects | Dome-              | Indus.                              | Hydro-    | Emiron.      | L.       | Export                              | total       | Import             | Imiga-                             | <b>Дошс</b>            | Indus-             | 1     | water   | water     | halance |
|                                              | Proposed Existing | Existing    | Ongoing                             | Total  | stic               | trial                               | power     | mental       | 1830     |                                     | utilisation |                    | tion                               | Stic                   | trial              | 900   | yields  | available | 2018180 |
| Ξ                                            | (2)               | (3)         | Ŧ                                   | 3      | (9)                | (7)                                 | (8)       | <u>&amp;</u> | (10)     | (11)                                | (12)        | (13)               | (14)                               | (3)                    | (16)               | (11)  | (81)    | (61)      | (20)    |
| Jun                                          | 3.04              | 1.37        | 2.05                                | 6.45   | 2.88               | 5.18                                | 0.00      | 0.02         | 14.52    | 00.0                                | 14.52       | 4.95               | 0.50                               | 2.30                   | 4.14               | 6.95  | 1.55    | 13.45     | -1.08   |
| JE]                                          | \$6.98            | 25.61       | 38.37                               | 120.96 | 2.97               | 5,353                               | 0.00      | 0.03         | 129:31   | 00:00                               | 129.31      | 93.11              | 9.46                               | 2.38                   | 4.28               | 16.12 | 308     | 112.31    | -17.01  |
| Aug                                          | 52.37             | 23.54       | 35.26                               | 111.16 | 2.97               | 5.35                                | 000       | 0.02         | 119.50   | 00.00                               | 119.50      | 85.56              | 8.69                               | 2.38                   | 4.28               | 15.35 | 1.67    | 102.58    | .16.92  |
| Sep                                          | 42.65             | 19.17       | 28.72                               | 90.54  | 2.88               | \$.18                               | 00.0      | 01.0         | 69.86    | 00.0                                | 69.86       | 89.69              | 7.08                               | 2.30                   | 4.14               | 13.53 | 85.6    | 92.79     | -5.90   |
| Oct                                          | 3.79              | 1 70        | 2.55                                | 8.05   | 2.97               | 5.35                                | 00.00     | 0.10         | 16.47    | 00.0                                | 16.47       | 6.20               | 0.63                               | 2.38                   | 4.28               | 7.29  | 9.5     | 22.98     | 6.52    |
| Nov                                          | 12.63             | 5.68        | 8.50                                | 26.81  | 2.88               | \$1.8                               | 000       | 6.10         | 34.96    | 000                                 | 34.96       | 20.64              | 2.10                               | 2.30                   | 4.4                | 8.54  | 9.62    | 38.80     | 3.83    |
| )<br>G                                       | 27.02             | 12.14       | 18.19                               | 57.36  | 2.97               | 5.35                                | 00'0      | 10.0         | 69:69    | 00.0                                | 62.69       | p1 ' <del>10</del> | 4.49                               | 2.38                   | 4.28               | 11.14 | 0.52    | 55 80     | 68 6-   |
| Jan                                          | 39.98             | 17.97       | 26.92                               | 84.87  | 2.97               | 5.35                                | 00:0      | 000          | 93.19    | 0.00                                | 93.19       | 65.32              | 6.64                               | 2.38                   | 4.28               | 13.30 | 90.0    | 78.68     | 14 51   |
| Feb                                          | 35.75             | 16.07       | 24.08                               | 75.90  | 2.68               | 4.83                                | 0.00      | 60.0         | 83.42    | 00.0                                | 83.42       | 28 42              | 5.94                               | 2.15                   | 3.87               | 11.95 | 0.2     | 70 57     | -12.85  |
| Mar                                          | 20.53             | 9.23        | 13.83                               | 43.59  | 767                | 5.35                                | 0.00      | 000          | 51.91    | 00.0                                | 16,18       | 33.55              | 3.41                               | 2.38                   | 4.28               | 10.07 | 0.13    | 43 72     | .8.19   |
| Apr                                          | 5.41              | 2.43        | 3.64                                | 11.49  | 2.88               | 5.18                                | 00.0      | 00.0         | 19.55    | 00.00                               | 19.55       | T-80.00            | 06.0                               | 2.30                   | 4.14               | 7 34  | 810     | 1667      | -2 88   |
| \fay                                         | 1.53              | 69'0        | 1.03                                | 3,25   | 2.97               | 5.35                                | 0.00      | 0.02         | 11.59    | 000                                 | 11.59       | 2.50               | 0.25                               | 2.38                   | 4.28               | 169   | 1.63    | 11.04     | -0.55   |
| Total                                        | 301.69            | 135.60      | 203.15                              | 640.43 | 35.00              | 63.00                               | 00.0      | 6.38         | 738 81   | 00.00                               | 738.81      | 492.00             | 50.00                              | 28.00                  | 50.40              | 128.4 | 38      | 658.4     | -80 41  |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colum     | 10 no (5+6  | +7+8+9)                             | Colu   | mp No. 12          | Column No. 12 = Column no. (10 + 11 | 0. (10+11 |              | mn 20.19 | Column no.19 # Column no (13+17+18) | (13+17+18)  |                    | Column no. 20 = Column no. (19-12) | Vama no.(19            | 12)                |       |         |           |         |

Table 4.10.6(b): Suvarnavathi Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                               |                |                           |                                      |        |                    |                   |                                      |          |              |              |                                         |        |            |                                   |                    |        | ļ         |          | Unit: MCM | MCM            |
|-----------------------------------------------|----------------|---------------------------|--------------------------------------|--------|--------------------|-------------------|--------------------------------------|----------|--------------|--------------|-----------------------------------------|--------|------------|-----------------------------------|--------------------|--------|-----------|----------|-----------|----------------|
|                                               |                |                           |                                      |        | V                  | Water Utilisation | sation                               |          |              |              |                                         |        |            |                                   | Water Availability | bility |           |          |           | A describilies |
| ) Canal                                       |                |                           |                                      | Wa     | Water requirements | cnts              |                                      |          |              |              | Gross                                   |        | H          | Regeneration from uses            | from uses          |        | Surface ( | Ground   | Gross     | Y TOTAL ST     |
| SILLOSA<br>-                                  | Utilisati      | on under in               | Utilisation under imigation projects | ojects | Dome-              | Indus-            | Hydro-                               | Environ- | T-101        | Ехроп        | total                                   | Import | [mga-      | Dome-                             | Indus-             | į      | water     | water    | water     | Palance        |
|                                               | Proposed       | Proposed Existing Ongoing | Drigoing                             | Total  | stic               | trial             | power                                | mental   | 1000         |              | utilisation                             |        | lion       | stic                              | trial              | 1001   | yields    | yields a | rvailable |                |
| (1)                                           | (2)            | (3)                       | (4)                                  | (5)    | (9)                | (1)               | (61)                                 | (6)      | (10)         | (3)          | (12)                                    | (13)   | (14)       | (15)                              | (16)               | (17)   | (18)      | (61)     | (30)      | (21)           |
| Jun                                           | 3.04           | 1.37                      | 2.05                                 | 6.45   | 5.18               | 5.18              | 0.00                                 | 0.03     | 16.83        | 0.00         | 16.83                                   | 4.95   | 0.50       | 4.14                              | 4,14               | 8.79   | 1.55      | 0.64     | 15.93     | -0.89          |
| 75                                            | \$6.98         | 25.61                     | 38.37                                | 120.96 | 5.35               | 5.35              | 00.0                                 | 0.03     | 131.69       | 0.00         | 131.69                                  | 93.11  | 9.46       | 4.28                              | 128                | 18.02  | 30.5      | 12.07    | 126.28    | 5.41           |
| Aug                                           | 52.37          | 23.54                     | 35.26                                | 111.16 | 5:35               | 5.35              | 0.00                                 | 0.02     | 121.88       | 00.0         | 121.88                                  | 85.56  | 8.69       | 4.28                              | 4.28               | 17.26  | 1.67      | 11.09    | 115.57    | -6.31          |
| Sep                                           | 42.65          | 19.17                     | 28.72                                | 90.54  | 5.18               | 5.18              | 0.00                                 | 0.10     | 100.99       | 0.00         | 100.99                                  | 89.69  | 7.08       | 4.4                               | 4.14               | 15.37  | 9.58      | 9.03     | 103.66    | 2.67           |
| Oct                                           | 3.79           | 1.70                      | 2.55                                 | \$.05  | 5.35               | 5.35              | 0.00                                 | 0.10     | 18.85        | 0.00         | 18.85                                   | 6.20   | 0.63       | 4.28                              | 4.28               | 61.6   | 9.50      | 0.80     | 25.69     | 6.84           |
| No.                                           | 12.63          | 5.68                      | 8.50                                 | 26.81  | 5.18               | 5.18              | 0.00                                 | 0.10     | 37.26        | 0.00         | 37.26                                   | 20.64  | 2.10       | 4,14                              | 4.14               | 10.38  | 6.62      | 2.68     | 43.31     | 6.05           |
| Dec                                           | 27.02          | 12.14                     | 18.19                                | 57.36  | \$.35              | 5.35              | 000                                  | 100      | 68 07        | 0.00         | 68.07                                   | 44,14  | 4.49       | 4.28                              | 4.28               | 13.05  | 0.52      | 5.72     | 63.43     | 4.64           |
| Jan                                           | 36.98          | 17.97                     | 26.92                                | 84.87  | 5.35               | 5.35              | 00.00                                | 00.0     | 95.57        | 0.00         | 95.57                                   | 65.32  | 6.64       | 4.28                              | 4.28               | 15.20  | 90.0      | 8.47     | 89.05     | -6.52          |
| Feb                                           | 35.75          | 16.07                     | 24.08                                | 75.90  | 4.83               | 4.83              | 00.0                                 | 000      | 85.57        | 000          | 85.57                                   | 58.42  | 5.94       | 3.87                              | 3.87               | 13.67  | 0.20      | 7.57     | 79.86     | .5 71          |
| Mar                                           | 20.53          | 9.23                      | 13.83                                | 43.59  | 5.35               | 535               | 00.0                                 | 000      | 54.29        | 0000         | 54.29                                   | 33.551 | 3,41       | 4.28                              | 4.28               | 11.97  | 0.11      | 4.35     | 49.93     | 4.31           |
| γbr                                           | 5.41           | 2.43                      | 3.64                                 | 11.49  | 5.18               | 5.18              | 0.00                                 | 000      | 21.85        | 000          | 21.85                                   | \$.84  | 06.0       | 4.14                              | 4.14               | 9.18   | 0.48      | 1.15     | 19.65     | -2.20          |
| May                                           | 1.53           | 0.69                      | 1.03                                 | 3.25   | 5.35               | 535               | 00'0                                 | 0.03     | 13.97        | 00'0         | 13.97                                   | 2.50   | 0.25       | 4.28                              | 4.28               | 8.82   | 1.63      | 0.32     | 13.27     | -0.70          |
| Total                                         | 301.69         | 301.69 135.60             | 203.15                               | 640.43 | 63.0               | 63.0              | 0.00                                 | 0.38     | 766.81       | 00.00        | 766.81                                  | 492.0  | 20.0       | 50.40                             | 50.4               | 150.80 | 38.00     | 63.90    | 744.70    | -22.11         |
| Note : Column no. 10 = Column no. (5+6+7+8+9) | 10. 10 = Colun | nn no.(5+¢                | (6+8+1+                              | Coln   | mn No. 12 =        | Column p          | Column No. 12 = Column no. (10 + 11) |          | umn no. 20 a | = Column no. | Column no.20 = Column no.(13+17+18+19). |        | umn no. 21 | Column no. 21 = Column no.(20-12) | 6.(20-12).         |        |           |          |           |                |

Table 4.10.6(c): Suvarnavathi Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

|                                                |                           |               |                                     |        |                    | Water Utilisation                  | sation      |          |             |           |                                      |        |            | W                                  | Water Availability | liny  |         |           | V for the last |
|------------------------------------------------|---------------------------|---------------|-------------------------------------|--------|--------------------|------------------------------------|-------------|----------|-------------|-----------|--------------------------------------|--------|------------|------------------------------------|--------------------|-------|---------|-----------|----------------|
| ;                                              |                           |               |                                     | Wa     | Water requirements | nems                               |             |          |             |           | Gross                                |        |            | Regeneration from uses             | from uses          |       | Surface | Gross     | Monthly        |
| Month                                          | Utilisation               | n under in    | Utilisation under imgation projects | ojects | Dome-              | Ludus-                             | Hydro-      | Environ- | Total       | Export    | total                                | Import | Irriga-    | Dome-                              | Indus              | Toll  | water   | water     | halance        |
|                                                | Proposed Existing Ongoing | Xisting C     | ngoing                              | Total  | stic               | trial                              | power       | mental   |             |           | utilisation                          |        | tion       | stic                               | trial              | Total | yields  | available |                |
| ε                                              | (2)                       | 3             | €                                   | (5)    | (9)                | (2)                                | (8)         | (6)      | (01)        | (11)      | (12)                                 | (13)   | (14)       | (15)                               | (16)               | (71)  | (81)    | (61)      | (20)           |
| Jun                                            | 30.5                      | 1.37          | 2.05                                | 6.45   | 2.88               | 5.18                               | 0.00        | 0.02     | 14.52       | 00:00     | 14.53                                | 4.95   | 0.50       | 2.30                               | 4.14               | 6.95  | 3.88    | 15.77     | 1.25           |
| [Inf                                           | 86.98                     | 25.61         | 38.37                               | 170.96 | 2.97               | 5.35                               | 000         | 0.03     | 129.31      | 0.00      | 129.31                               | 93.11  | 9.46       | 2.38                               | 4.28               | 16.12 | 7.70    | 116.93    | -12.39         |
| Aug                                            | 52.37                     | 23.54         | 35.26                               | 111.16 | 2.97               | 5.35                               | 0.00        | 0.02     | 05'611      | 00:0      | 119.50                               | 85.56  | 8.69       | 2.38                               | 4.28               | 15.35 | 4.18    | 105.09    | -14.42         |
| Se                                             | 42.65                     | 19.17         | 28.72                               | 90.54  | 2.88               | 5.18                               | 0.00        | 0.10     | 69.86       | 00:0      | 69.86                                | 69.68  | 7.08       | 2.30                               | 4.14               | 13.53 | 23.95   | 107.16    | 8.47           |
| Ö                                              | 3.79                      | 1.70          | 2.55                                | \$.05  | 2.97               | 5.35                               | 0.00        | 0.10     | 16.47       | 0.00      | 16.47                                | 6.20   | 0.63       | 2.38                               | 4.28               | 7.29  | 23.75   | 37.23     | 20.77          |
| Zo.                                            | 12.63                     | 5.68          | 8.50                                | 26.81  | 2.88               | 5.18                               | 00'0        | 0.10     | 34.96       | 00.0      | 34.96                                | 20.64  | 2.10       | 2.30                               | 4.14               | 8.54  | 24.05   | 53.23     | 18.26          |
| 30                                             | 27.02                     | 12.14         | 18.19                               | 57.36  | 767                | 5:35                               | 0.00        | 0.01     | 69.59       | 0.00      | 69.69                                | 41.14  | 4.49       | 2.38                               | 4.28               | 11.14 | 1.30    | 56.58     | -9.11          |
| Jan                                            | 39.98                     | 17.97         | 26.92                               | 22.87  | 767                | 5.35                               | 00.0        | 0.00     | 93.19       | 00.00     | 93.19.                               | 65.32  | 6.64       | 2.38                               | 4.28               | 13.30 | 0.15    | 78.77     | -14.42         |
| Feb                                            | 35.75                     | 16.07         | 24.08                               | 75.90  | 2.68               | 1.83                               | 0.00        | 000      | 83.42       | 00:0      | 83.42                                | 58.42  | 5.94       | 2.15                               | 3.87               | 11.95 | 0.50    | 70.87     | -12.55         |
| -E                                             | 20.53                     | 9.23          | 13.83                               | 43.59  | 2.97               | 5.35                               | 00.0        | 0.00     | 51.91       | 0.00      | 51.91                                | 33.55  | 3.41       | 2.38                               | 4.28               | 10.07 | 0.28    | 43.89     | -8.02          |
| Acc                                            | 5.41                      | 2.43          | 364                                 | 11.49  | 2.88               | 5.18                               | 000         | 00.0     | 19.55       | 00.0      | 19.55                                | 8.84   | 06.0       | 2.30                               | 4.14               | 7.34  | 1.20    | 17.39     | -2.16          |
| May                                            | 1.53                      | 690           | 1.03                                | 3.25   | 3.97               | 5:35                               | 00.00       | 0.02     | 11.59       | 00'0      | 11.59                                | 2.50   | 0.25       | 2.38                               | 4.28               | 16.9  | 4.08    | 13.49     | 1.90           |
| Total                                          | 301.69                    | 301.69 135.60 | 203.15                              | 640.43 | 35.00              | 63.00                              | 0.00        | 0.38     | 738.81      | 000       | 738.81                               | 492.00 | 20.0       | 28.00                              | 50.40              | 128.4 | 95.00   | 715.40    | -23.41         |
| Note : Column no. 10 = Column no. (5+6+7+8+9). | 10 = Colum                | n no.(5+6     | +7+8+9).                            | Colu   | mn No. 12          | Column No. 12 = Column no. (10+11) | 10. (10+11) |          | шпп по.19 = | Column no | Calumn no.19 = Column no.(13+17+18). | Column | no.20 = Co | Column no. 20 = Column no (19-12). | .12).              |       |         |           |                |
|                                                |                           |               |                                     |        |                    |                                    |             |          |             |           |                                      |        |            |                                    |                    |       |         |           |                |

Table 4.10.6(d): Suvarnavathi Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                 |                                                |              |            |                                      |           |                   |           |          |           |             |                                          |        |             |                                   |                    |        |         |        | Unit: MCM | MCM     |
|-----------------|------------------------------------------------|--------------|------------|--------------------------------------|-----------|-------------------|-----------|----------|-----------|-------------|------------------------------------------|--------|-------------|-----------------------------------|--------------------|--------|---------|--------|-----------|---------|
|                 |                                                |              |            |                                      | Wal       | Water Utilisation | tion      |          |           |             |                                          |        |             |                                   | Water Availability | bility |         |        |           | 11.     |
|                 |                                                |              |            | Water requirements                   | quiremen  | its               |           |          |           |             | Gross                                    |        |             | Regeneration from uses            | i from uses        |        | Surface | Ground | Gross     | Monthly |
| Month           | Utilisation under impation projects            | oder imgalic | n projects | s Dome-                              | _         | Indus-            | Hydro-    | Environ- | Total     | Export      | total                                    | Import | Irriga-     | Dome-                             | -snpur             | Total  | water   | water  | water     | halance |
|                 | Proposed Existing Ongoing                      | ung Ongour   | rg Total   | E SE                                 |           | Tein,             | power     | mental   | 200       |             | utilisation                              |        | hon         | stic                              | trial              | 1970   | yields  | yields | vailable  |         |
| ε               | (2) (3)                                        | (£)          | (S)        | (9)                                  |           | (7)               | (61)      | 6)       | (10)      | (11)        | (12)                                     | (13)   | (14)        | (15)                              | (16)               | (11)   | (18)    | (61)   | (30)      | (21)    |
| ງີນຄ            | 3.04                                           | 1.371 2      | 2.05 6     | 6.45                                 | 5.18      | 5.18              | 00.0      | 0.02     | 16.83     | 00'0        | 16.83                                    | 4.95   | 0.50        | 2.30                              | 4.14               | 6.95   | 3.88    | 19.0   | 16.42     | -0.41   |
| Jul             | 56.98 2                                        | 25.61 38     | 38.37 120  | 120.96                               | 5.35      | 5.35              | 00.0      | 0.03     | 131.69    | 00.0        | 131.69                                   | 93.11  | 9.46        | 2.38                              | 4.28               | 16.12  | 7.70    | 12.07  | 129.00    | -2.69   |
| Aug             | 52.37 2                                        | 23.54 35     | 35.26 111  | 111.16                               | 5.35      | 5.35              | 00.0      | 0.02     | 121.88    | 000         | 121.88                                   | 85.56  | 69.8        | 2.38                              | 4.28               | 15,35  | 4.18    | 11.09  | 116.18    | -5.70   |
| e<br>S          |                                                | 19.17 28     | 28.72      | 90.54                                | 5.18      | 5.18              | 0.00      | 0.10     | 100.99    | 00.00       | 100.99                                   | 89.68  | 7.08        | 2.30                              | 4,14               | 13.53  | 23.95   | 9.03   | 116.19    | 15.20   |
| Oct             | 3.79                                           | 1.70         | 2.55 8     | 8.05                                 | 5.35      | 5.35              | 0.00      | 0.10     | 18.85     | 00.0        | 18,85                                    | 6.20   | 0.63        | 2.38                              | 4.28               | 7.29   | 23.75   | 08.0   | 38.04     | 19.19   |
| Nov             | 12.63                                          | 5.68         | 8.50 26    | 26.81                                | 5.18      | 5.18              | 00'0      | 01.0     | 37.26     | 00.0        | 37.26                                    | 20.64  | 2.10        | 2.30                              | 4.14               | 8.54   | 24.05   | 2.68   | 55.90     | 18.64   |
| 2               | 27.02                                          | 12.14        | 18 19 57   | 57.36                                | 5.35      | 5.35              | 0.00      | 10.0     | 68.07     | 00.00       | 68.07                                    | 44.14  | 4.49        | 2.38                              | 4.28               | 11.14  | 1.30    | 5.72   | 62.30     | -5.76   |
| Jan             | 39.98                                          | 32 17.971    | 26.92      | 84.87                                | 5.35      | 5.35              | 0.00      | 000      | 95.57     | 00.00       | 75.29                                    | 65.32  | 6.64        | 2.38                              | 4.28               | 13.30  | 0.15    | 8.47   | 87.24     | -8.33   |
| - Feb           | 35.75                                          | 16.07        | 24.08 75   | 75.90                                | 4.83      | 4.83              | 0.00      | 0.00     | 85.57     | 00.0        | 85.57                                    | 58.42  | 5.94        | 2.15                              | 3.87               | 11.95  | 0.50    | 7.57   | 78.44     | 7.12    |
| Mar             | 20.53                                          | 9.23         | 13.83      | 43.59                                | 5.35      | 5.35              | 0.00      | 0.00     | £.23      | 000         | 54.29                                    | 33.55  | 3.41        | 2.38                              | 4.28               | 10.07  | 0.28    | 4.35   | 48.24     | -6.05   |
| Apr             |                                                | 2.43         | 3.04       | 11.49                                | 5.18      | 5.18              | 0.00      | 0.00     | 21.85     | 00.00       | 21.85                                    | 8.84   | 06.0        | 2.30                              | 4.14               | 7.34   | 1.20    | 1.15   | 18.53     | -3.32   |
| May             | 1.53                                           | 0.69         | 1.03       | 3.25                                 | 5.35      | 5.35              | 00.0      | 0.03     | 13.97     | 000         | 13.97                                    | 2.50   | 0.25        | 2.38                              | 4.28               | 16.9   | 4.08    | 0.32   | 13.81     | -0.15   |
| Total           | 301.69                                         | 135.60 203   | 203.15 640 | 640.43                               | 63.0      | 63.0              | 0.00      | 0.38     | 766.81    | 00.00       | 766.81                                   | 492.0  | 20.0        | 28.0                              | 50.4               | 128.39 | 95.00   | 63.90  | 779.29    | 12.48   |
| Note : Column n | Note : Column no. 10 = Column no. (5+6+7+8+9). | 0.(5+6+7+8   |            | Column No. 12 = Column no. (10 + 11) | o. 12 = C | olumn no          | (10 + 11) |          | umn no.20 | = Column no | Column no. 20 = Column no. (13+17+18+19) |        | lumn no. 21 | Column no. 21 = Column no.(20-12) | 10:(20-12)         |        |         |        | į         |         |

Table 4.10.6(e): Suvarnavathi Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

-2.22 -18.15 -12.96 -0.48 -3.26 -10.27 -14.55 80 Unit: MCM Monthly water balance 8 43.64 85.73 15.98 31.71 55.42 78.64 70.42 available water 2,52 2.53 2.53 0.14 0.05 0.03 0.13 0.83 Surface water yields Ê 6.91 3.30 16,12 Total Water Availability 4.28 4 14 4.28 50.40 Regeneration from uses [ndusfrial 9 Column no.20 = Column no.(19-12) 28.00 Domestic 20.00 Irrigation 85.56 6.20 20.64 44.14 65.32 58.42 33.55 Import 129.31 119.50 98.69 16.47 34.96 65.69 93.19 Gross total utilisation 14.52 Column no.19 \* Column no.(13+17+18 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 00.00 0 0000 0000 Export 98.69 98.69 98.69 93.19 83.42 14.52 19.55 Total 0.10 Environmenta 9 0.00 0.00 0.00 00.00 00.00 Column No. 12 = Column no. (10 + 11) Hydro power Water Utilisation 88 5.35 Indus-Lia Water requirements 35.00 Domežį. 9 6.45 8.05 26.81 57.36 84.87 75.90 43.59 11.49 640.43 120,96 Total Utilisation under irrigation projects 
 Jun
 3.04
 1.37
 2.05

 Jul
 56.98
 25.61
 38.37

 Aug
 52.37
 23.54
 35.26

 Sep
 42.65
 19.17
 28.72

 Oct
 3.79
 1.70
 2.55

 Nov
 12.63
 5.68
 8.50

 Jan
 39.02
 12.14
 18.19

 Jan
 39.02
 12.14
 18.19

 Jan
 39.02
 12.14
 18.19

 Apr
 20.53
 9.23
 13.83

 Apr
 5.41
 2.43
 3.64

 May
 1.53
 0.69
 1.03

 Most
 Column no.10 = Column no.(5+6+7+8+9).
 Existing Ongoing Proposed 2 Month Ê

Table 4.10.6(f): Suvarnavathi Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                    | Gross Monthly          | water                                 | available                 | (20) (21) | 54 14.79 -2.02 | 57 124.01 -7.68 | 99 [114.34] -7.54 | 23 96.60 4.39 | 80 18.69 -0.16 | 58 36.22 -1.04 | 5.72 63.05 -5.02 | 47] 89.01 -6.56 | 57 79.71 -5.86 | 35 49.90 4.39 | 1.15 19.30 -2.55 | 32 12.07 -1.90 | 90 716.70 -50.11 |                                         |
|--------------------|------------------------|---------------------------------------|---------------------------|-----------|----------------|-----------------|-------------------|---------------|----------------|----------------|------------------|-----------------|----------------|---------------|------------------|----------------|------------------|-----------------------------------------|
|                    | e Ground               |                                       | yields                    | (61)      | 0.41 0.64      | 0.81 12.07      | 0.11<br>0.44      | 2.52 9.03     | 2.5 0.80       | 2.53 2.68      | 0.14 5.7         | 0.02 8.47       | 0.05           | 0.03 4.35     | 0.13 1.1         | 0.43 0.32      | 10 63.90         |                                         |
|                    | Surface                |                                       | yields                    | (18)      | 8.79           | 18.02 0.        | 17.26             | 15.37 2.      | 61'6           | 10.38          | 13.05 0          | 15.20 0.        | 13.67 0.       | 0 2511        | 0 81.6           | 8.82 0.        | 50.80            |                                         |
| Water Availability | 303                    | 1                                     | - F                       | (11)      | 4.14           | 4.28 18         | 4.28              | 4.14          | 4.28           | 4.14 10        | 4.28             | 4.28 15         | 3.87 13        | 4.28          | 4.14             | 4.28 8         | 50.4 150         | 1                                       |
| Water A            | Regeneration from uses | -snpu]                                | tria                      | (16)      |                |                 |                   |               |                |                |                  |                 |                |               |                  |                |                  | 144 647                                 |
|                    | Regenerat              | Dome-                                 | stic                      | (15)      | 0 4.14         | 4.28            | 9 4.28            | 4.14          | 3 4.28         | 4.14           | 9 4.28           | 4.28            | 4 3.87         | 1 4.28        | 0 4.14           | 5 4,28         | 50.40            | 4                                       |
|                    |                        | Irriga                                | Lion                      | (14)      | 0.50           | 9.46            | 8.69              | 3 7.08        | 0,63           | 2.10           | 4,49             | 6.64            | 5.94           | 3.41          | 06.90            | 0.25           | 0.08             |                                         |
|                    |                        | Import                                |                           | (13)      | 4.95           | 93.11           | 85.56             | 89.68         | 6.20           | 20.64          | 41.14            | 65.32           | 58.42          | 33.55         | 8.85             | 2.50           | 492.0            | l                                       |
|                    | Gross                  | total                                 | utilisation               | (13)      | 16.81          | 131.69          | 121.88            | 100.99        | 18.85          | 37.26          | 68.07            | 95.57           | 85.57          | 2.3           | 21.85            | 13.97          | 766.81           |                                         |
|                    |                        | Export                                |                           | (11)      | 00.0           | 00'0            | 00.0              | 00:0          | 00:0           | 00.0           | 00:0             | 00.0            | 00.0           | 00'0          | 0.00             | 00:0           | 0.00             |                                         |
|                    |                        | Total                                 | I OHD                     | (10)      | 16.81          | 131.69          | 121.88            | 100.99        | 18.85          | 37.26          | 68.03            | 95.57           | 85.57          | \$4.29        | 21.85            | 13.97          | 766.81           | 1                                       |
|                    |                        | Environ-                              | mental                    | (6)       | 00.0           | 0.03            | 0.02              | 0.10          | 01.0           | 0.10           | 0.01             | 00.00           | 00.0           | 00.00         | 00.0             | 0.03           | 0.38             | ١                                       |
| salion             |                        | Hydro-                                | power                     | (61)      | 000            | 000             | 0.00              | 000           | 0.00           | 00.0           | 00.00            | 00.0            | 0.00           | 00.0          | 00.0             | 0.00           | 00'0             | 4                                       |
| Water Utilisation  | ments                  | Inchus-                               | Ę.                        | (£)       | 5.18           | 5.35            | 5.35              | 5.18          | 5.35           | 5.18           | 5.35             | 5.35            | 4.83           | 5.35          | \$1.8            | 5.35           | 63.0             | - 4                                     |
|                    | Water requirements     | Dome-                                 | stic                      | (9)       | 5.18           | 5.35            | 5.35              | 5.18          | 5.35           | 5.18           | 5.35             | 5.35            | 4.83           | 5.35          | 5.18             | 5.35           | 63.0             |                                         |
|                    | W                      | projects                              | Total                     | (5)       | 5 6.45         | 7 120.96        | 5 111.16          | 2 90.54       | 50.8           | 0 26.81        | 57.36            | 2 84.87         | 8 75.90        | 3 43.59       | 11.49            | 3 3.25         | 5 640.43         |                                         |
|                    |                        | rimgation                             | Ongoing                   | (4)       | 7 2.05         | 38.37           | 35.26             | 7 28.72       | 0 2.55         | 8.50           | 4 18.19          | 7 26.92         | 7 24.08        | 3 13.83       | 3.64             | 1.03           | 0 203.15         |                                         |
|                    |                        | Utilisation under irrigation projects | Proposed Existing Ongoing | (2) (3)   | 3.04 1.37      | 56.98 25.61     | 52.37 23.54       | 42.65 19.17   | 3.79 1.70      | 12.63 5.68     | 27.02 12.14      | 39.98           | 35.75 16.07    | 20.53 9,23    | 5.41 2.43        | 1.53 0.69      | 301.69 135.60    |                                         |
|                    | 1,500                  |                                       | Prop                      | (1)       | Jun            | Jul             | Aug               | Sep           | og<br>O        | Nov            | Dec              | Jan             | Feb            | Mar           | Apr              | May            | Total            | 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 |

Table 4.10.6(g): Suvarnavathi Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

| Unit: MCM | 1 1 1              | Monthly                | halone                              | 34179186         | (20)   | -2.63  | -20.09  | -18.59  | -15.48  | -2.98  | -5.79  | -10.41   | -14.57  | -13.05  | -8.30   | -3.36  | -2.18  | -118.41       |                                               |
|-----------|--------------------|------------------------|-------------------------------------|------------------|--------|--------|---------|---------|---------|--------|--------|----------|---------|---------|---------|--------|--------|---------------|-----------------------------------------------|
| Unit      |                    | Gross                  | water                               | available        | (61)   | 06.11  | 109.23  | 16:001  | 83.21   | 13.48  | 29.18  | 55.28    | 78.62   | 70.37   | 43.61   | 16.19  | 9.41   | 620.40        |                                               |
|           |                    | Surface                | water                               | yields           | (18)   | 00:0   | 00:0    | 00:0    | 0.00    | 00.00  | 0.00   | 00:0     | 0.00    | 0.00    | 0:00    | 00:0   | 0.00   | 0.00          |                                               |
|           | ility              |                        | Lyse                                | 10191            | (11)   | 6.95   | 16.12   | 15.35   | 13.53   | 7.29   | 8.54   | 11.14    | 13.30   | 11.95   | 10.07   | 7.34   | 16.9   | 128.40        |                                               |
|           | Water Availability | from uses              | Ludus-                              | trial            | (91)   | 4.14   | 4.28    | 4.28    | 4.14    | 4.28   | 4.14   | 4.28     | 4.28    | 3.87    | 4.28    | + ] +  | 4.28   | S0.40         | .12).                                         |
|           | W                  | Regeneration from uses | Dome.                               | stic             | (15)   | 2.30   | 2.38    | 2.38    | 2.30    | 2.38   | 2.30   | 2.38     | 2.38    | 2.15    | 2.38    | 2.30   | 2.38   | 28.00         | lumn no.(19                                   |
|           |                    | E                      | lmga.                               | tion             | (14)   | 0.50   | 9.46    | 8.69    | 7.08    | 0.63   | 2.10   | 4.49     | 6.64    | 5.94    | 3,41    | 0.00   | 0.25   | 50.00         | Column no.20 = Column no.(19-12).             |
| d         |                    |                        | Import                              |                  | (13)   | 4.95   | 93.11   | 85.56   | 89.68   | 6.20   | 20.64  | <u>t</u> | 65.32   | 58.42   | 33.55   | 8.84   | 2.50   | 492.00        | Column                                        |
| -1        |                    | Gross                  | total                               | noiteation       | (11)   | 14.52  | 129.31  | 119.50  | 69.86   | 16.47  | 34.96  | 69.69    | 93.19   | 83.42   | 51.91   | 19.55  | 11.59  | 738.81        | (13+17+18)                                    |
| l         |                    |                        | Export                              |                  | (11)   | 0.00   | 0.00    | 0.00    | 0.00    | 0.00   | 0.00   | 0.00     | 0.00    | 00.0    | 0.00    | 0.00   | 0.00   | 0.00          | Column no.19 = Calumn no.(13+17+18)           |
|           |                    |                        | Total                               | 100              | (10)   | 14.52  | 129.31  | 119.50  | 69.86   | 16.47  | 34.96  | 69.59    | 93.19   | 83.42   | 51.91   | 19.55  | 11.59  | 738.81        | = 91.ou nun                                   |
|           |                    |                        | Environ-                            | mental           | (6)    | 0.05   | 0.03    | 0.02    | 0.10    | 0.10   | 0.10   | 0.01     |         | 0.00    | 00:00   | 0.00   | 0.02   | 0.38          |                                               |
|           | Isation            |                        | Hydro                               | power            | (8)    | 0.00   | 0.00    | 00.0    | 0.00    | 0.00   | 00.00  | 0.00     | 0.00    | 0.00    | 0.00    | 0.00   | 0.00   | 0.00          | Column No. 12 = Column no. (10 + 11)          |
|           | Water Utilisation  | ements                 | Indus-                              | trial            | (J)    | 5.18   | 5.35    | 5.35    | 5.18    | 5.35   | 5.18   | 5.35     | 5.35    | 4.83    | 5.35    | 5.18   | 5.35   | 63.00         | 2 = Column                                    |
|           |                    | Water requirements     | Dome-                               | stic             | (9)    | 5 2.88 | 2.97    | 5 2.97  | 4 2.88  | 5 2.97 | 1 2.88 | 76.2     | 7 2.97  | 0 2.68  | 2.97    | 2.88   | 2.97   | 3 35.00       | lumn No. 1                                    |
|           |                    | 1                      | rojects                             | Total            | (5)    | 6.45   | 120.96  | 111.16  | 90.54   | 8.05   | 26.8]  | 57.36    | 84.87   | 75.90   | 43.59   | 11.49  | 3.25   | 640.43        |                                               |
|           |                    |                        | Utilisation under impation projects | Existing Ongoing | €      | 7 2.05 | 1 38.37 | 4 35.26 | 7 28.72 | 0 2.55 | 8 8.50 | 4 18.19  | 7 26.92 | 7 24.08 | 3 13.83 | 3 3.64 | 9 1.03 | 0 203.15      | (6+8+2+9+                                     |
|           |                    | i                      | on unde                             | Existing         | e<br>E | 1.37   | 19.25   | 13.54   | 19.17   | 1.70   | 5.68   | 12.14    | 17.97   | 16.07   | 9.23    | 2.43   | 0.69   | 301.69 135.60 | mn no.(5                                      |
|           |                    |                        | Utilisat                            | Proposed         | (3)    | 3.04   | 86.98   | 52.37   | 42.65   | 3.79   | 12.63  | 27.02    | 39.98   | 35.75   | 20.53   | 5.41   | 1.53   | 301.69        | o, 10 = Colu                                  |
|           |                    | 4                      | Monin                               |                  | ε      | րոչ    | 126     | Aug     | Š       | pg.    | Nov    | ž        | Jan     | Feb     | N far   | Арг    | May    | Tota          | Note: Column no. 10 = Column no. (5+6+7+8+9). |

Table 4.10.6(h): Suvarnavathi Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

| MCM       |                    | Monthly                | water                                 | O'ST GENERAL | (3)  | 44.5      | -8.49    | -7.98    | 16.9     | -2.66     | -3.57   | -5.16    | -6.58 | 16.5.    | 4.42    | -2.68   | -2.33     | -60.11    |                                              |
|-----------|--------------------|------------------------|---------------------------------------|--------------|------|-----------|----------|----------|----------|-----------|---------|----------|-------|----------|---------|---------|-----------|-----------|----------------------------------------------|
| Unit: MCM |                    | Gross                  | water                                 | available    | (30) | 14.38     | 123.20   | 113.90   | \$4.08   | 16.19     | 33.69   | 62.91    | 88.99 | 79.66    | 49.87   | 19.17   | 11.64     | 706.70    |                                              |
|           |                    | Ground                 | water                                 | yields       | (61) | 19:0      | 12.07    | 11.09    | 9.03     | 08.0      | 2.68    | 5.72     | 8.47  | 7.57     | 4.35    | 1.15    | 0.32      | 63.90     |                                              |
|           |                    | Surface                | water                                 | yields       | (81) | 00.0      | 00.0     | 00.0     | 0.00     | 00.00     | 00.0    | 0.00     | 0.00  | 0.00     | 0.00    | 000     | 0.00      | 0.00      |                                              |
|           | ability            |                        |                                       | 3            | (17) | 8.79      | 18.02    | 17.26    | 15.37    | 9.19      | 10.38   | 13.05    | 15.20 | 13.67    | 11.97   | 9.18    | 8.82      | 150.80    |                                              |
|           | Water Availability | from uses              | -snpuJ                                | Eri al       | (16) | 4.14      | 4.28     | 4.28     | 4.14     | 4.28      | 4,14    | 4.28     | 4.28  | 3.87     | 4.28    | 4.14    | 4.28      | 50.40     | 5.(20-12).                                   |
|           |                    | Regeneration from uses | Dome-                                 | stic         | (15) | 4.14      | 4.28     | 4.28     | 4.14     | 4.28      | 4.14    | 4.28     | 4.28  | 3.87     | 4.28    | 4.14    | 4.28      | 50.40     | - Column n                                   |
|           |                    | 24                     | Imga-                                 | tion         | (14) | 0.50      | 9.46     | 8.69     | 7.08     | 0.63      | 2.10    | 4.49     | 6.64  | 5.94     | 3,41    | 0.50    | 0.25      | 20.00     | Column no. 21 = Column no.(20-12)            |
|           |                    |                        | Import                                |              | (13) | 4.95      | 93.11    | 85.56    | 89.69    | 6.20      | 20.64   | 44.14    | 65.32 | 58.42    | 33.55   | 8.0.9   | 2.50      | 492.00    | ŀ                                            |
|           |                    | Gross                  | iotal                                 | utilisation  | (12) | 16.83     | 131.69   | 121.88   | 100.99   | 18.85     | 37.26   | 68.07    | 95.57 | 85.57    | \$4.29  | 21.85   | 13.97     | 766.81    | 51+8 <b>1</b> +21+£                          |
|           |                    |                        | Export                                | Th.          | (11) | 0.00      | 0.00     | 0.00     | 0.00     | 0.00      | 0.00    | 0.00     | 00:00 | 0.00     | 00'0    | 0.00    | 0.00      | 0.00      | Column no.20 = Column no.(13+17+18+19).      |
|           |                    |                        | H Loro                                | ielo         | (10) | 16.83     | 131.69   | 121.88   | 100.99   | 18.85     | 37.26   | 68.07    | 95.57 | 85.57    | 54.29   | 21.85   | 13.97     | 766.81    | nn no.20 = C                                 |
|           |                    |                        | Emiron-                               | mental       | (6)  | 0.03      | 0.03     | 0.02     | 0.10     | 0.10      | 0.10    | 0.01     | 00.00 | 00:0     | 00.0    | 00:00   | 0.02      | 0.38      | Colun                                        |
|           | alion              |                        | Hydro- E                              | power        | (61) | 0.00      | 00.0     | 0.00     | 0.00     | 0.00      | 00.0    | 0.00     | 000   | 0.00     | 0.00    | 0.00    | 0.00      | 0.00      | . (10 ÷ 11)                                  |
|           | Water Utilisation  | nents                  | Indus-                                | Lival        | (7)  | 5,18      | 5.35     | 5.35     | 5.18     | 5.35      | 5.18    | 5.35     | 5.35  | 4.83     | 5.35    | 5.18    | 5.35      | 63.00     | Column No. 12 = Column no. (10 + 11)         |
| H         | Δ                  | Water requirements     | Dome-                                 | stic         | (9)  | 5.18      | 5.35     | 5.35     | 5.18     | 5:35      | 5.18    | 5.35     | 5.35  | 4.83     | 5.35    | 5.18    | 5.35      | 63.00     | mn No. 12 =                                  |
| ٦         |                    | W                      | rojects                               | Total        | (5)  | 6.45      | 120.96   | 111.16   | 90.54    | 8.05      | 26.81   | 57.36    | 84.87 | 75.90    | 43.59   | 11.49   | 3.25      | 640.43    | Colu                                         |
|           |                    |                        | Utilisation under irrigation projects | Ongoing      | (4)  | 7 2.05    | 38.37    | 35.26    | 7 28.72  | 0 2.55    | 8.50    | 18.19    | 26.92 | 7 24.08  | 3 13.83 | 3.64    | 9 1.03    | 203.15    | +6+1+8+6)                                    |
|           |                    |                        | ation under                           | d Existing   | 3    | 3,04 1.37 | 98 25.61 | 37 23.54 | 65 19.17 | 3.79 1.70 | 63 5.68 | 02 12.14 | 17.97 | 75 16.07 | 53 9.23 | 41 2.43 | 1.53 0.69 | 69 135.60 | մա <b>տո no</b> .(5                          |
| :         |                    |                        | Utilis                                | Proposed     | 2    | 3.        | \$6.98   | 52.37    | 42.65    | m         | 12.63   | 27.02    | 39.98 | 35.75    | 20.53   | 5.41    | -         | 301.69    | no. 10 = Co                                  |
|           |                    | 7                      | Month                                 |              | ε    | ru-       | lu.      | Aug      | ç        | ő         | Nov.    | డ్డ      | Jan   | Feb      | ) (ar   | ΑX      | May       | Tota      | Note: Column no. 10 = Column no. (5+6+7+8+9) |

Table 4.10.7(a): Palar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                              |               |                                       |                  |        |                    | Water Utilisation | Salion                              |          |              |           |                                      |        |              | 7                                | Water Availability | hility |         |           | 11. 71       |
|----------------------------------------------|---------------|---------------------------------------|------------------|--------|--------------------|-------------------|-------------------------------------|----------|--------------|-----------|--------------------------------------|--------|--------------|----------------------------------|--------------------|--------|---------|-----------|--------------|
| Marit                                        |               |                                       |                  | Wal    | Water requirements | Tichts            |                                     |          |              |           | Gross                                |        |              | Regeneration from uses           | from uses          |        | Surface | Gross     | VIONIN       |
| MONIC                                        | Utilisatio    | Utilisation under irrigation projects | ngation pro      | )ects  | Dome-              | -snpul            | Hydro-                              | Environ- | F            | Export    | total                                | Import | Irriga-      | Dome.                            | -snpuj             | T-44=1 | Water   | water     | halance<br>h |
|                                              | Proposed      | Proposed Existing Ongoing             | nigoing          | Total  | stic               | trial             | power                               | mental   | 200          |           | utilisation                          |        | tion         | Stic                             | E in               | 101    | yields  | available |              |
| (E)                                          | (2)           | (3)                                   | ( <del>f</del> ) | (5)    | (9)                | (7)               | (8)                                 | (6)      | (01)         | (I)       | (12)                                 | (13)   | (14)         | (31)                             | (16)               | (71)   | (81)    | (61)      | (30)         |
| Jun                                          | 2.47          | 0.14                                  | 0.39             | 3.00   | 06'0               | 3.62              | 00'0                                | 0.10     | 7.62         | 00'0      | 7.62                                 | 00.0   | 0.15         | 0.72                             | 2.89               | 3.76   | 98'6    | 13.62     | 90 9         |
| Jul                                          | 43.58         | 2.41                                  | 16'9             | 52.90  | 0.93               | 3.74              | 000                                 | 0.21     | 57.81        | 00'0      | 57.81                                | 00:0   | 2.57         | 0.75                             | 2.99               | 6.31   | 20.75   | 27.06     | 30.75        |
| Aug                                          | 40.06         | 2,22                                  | 6.35             | 48.63  | 0.93               | 3.74              | 000                                 | 0.26     | 53.58        | 00.0      | 53.58                                | 00.0   | 2.37         | 0.75                             | 2.99               | 6.10   | 26.03   | 32.13     | 31.45        |
| Sep                                          | 32.48         | 1.80                                  | 5.15             | 39.44  | 06.0               | 3.62              | 000                                 | 0.29     | 44.25        | 000       | 44.25                                | 00:0   | 192          | 0.72                             | 2.89               | 5.53   | 28.71   | 34.24     | 00 01-       |
| ğ                                            | 3.94          | 0.22                                  | 0.63             | 4.78   | 0.93               | 3.74              | 00'0                                | 70.0     | 9.53         | 00'0      | 9.53                                 | 000    | 0.23         | 0.75                             | 2.99               |        | 7.40    | 11.37     | 1 84         |
| Nov                                          | 11.29         | 0.62                                  | 1.79             | 13.70  | 06.0               | 3.62              | 00.00                               | 00.00    | 18.24        | 00'0      | 18.24                                | 0000   | 0.67         | 0.72                             | 2.89               | 4.28   | 0.25    | 4.53      | -13 70       |
| Dec<br>Dec                                   | 3.6<br>10.6   | 1.05                                  | 3.02             | 23.12  | 0.93               | 3.74              | 00:0                                | 0.0      | 27.84        | 000       | 27.84                                | 00.0   | 1.12         | 0.75                             | 2.99               | 4.86   | 3.86    | 8.72      | -1912        |
| Jan                                          | 23.09         | 1.28                                  | 3.66             | 28.03  | 0.93               | 3.74              | 00.0                                | 003      | 32,74        | 000       | 32,74                                | 000    | 1.36         | 0.75                             | 2.99               | 5.10   | 2.88    | 7.98      | -24 76       |
| Feb                                          | 24.40         | 1.35                                  | 3.87             | 29.62  | 0.84               | 3.38              | 00.0                                | 0.03     | 33.87        | 000       | 33.87                                | 00:0   | <u>-</u>     | 99 0                             | 2.70               | 4 82   | 1.73    | 6.55      | .27 33       |
| Mar                                          | 14.55         | 18.0                                  | 2.31             | 17.66  | 0.93               | 3.74              | 00.00                               | 0.02     | 22.34        | 000       | 22.34                                | 000    | 98.0         | 0.75                             | 2.99               | 7 60   | 95.1    | 91.9      | -1619        |
| Apr                                          | 4.08          | 0.23                                  | 0.65             | 4.95   | 0.90               | 3.62              | 00.0                                | 00.0     | 9.47         | 000       | 9.47                                 | 00:0   | 0.24         | 0.72                             | 2,89               | 3 86   | 210     | 4.03      | -\$ 45       |
| May                                          | 1.23          | 0.07                                  | 0.20             | 1.50   | 0.93               | 3.74              | 00.0                                | 0.02     | 61.9         | 00'0      | 61.9                                 | 00:00  | 0.07         | 0.75                             | 2.99               | 3.81   | 1.79    | 5.60      | -0.59        |
| Total                                        | 220.37        | 12.20                                 | 34.96            | 267.53 | 11.00              | 44.00             | 000                                 | 1.05     | 323.48       | 000       | 323.48                               | 000    | 13.0         | 8.80                             | 35.20              | 57.0   | 66.401  | 161.90    | -161 49      |
| Mote: Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Colun | n no. (5+6-                           | +7+8+9)          | Colun  | nn No. 12          | = Column n        | Column No. 12 = Column no. (10 + 11 |          | umn no. 19 - | Column no | Column no.19 = Column no.(13+17+18). | Column | 1 no.20 = Ca | Calumn no.20 = Calumn no.(19-12) | 1-12).             |        |         |           |              |

Table 4.10.7(b): Palar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                              |               |             |                                      |        |                                      | Water Utilisation | sation       |          |             |             |                                        |        |             |                                    | Water Availability | bility |         |        |           |         |
|----------------------------------------------|---------------|-------------|--------------------------------------|--------|--------------------------------------|-------------------|--------------|----------|-------------|-------------|----------------------------------------|--------|-------------|------------------------------------|--------------------|--------|---------|--------|-----------|---------|
| March                                        |               |             |                                      | Wa     | Water requirements                   | nents             |              |          |             | ,           | Gross                                  |        |             | Regeneration from uses             | 1 from uses        |        | Surface | Ground | Gross     | Monthly |
| ווווווווווווווווווווווווווווווווווווווו      | Utilisatic    | on under in | Julisation under irrigation projects | ojects | Dome-                                | Indus-            | Hydro-       | Environ- | 1.4.6       | Export      | total                                  | Import | Imiga-      | Dome                               | Indus-             | l ete  | water   | water  | water     | אימוכנ  |
|                                              | Proposed      | Existing C  | Ongoing                              | Total  | stic                                 | trial             | power        | mental   | 1001        |             | utilisation                            |        | tion        | stic                               | leial              | 10101  | yields  | yields | available | 9.5     |
| (1)                                          | (2)           | (3)         | (4)                                  | (5)    | (9)                                  | (3)               | (61)         | (6)      | (01)        | Ξ           | (12)                                   | (13)   | (14)        | ((1)                               | (16)               | (17)   | (18)    | (19)   | (07)      | (21)    |
| Jun                                          | 2.47          | 0.14        | 0.39                                 | 3.00   | 3,62                                 | 3.62              | 000          | 01.0     | 10.33       | 000         | 10.33                                  | 00.0   | 0.15        | 2.89                               | 2.89               | 5,93   | 9.86    | 1.57   | 17.36     | 7 03    |
| Jul                                          | 43.58         | 2.41        | 16.9                                 | \$2.90 | 3.74                                 | 3.74              | 00:0         | 0,21     | 85.09       | 000         | 85.09                                  | 00.0   | 2.57        | 2.99                               | 2.99               | 8.55   | 20.75   | 27.62  | \$6.93    | 3 66    |
| Aug                                          | 90 07         | 2.22        | 6.35                                 | 48.63  | 3.74                                 | 3.74              | 000          | 0.26     | \$6.36      | 000         | 56.36                                  | 0.00   | 2.37        | 2.99                               | 2.99               | 8.34   | 26.03   | 25.39  | 59 77     | 3+0     |
| Sep                                          | 32.48         | 1.80        | 5.15                                 | 39.44  | 3.62                                 | 3.62              | 00.0         | 0.29     | 46.96       | 000         | 46.96                                  | 00:0   | 1.92        | 2.89                               | 2.89               | 7.70   | 18.71   | 20.59  | 57.01     | 10.05   |
| <b>တ</b>                                     | 3.94          | 0.22        | 0.63                                 | 4.78   | 3.74                                 | 3.74              | 000          | 0.07     | 12.33       | 000         | 12.33                                  | 00.0   | 0.23        | 2.99                               | 2.99               | 6.21   | 01'7    | 2.50   | 16.11     | 3.78    |
| Nov                                          | 11.29         | 0.62        | 1 79                                 | 13.70  | 3.62                                 | 3.62              | 00.0         | 000      | 20.94       | 00.0        | 20.94                                  | 0.00   | 0.67        | 2.89                               | 2 89               | 6.45   | 0.25    | 7.16   | 13.86     | -7 08   |
| э<br>Д                                       | اه<br>اه      | 1.05        | 3.02                                 | 23.12  | 3,74                                 | 3.74              | 00.0         | 0.04     | 30.63       | 00.0        | 30.63                                  | 000    | 1.12        | 2.99                               | 2.99               | 7,10   | 3.86    | 12.07  | 23.03     | -7.59   |
| Jan                                          | 13.09         | 1.28        | 3.66                                 | 28.03  | 3.74                                 | 3.74              | 00.0         | 60.03    | 35.53       | 00.0        | 35.53                                  | 0.00   | 1.36        | 2.99                               | 2.99               | 7.34   | 2.88    | 14.63  | 24.86     | .10 67  |
| Feb                                          | 24.40         | 1.35        | 3.87                                 | 29.62  | 3.38                                 | 3.38              | 0.00         | 0.03     | 36.39       | 00:0        | 36.39                                  | 00:00  | 1.41        | 2.70                               | 2.70               | 6.84   | 1.73    | 15.47  | 24.04     | -12.35  |
| Mar                                          | 14.55         | 0.81        | 2.31                                 | 17.66  | 3.74                                 | 3.74              | 00.0         | 0.02     | 25.15       | 00:0        | 25.15                                  | 000    | 98.0        | 7.99                               | 2.99               | 6.84   | 1.56    | 9.22   | 17.62     | .7.53   |
| Apr                                          | 4.08          | 0.23        | 0.65                                 | 4.95   | 3.62                                 | 3.62              | 00.0         | 00.0     | 12.18       | 00:0        | 12.18                                  | 0000   | 0.24        | 2.89                               | 2 89               | 603    | 0.17    | 2.58   | 8.78      | 3.40    |
| May                                          | 1.23          | 0.07        | 0.20                                 | 1.50   | 3.74                                 | 3.74              | 00.0         | 0.02     | 8.99        | 00:0        | 66.8                                   | 00:0   | 0.07        | 5.99                               | 2 99               | 6.05   | 1.79    | 0.78   | 8.62      | 9£ (r   |
| Total                                        | 220.37        | 12.20       | 34.96                                | 267.53 | 44.00                                | 44.00             | 00:00        | 1.05     | 356.58      | 00:0        | 356.58                                 | 00:0   | 13.0        | 35.20                              | 35.20              | 83.4   | 104.99  | 139.70 | 328.09    | 6+ 87.  |
| Note: Column no. 10 = Column no.(5+6+7+8+9). | o. 10 = Colun | th no.(5+6  | +3+8+6)                              | Colui  | Column No. 12 = Column no. (10 + 11) | = Column n        | .c. (10 + 11 |          | umn no.20 = | - Column no | Column no 20 = Column no.(13+17+18+19) |        | fumn no. 21 | Column no. 21 = Column no. (20-12) | 10.(20-12).        |        |         |        |           |         |

Table 4.10.7(c): Palar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| [                                            |               |                                       |            |        |                    |                                      |             |          |            |             |                                     |        |              |                                    |                    |        |         | Unit      | Unit: MCM |
|----------------------------------------------|---------------|---------------------------------------|------------|--------|--------------------|--------------------------------------|-------------|----------|------------|-------------|-------------------------------------|--------|--------------|------------------------------------|--------------------|--------|---------|-----------|-----------|
|                                              |               |                                       |            |        | ~                  | Water Utilisation                    | sation      |          |            |             |                                     |        |              | H                                  | Water Availability | nility |         |           | :         |
| 1,441                                        |               |                                       |            | Wate   | Water requirements | rènis                                |             |          |            |             | Gross                               |        |              | Regeneration from uses             | n from uses        |        | Surface | Gross     | Monthly   |
| Difforts:                                    | Utilisatio    | Utilisation under irrigation projects | cation pro |        | Dome-              | Indus-                               | Hydro-      | Environ- | -<br>-     | Export      | total                               | Import | -riga-       | Dome.                              | Indus-             | ŀ      | water   | water     | Water     |
|                                              | Proposed E    | Proposed Existing Ongoing             | going      | Total  | stic               | trial                                | power       | mental   | 1210 1     |             | utilisation                         |        | tion         | stic                               | trial              | 201    | yields  | available |           |
| (1)                                          | [ (2) ]       | (3)                                   | (4)        | (5)    | (9)                | (2)                                  | (8)         | (6)      | (10)       | (11)        | (12)                                | (13)   | (14)         | (15)                               | (91)               | (11)   | (81)    | (61)      | (20)      |
| Jun                                          | 2.47          | 0.14                                  | 0.39       | 3.00   | 0.60               | 3.62                                 | 00.0        | 0.10     | 7.62       | 00.00       | 7.62                                | 00'0   | 0.15         | 0.72                               | 2.89               | 3.76   | 90.91   | 19.82     | 12.30     |
| Pu!                                          | 43.58         | 2.41                                  | 16.9       | 52.90  | 0.93               | 3.74                                 | 00.00       | 0.21     | 57.81      | 000         | 57.81                               | 000    | 2.57         | 0.75                               | 2.99               | 6.3    | 33.80   | 40.11     | -17.70    |
| Aug                                          | 40.06         | 2.22                                  | 6.35       | 48.63  | 0.93               | 3.74                                 | 00.00       | 0.26     | 53.58      | 00:0        | 53.58                               | 0000   | 237          | 0.75                               | 2.99               | 6.10   | 42.40   | +8.50     | 5.09      |
| Хrр                                          | 32.48         | 1.80                                  | 5.15       | 39.44  | 06'0               | 3.62                                 | 00.00       | 0.29     | 44.25      | 00:0        | 44.25                               | 00.0   | 192          | 0.72                               | 2.89               | 5.53   | 46,76   | 52.29     | 8.05      |
| ទ                                            | 3.94          | 0.22                                  | 0.63       | 4.78   | 0.93               | 3.74                                 | 00.00       | 0.07     | 9.53       | 00:0        | 9.53                                | 00.00  | 0.23         | 0.75                               | 2.99               | 3.97   | 12.05   | 16.02     | 6.49      |
| Nov.                                         | 11.29         | 0.62                                  | 6/         | 13.70  | 06.0               | 3.62                                 | 00:00       | 00.00    | 18.24      | 00:0        | 18.24                               | 00.0   | 0.67         | 0.72                               | 2.89               | 4.28   | 0.41    | 4.69      | .13.55    |
| Ď                                            | 19.04         | 1.05                                  | 3.02       | 23.12  | 0.93               | 3.74                                 | 00'0        | 0.04     | 27.84      | 00:00       | 27.84                               | 0.00   | 1,12         | 0.75                               | 2.99               | 4.86   | 6.29    | 11.15     | -16.69    |
| Jan                                          | 23.09         | 1.28                                  | 3.66       | 28.03  | 0.93               | 3.74                                 | 00.00       | 0.03     | 32.74      | 00:0        | 32,74                               | 00.00  | 1.36         | 0.75                               | 2.99               | 5.10   | 4.69    | 9.79      | -22.95    |
| Feb                                          | 24.40         | 1.35                                  | 3.87       | 29.62  | 0.84               | 3.38                                 | 00.00       | 0.03     | 33.87      | 0.00        | 33.87                               | 0.00   | ₽†*I         | 0.68                               | 2.70               | 4.82   | 2.82    | 7.63      | -26.24    |
| Mar                                          | 14.55         | 0.81                                  | 2.31       | 17.66  | 0.93               | 3.74                                 | 0.00        | 0.05     | 22.34      | 0.00        | 22,34                               | 00.0   | 98.0         | 0.75                               | 2.99               | 4.60   | 2.54    | 7.14      | -15.20    |
| Эрг                                          | 4.08          | 0.23                                  | 0.65       | 4.95   | 0.60               | 3.62                                 | 0.00        | 00'0     | 9.47       | 00.00       | 21 6                                | 000    | 0.24         | 0.72                               | 2.89               | 3.86   | 0.28    | 4.13      | -5.34     |
| May                                          | 1.23          | 0.07                                  | 0.20       | 1.50   | 0.93               | 3.74                                 | 0.00        | 0.05     | 6.19       | 0.00        | 6.19                                | 0.00   | 20'0         | 0.75                               | 2.99               | 3.81   | 2.92    | 6.73      | 0.54      |
| Total                                        | 220.37        | 12.20                                 | 34,96      | 267.53 | 11.00              | 14.00                                | 00.00       | 1.05     | 323.48     | 00:0        | 323.48                              | 0.00   | 13.0         | 8.80                               | 35.20              | 57.0   | 17.00   | 228.00    | 95.48     |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 2. 10 = Colum | n no.(5+6+                            | 7+8+9).    | Colum  | m No. 12=          | Column No. 12 = Column no. (10 ± 11) | 0. (10 ± 11 |          | umn no.19: | = Column no | Column no.19 = Column no.(13+17+18) |        | n no.20 = C. | Column no. 20 = Column no. (19-12) | >-12).             |        |         |           |           |

Table 4.10.7(d): Palar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                             |             |                                       | ,<br>,           |        |                    |                                     |           |          |            |                                         |            |        | -                                   |                        |                    |        |         |        | Unit: MCM | MCM        |
|---------------------------------------------|-------------|---------------------------------------|------------------|--------|--------------------|-------------------------------------|-----------|----------|------------|-----------------------------------------|------------|--------|-------------------------------------|------------------------|--------------------|--------|---------|--------|-----------|------------|
|                                             |             | 1                                     |                  |        | H                  | Water Utilisation                   | tion      |          |            |                                         |            |        |                                     |                        | Water Availability | bility |         |        |           |            |
| 1,441                                       |             |                                       |                  | Wate   | Water requirements | cnts                                |           |          |            |                                         | Gross      |        | 4                                   | Regeneration from uses | i from uses        |        | Surface | Ground | Gross     | Monthly    |
| I JUOIN                                     | Utilisation | Utilisation under irrigation projects | gation proj      |        | Dome-              | Indus-                              | Hydro-    | Environ- | T-4-3      | Export                                  | total      | Import | Imiga-                              | Dome-                  | Indus-             | ŀ      | water   | water. | water     | Valet.     |
|                                             | Proposed E  | Existing Ongoing                      | -                | Total  | stic               | trial                               | power     | mental   | I otal     |                                         | milisation |        | tion                                | stic                   | 큠드                 | 1001   | yields  | yields | available | ai ance    |
| (i)                                         | (2)         | (3)                                   | ( <del>-</del> ) | (5)    | (9)                | (3)                                 | (19)      | (6)      | (10)       | (11)                                    | (12)       | (13)   | (14)                                | (15)                   | (91)               | (17)   | (81)    | (6E)   | (50)      | ( <u>5</u> |
| Jun                                         | 2.47        | 0.14                                  | 0.39             | 3.00   | 3.62               | 3.62                                | 06.0      | 0.10     | 7.62       | 00.0                                    | 7.62       | 000    | 0.15                                | 0.72                   | 2.89               | 3.76   | 16.06   | 1.57   | 21.39     | 21.39      |
| Jul                                         | 43.58       | 2.41                                  | 6.91             | 52.90  | 3.74               | 3.74                                | 0.00      | 0.21     | 57.81      | 0000                                    | 57.81      | 00:0   | 2.57                                | 0.75                   | 2.99               | 6.31   | 33.80   | 27.62  | 67.73     | 9.92       |
| Aug                                         | 40.06       | 2.22                                  | 6.35             | 48.63  | 3.74               | 3.74                                | 0.00      | 0.26     | 53.58      | 0000                                    | 53.58      | 00.0   | 2.37                                | 0.75                   | 2.99               | 6.10   | 42.40   | 25.39  | 73.89     | 20.31      |
| Sep.                                        | 32.48       | 1.80                                  | 5.15             | 39.44  | 3.62               | 3 62                                | 0.00      | 0.29     | 44.25      | 00.0                                    | 44.25      | 000    | 1.92                                | 0.72                   | 2.89               | 5.53   | 46.76   | 20.59  | 72.89     | 28.64      |
| Oct                                         | 3.94        | 0.22                                  | 0.63             | 4.78   | 3.74               | 3.74                                | 0.00      | 0.07     | 9.53       | 00.0                                    | 9.53       | 00.0   | 0.23                                | 0.75                   | 2.99               | 3.97   | 12.05   | 2.50   | 18.52     | 8.99       |
| Nov                                         | 11.29       | 0.62                                  | 1.79             | 13.70  | 3.62               | 3.62                                | 0.00      | 00.0     | 18.24      | 000                                     | 18.24      | 000    | 0.67                                | 0.72                   | 2.89               | 4.28   | 0.41    | 7.16   | 11.85     | -6.39      |
| Dcc                                         | 19:04       | 1.05                                  | 3.02             | 23.12  | 3.74               | 3.74                                | 0.00      | 0.04     | 27.84      | 00.0                                    | 27.84      | 000    | 1.12                                | 0.75                   | 2.99               | 4.86   | 6.29    | 12.07  | 23.22     | 4.62       |
| Jan                                         | 23.09       | 1.28                                  | 3.66             | 28.03  | 3.74               | 3.74                                | 0.00      | 0.03     | 32.74      | 00:0                                    | 32.74      | 00.00  | 1.36                                | 0.75                   | 2.99               | 5.10   | 4.69    | 14.63  | 24.43     | -8.32      |
| Feb                                         | 24.40       | 1.35                                  | 3.87             | 29.62  | 3.38               | 3 38                                | 0.00      | 0.02     | 33.87      | 0.00                                    | 33.87      | 0.00   | 7                                   | 0.68                   | 2.70               | 4.82   | 2.82    | 15.47  | 23.10     | -10.77     |
| Mar                                         | 14.55       | 0.81                                  | 2.31             | .17.66 | 3.74               | 3.74                                | 0.00      | 0.02     | 22.34      | 00.0                                    | 22.34      | 000    | 0.86                                | 0.75                   | 3.99               | 4,60   | 2.54    | 9.22   | 16.36     | 86.5-      |
| Apr                                         | 80.+        | 0.23                                  | 0.65             | 4.95   | 3.62               | 3.62                                | 0.00      | 00.00    | 9.47       | 0.00                                    | 9.47       | 000    | 0.24                                | 0.72                   | 2.89               | 3.86   | 0.28    | 2.58   | 6.72      | -3.75      |
| May                                         | 1.23        | 0.07                                  | 0.20             | 1.50   | 3.74               | 3.74                                | 0.00      | 0.05     | 6.19       | 00:0                                    | 6.19       | 00.00  | 0.07                                | 0.75                   | 2.99               | 3.81   | 2.92    | 0.78   | 15.7      | 1.32       |
| Total                                       | 220.37      | 12.20                                 | .  96'₩          | 267.53 | 11.00              | 1 <del>1</del> 00                   | 0.00      | 1.05     | 323.48     | 0.00                                    | 323.48     | 0.00   | 13.0                                | 8.8                    | 35.20              | 57.0   | 171.00  | 139.70 | 367.70    | 14.22      |
| Note: Column no. 10 = Column no.(5+6+7+8+9) | 10 = Colum  | n no.(5+6+,                           | 7+8+9).          | Colum  | n No. 12 =         | Column No. 12 = Column no. (10 + 11 | (10 + 11) | Colu     | mn no.20 = | Johnn no. 20 = Column no. (13+17+18+19) | 13+17+18+1 |        | Column no. 21 = Column no. (20-12). | = Column n             | 0.(20-12).         | 1      |         |        |           |            |

Table 4.10.7(e): Palar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                                            |              |                                       |             |        | 1                  | Water Utilisation | ration                               |          |             |           |                                     |        |              | n                                 | Water Availability | ility |         |           |                   |
|--------------------------------------------|--------------|---------------------------------------|-------------|--------|--------------------|-------------------|--------------------------------------|----------|-------------|-----------|-------------------------------------|--------|--------------|-----------------------------------|--------------------|-------|---------|-----------|-------------------|
| Manik                                      | !<br>        |                                       |             | Wali   | Water requirements | nents             |                                      |          |             |           | Gross                               |        |              | Regeneration from uses            | from uses          |       | Surface | Gross     | Monthly           |
| I I I I I I I I I I I I I I I I I I I      | Utilisatic   | Utilisation under irrigation projects | igation pro | -      | Dome-              | -snpur            | -Elydro-                             | Environ- | F           | Ехроп     | total                               | Import | Irriga-      | Dome-                             | -snpul             | ļ     |         | water     | Wales<br>Folianes |
|                                            | Proposed .   | Proposed Existing Ongoing             | guiogu      | Total  | stic               | trial             | ромег                                | mental   | l O(a)      |           | utilisation                         |        | tion         | stic                              | trial              | 100   | yields  | available | Deserve           |
| (1)                                        | (2)          | (3)                                   | 9           | (5)    | (9)                | (£)               | (8)                                  | 6        | (10)        | Œ         | (12)                                | (13)   | (14)         | (15)                              | (16)               | (1)   | (81)    | (61)      | (20)              |
| շող                                        | 247          | 0.14                                  | 0.39        | 3.00   | 06.0               | 3.62              | 00.0                                 | 0,10     | 7.62        | 00.0      | 7.62                                | 00.0   | 0,15         | 0.72                              | 2.89               | 3.76  | 6.76    | 10.52     | 2.90              |
| Jul                                        | 43.58        | 2.41                                  | 169         | 52.90  | 0.93               | 3.74              | 00.0                                 | 0.21     | 57.81       | 00.0      | 57.81                               | 0.00   | 2.57         | 0.75                              | 2.99               | 6.31  | 14.23   | 20.54     | -37.27            |
| Aug                                        | 40.06        | 2.22                                  | 6.35        | 48.63  | 0.93               | 3.74              | 000                                  | 0.26     | 53.58       | 00.0      | 53.58                               | 00.00  | 2.37         | 0.75                              | 2.99               | 6.10  | 17.85   | 23.95     | -29.63            |
| Sep                                        | 32.48        | 1.80                                  | 5.15        | 39.44  | 06.0               | 3.62              | 00.0                                 | 0.29     | 44.25       | 00.0      | 44.25                               | 00.0   | 1.92         | 0.72                              | 2.89               | 5.53  | 69.61   | 25.22     | -19.02            |
| Š                                          | 3.94         | 0.22                                  | 0.63        | 4.78   | 0.93               | 3.74              | 0.00                                 | 0.07     | 9.53        | 00.0      | 9.53                                | 0.00   | 0.23         | 0.75                              | 2.99               | 3.97  | 5.07    | 9.04      | -0.49             |
| Nov                                        | 11 29        | 0.62                                  | 1.79        | 13.70  | 06.0               | 3.62              | 0.00                                 | 0.00     | 18.24       | 00.00     | 18.24                               | 00.0   | 0.67         | 0.72                              | 2.89               | 4.28  | 0.17    | 4.45      | -13 78            |
| Dec                                        | 19.04        | 1.05                                  | 3.02        | 23.12  | 0.93               | 3.74              | 0.00                                 | 0.04     | 27.84       | 00.00     | 27.84                               | 00.00  | 1.12         | 0.75                              | 2.99               | 4.86  | 2.65    | 7.51      | -20.33            |
| Jan                                        | 23.09        | 1.28                                  | 3.66        | 28.03  | 0.93               | 3.74              | 00.0                                 | 0.03     | 32.74       | 00.0      | 32.74                               | 0.00   | 1.36         | 0.75                              | 2.99               | 5.10  | 1.97    | 707       | -25.67            |
| Feb                                        | 24.40        | 1.35                                  | 3.87        | 29.62  | 78.0               | 3.38              | 00.0                                 | 0.02     | 33.87       | 00.00     | 33.87                               | 0.00   | 4            | 89.0                              | 2.70               | 4.82  | 1.19    | 10.9      | -27.87            |
| Mar                                        | 14.55        | 0.81                                  | 2.31        | 17.66  | 0.93               | 3.74              | 00.0                                 | 0.02     | 22.34       | 000       | 22.34                               | 0.00   | 0.86         | 0.75                              | 2.99               | 7.60  | 1.07    | 567       | -16 68            |
| Apr                                        | 4.08         | 0.23                                  | 0.65        | 495    | 0.90               | 3.62              | 0.00                                 | 0.001    | 9.47        | 00.0      | 9.47                                | 0.00   | 0.24         | 0.72                              | 2.89               | 3.86  | 0.12    | 3 98      | -5 50             |
| May                                        | 1 23         | 0.07                                  | 0.20        | 1.50   | 0.93               | 3.74              | 0.00                                 | 0.02     | 61.9        | 00.0      | 61.9                                | 0.00   | 0.07         | 0.75                              | 2.99               | 3.8   | 1.23    | \$.04     | -1.15             |
| Total                                      | 220.37       | 12.20                                 | 34.96       | 267.53 | 11.00              | 4,00              | 0.00                                 | 1.05     | 323.48      | 00.0      | 323,48                              | 0.00   | 13.0         | 8.80                              | 35.20              | 57.0  | 71.99   | 128.99    | 194 49            |
| Note: Column no.10 = Column no (5+6+7+8+9) | 2.10 - Colum | 10 no (5+6+                           | -7+8+9).    | Colum  | un No. 12          | Column n          | Column No. 12 - Column no. (10 + 11) |          | umn no.19 = | Column no | Column no.19 = Column no.(13+17+18) |        | 1 no 20 = C. | Column no 20 = Column no. (19-12) | -12).              |       |         |           |                   |

Table 4.10.7(f): Palar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                    | Nionthly               | Malei                                |                | (21)     | 3.93  | .10.18     | 78     | 1.03  | 1,45  |       | -8.80 | -11.58 | .12 89 | 8.02  | 3.45  |       | 61.49  |                                              |
|--------------------|------------------------|--------------------------------------|----------------|----------|-------|------------|--------|-------|-------|-------|-------|--------|--------|-------|-------|-------|--------|----------------------------------------------|
|                    | Gross                  | water                                | available      | (20)     | 14.26 | 50.41      | \$1.59 | 47.99 | 13.78 | 13.78 | 21.82 | 23.95  | 23.50  | 17.13 | 8.73  | 8.06  | 295.09 |                                              |
|                    | Ground                 | water                                | yields         | (61)     | 1.57  | 27.62      | 25.39  | 20.59 | 2.50  | 7,16  | 12.07 | 14.63  | 15.47  | 9.22  | 2.58  | 0.78  | 139.70 |                                              |
|                    | Surface                | waler                                | yiclds         | (81)     | 6.76  | 14.23      | 17.85  | 19.69 | 5.07  | 0.17  | 2.65  | 1.97   | 1.19   | 1.07  | 0.12  | 1.23  | 71.99  |                                              |
| bility             |                        | -                                    | JE 101         | (17)     | 5.93  | 8.55       | 8.34   | 7.70  | 6.21  | 6.45  | 7.10  | 7.34   | 6.84   | 6.84  | 6.03  | 6.05  | 83,4   |                                              |
| Water Availability | from uses              | Indus-                               | le i J         | (16)     | 2.89  | 2.99       | 2.99   | 2.89  | 2.99  | 2.89  | 2.99  | 2.99   | 2.70   | 2.99  | 2.89  | 2.99  | 35.20  | (20-12)                                      |
| 3                  | Regeneration from uses | Dome-                                | stic           | (15)     | 2.89  | 2.99       | 2.99   | 2.89  | 2.99  | 2.89  | 2.99  | 2.99   | 2.70   | 2.99  | 2.89  | 2.99  | 35.2   | Column no                                    |
|                    | 2                      | Irriga-                              | tion           | (14)     | 0.15  | 2.57       | 2.37   | 1.92  | 0.23  | 0.67  | 1.12  | 1.36   | 1      | 0.86  | 0.24  | 0.07  | 130    | Column no. 21 = Column no. (20-12)           |
|                    |                        | Impou                                |                | (13)     | 0.00  | 00.0       | 00.0   | 00.0  | 00:0  | 000   | 00.00 | 00:0   | 00:0   | 00:0  | 00:0  | 00:00 | 00:0   | Г                                            |
|                    | Gross                  | total                                | utilisation    | (12)     | 10.33 | 86.58      | \$6.36 | 46.96 | 12.33 | 20.94 | 30.63 | 35.53  | 36.39  | 25.15 | 12.18 | 66.3  | 356.58 | 13+17+18+1                                   |
|                    |                        | Export                               | ח              | Ē        | 0.00  | 0.00       | 0.00   | 0.00  | 0.00  | 00'0  | 00:0  | 0.00   | 0.00   | 0.00  | 0.00  | 0.00  | 0.00   | Column no.20 = Column no.(13+17+18+19)       |
|                    |                        | 1                                    | tolat          | (10)     | 10.33 | 60.58      | 56.36  | 46.96 | 12.33 | 20.94 | 30.63 | 35.53  | 36.39  | 25.15 | 12.18 | 8.99  | 356.58 | mn no.20 =                                   |
|                    |                        | Environ-                             | mental         | (6)      | 01.0  | 0.21       | 0.26   | 0.29  | 0.07  | 00'0  | 0.04  | 0.03   | 0.02   | 0.02  | 000   | 0.02  | 1:05   | Colu                                         |
| ation              |                        | Hydro-                               | power          | (61)     | 0.00  | 0.00       | 00.0   | 0.00  | 0.00  | 00.0  | 0.00  | 0.00   | 00.0   | 0.00  | 0.00  | 0.00  | 0.00   | Column No. 12 = Column no. (10 + 11)         |
| Water Utilisation  | ent s                  | Inchus-                              | trial<br>leist | (7)      | 3.62  | 3.74       | 3.74   | 3.62  | 3.74  | 3.62  | 3.74  | 3.74   | 3.38   | 3.74  | 3.62  | 3.74  | 14.00  | Column n                                     |
| V                  | Water requirements     | Dome-                                | stic           | (9)      | 3.62  | 3.74       | 3.74   | 3.62  | 3.74  | 3.62  | 3.74  | 3.74   | 3.38   | 3.74  | 3.62  | 3.74  | 44.00  | ran No. 12 =                                 |
|                    | Wat                    | ojects                               | Total          | (5)      | 3.00  | 52.90      | 48.63  | 39.44 | 4.78  | 13.70 | 23.12 | 28.03  | 29.62  | 17.66 | 4.95  | 1.50  | 267.53 | Colon                                        |
|                    |                        | Julisation under irrigation projects | Ongoing        | <b>(</b> | 0.39  | 6.91       | 6.35   | 5.15  | 0.63  | 1.79  | 3.02  | 3.66   | 3.87   | 2.31  | 0.65  | 0.20  | 34.96  | 5+7+8+9)                                     |
|                    |                        | ion under i                          | Existing       | (3)      | 0.14  | 2.41       | 222    | 1.80  | 0.22  | 0.62  | 1.05  | 1.28   | 1.35   | 0.81  | 0.23  | 0.07  | 12.20  | mn no.(5+t                                   |
|                    |                        | Utilisat                             | Proposed       | (3)      | 2.47  | 43.58      | 40.06  | 32.48 | 3.94  | 11.29 | 19.04 | 23.09  | 24.40  | 14.55 | 4.08  | 1.23  | 220.37 | 10 = Colu                                    |
|                    | Manch                  | I ATOLINI                            |                | ε        | Jun   | <b>[</b> ] | Aug    | Sep   | Ö     | Nov   | Dec   | Jan    | Feb    | Mar   | Apr   | May   | Total  | Note : Column no. 10 = Column no.(5+6+7+8+9) |

Table 4.10.7(g): Palar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                    | Monthly      | twater                 | halance                               | - N. B.          | (30)    | -2.17     | 17.5       | 43.02      | -33.79     | 4.29      | 13.91      | -22.32     | -27.15     | -28.76     | -17.48     | -5.59     | -2.07  | -248.48      |                                              |
|--------------------|--------------|------------------------|---------------------------------------|------------------|---------|-----------|------------|------------|------------|-----------|------------|------------|------------|------------|------------|-----------|--------|--------------|----------------------------------------------|
|                    |              | 2002                   | water                                 | available        | (61)    | 5.45      | 18.6       | 10.56      | 10.45      | 5.24      | 4.32       | 5.52       | 5.59       | 5.12       | 4.87       | 3.89      | 4.12   | 75.00        |                                              |
|                    | 1            | vurtace                | water                                 | yields           | (81)    | 1.69      | 3.56       | 4.46       | 4.92       | 1.27      | 0.04       | 99'0       | 0,49       | 0.30       | 0.27       | 0.03      | 0.31   | 18.00        |                                              |
| Zileo              | Avin         |                        | i<br>F                                | 100              | (11)    | 3.76      | 6.31       | 01.9       | 5.53       | 3.97      | 4.28       | 4.86       | 5.10       | 4.82       | 4.60       | 3.86      | 3.81   | 57.0         |                                              |
| Water Ausilabilian | From Wattag  | mom uses               | Indus-                                | trial            | (91)    | 2.89      | 2.99       | 2.99       | 2.89       | 2.99      | 2.89       | 2.99       | 2,991      | 2,70       | 2.99       | 2.89      | 2.99   | 35.20        | -12).                                        |
| W.                 | 44           | Regeneration from uses | Dome-                                 | stic             | (15)    | 0.72      | 0.75       | 0.75       | 0.72       | 0.75      | 0.72       | 0.75       | 0.75       | 0.68       | 0.75       | 0.72      | 0.75   | 8.80         | Column no. 20 = Column no. (19-12)           |
| Ì                  |              |                        | lmiga-                                | tion             | (14)    | 0.15      | 2.57       | 2.37       | 1.92       | 0.23      | 0.67       | 1.12       | 1.36       | 1.44       | 0.86       | 0.24      | 0.07   | 13.0         | 3 No. 20 = Co                                |
| Ì                  |              |                        | Import                                |                  | (13)    | 0.00      | 0.00       | 00.0       | 00:0       | 00:0      | 00:0       | 00.00      | 000        | 00:00      | 00.0       | 0.00      | 00:0   | 0.00         | Column                                       |
|                    |              | 25.5                   | total                                 | utilisation      | (12)    | 7.62      | 57.81      | 53.58      | 44.25      | 9.53      | 18.24      | 27.84      | 32.74      | 33.87      | 22.34      | 9.47      | 6.19   | 323.48       | (13+17+18).                                  |
|                    |              |                        | Export                                |                  | (11)    | 0.00      | 0.00       | 0.00       | 0.00       | 0.00      | 0.00       | 0.00       | 0.00       | 0.00       | 0.00       | 0.00      | 0.00   | 0.00         | Jalumn no. 19 = Calumn no. (13+17+18)        |
|                    |              |                        | ŕ                                     | - Old            | (10)    | 7.62      | 57.81      | 53.58      | 44.25      | 9.53      | 18.24      | 27.84      | 32.74      | 33.87      | 22.34      | 9.47      | 6.19   | 323.48       | umn no. 19 =                                 |
|                    |              |                        | Environ-                              | mental           | (6)     | 0.10      | 0.21       | 0.26       |            | 10.0      | 000        | 0.04       | 0.03       | 0.02       | 0.02       | 000       | 0.02   | 1.05         | ) (                                          |
| ication            | Hadrigh      |                        | Hydro.                                | power            | (8)     | 0.00      | 0.00       | 0.00       | 00.00      | 00.00     | 0.00       | 0.00       | 0.00       | 0.00       | 000        | 0.00      | 0.00   | 000          | no. (10 + 11                                 |
| Water Historian    | Wale Ch      | ements                 | Indus-                                | triat            | (2)     | 3.62      | 3.74       | 3.74       | 3.62       | 3.74      | 3.62       | 3.74       | 3.74       | 3,38       | 3.74       | 3.62      | 3.74   | 41.00        | Column No. 12 = Column no. (10 + 11          |
|                    | Zing and and | water requirements     | Dome-                                 | stic             | (9)     | 06:0      | 0.93       | 3 0.93     | 4 0.90     | 8 0.93    | 06.0       | 2 0.93     | 3 0.93     | 0.84       | 5 0.93     | 06.0      | 0.93   | 3 11.00      | I'm No. 1                                    |
|                    |              |                        | n projects                            | Total            | (5)     | 0.39 3.00 | 6.91 52.90 | 6.35 48.63 | 5.15 39.44 | 0.63 4.78 | 1,79 13.70 | 3.02 23.12 | 3.66 28.03 | 3.87 29.62 | 2.31 17.66 | 0.65 4.95 | 0.20   | 34.96 267.53 |                                              |
|                    | }            |                        | der irrigatio                         | Existing Ongoing | (4)     | 0.14 0    | 2.41       | 2,22 6     | 3.80       | 0.22 0    | 0.62       | 1.05       | 1.28       | 1,35       | 0.81       | 0.23 0    | 0.07   | 12,20        | (5+6+7+8+                                    |
|                    |              |                        | Utilisation under irrigation projects | Proposed Exist   | (5) (3) | 2.47 0    | 43.58 2    | 40,06      | 32.48      | 3.94      | 11.29 0    | 19.04      | 23.09      | 24.40      | 14.55 0    | 4.08 0    | 1.23 0 | 220.37] 12   | - Column no                                  |
|                    | 1            | Month                  |                                       | Pro              | (i)     | Jun       |            | 90         | Sep        | Set       | Nov        | 350        | an         | ę          | Nfar       | Apr       | May    | Total        | Note: Column no. 10 = Column na. (5+6+7+8+9) |

Table 4.10.7(h): Palar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

| ļ                                             |                           |            |                                     |        |                    |                                     |             |          |           |            |                                         |        |             |                                   |                    |         |         |        | Unit: MCM | MCM     |
|-----------------------------------------------|---------------------------|------------|-------------------------------------|--------|--------------------|-------------------------------------|-------------|----------|-----------|------------|-----------------------------------------|--------|-------------|-----------------------------------|--------------------|---------|---------|--------|-----------|---------|
|                                               |                           |            |                                     |        |                    | Water Utilisation                   | salion      |          |           |            |                                         |        |             |                                   | Water Availability | ability |         |        |           |         |
| 1,000                                         | i                         | <br>       |                                     | Wal    | Water requirements | nenis                               |             |          |           |            | Gross                                   |        |             | Regeneration from Uses            | from Uses          |         | Surface | Ground | Gross     | Monthly |
| (COOLS)                                       | Utilisatio                | n under ir | Utilisation under impation projects | ojects | Dome-              | Indus-                              | Hydro       | Erwiron- | 1.10      | Export     | total                                   | Import | Imiga-      | Dome-                             | -snpu]             | ł       | water   | water  | water     | Weign   |
|                                               | Proposed Existing Ongoing | Existing ( | Ingoing                             | Total  | stic               | LT:al                               | power       | mental   | Iorai     |            | utilisation                             |        | tion        | stic                              | trial              | 1013    | yields  | yields | available | מוימוכב |
| 0                                             | (3)                       | (3)        | (4)                                 | (5)    | (9)                | ( <u>1</u> )                        | (61)        | (6)      | (10)      | (11)       | (12)                                    | (13)   | (14)        | (15)                              | (16)               | (11)    | (3)     | (61)   | (8)       | (5)     |
| Jun                                           | 2.47                      | 0.14       | 0.39                                | 3.00   | 3.62               | 3.62                                | 0.00        | 01.0     | 10.33     | 00.00      | 10.33                                   | 00.0   | 0.15        | 2.89                              | 2.89               | 5.93    | 1.69    | 1.57   | 9.19      | -1.14   |
| Por                                           | 43.58                     | 2.41       | 9169                                | 52.90  | 3.74               | 3.74                                | 0.00        | 0.2      | 60.58     | 00.00      | 60.58                                   | 00.0   | 2.57        | 2.8                               | 2.99               | 8.55    | 3.56    | 27.62  | 39.74     | -20.85  |
| Aug                                           | 90'0*                     | 2,22       | 6.35                                | 48.63  | 3.74               | 3.74                                | 0.00        |          | \$6.36    | 00.00      |                                         | 0.00   | 2.37        | 2.99                              | 2.99               | 8.34    | 4.45    | 25.39  | 38.20     | -18.17  |
| ŝ                                             | 32.48                     | 1.80       | 5.15                                | 39.44  | 3.62               | 3.62                                | 00'0        | 0.29     | 46.96     | 00.00      | 96.90                                   | 00.0   | 1.92        | 2.89                              | 2.89               | 7.70    | 4.92    | 30.59  | 33.22     | -13.74  |
| ğ                                             | 3.94                      | 0.22       | 0.63                                | 4.78   | 3.74               | 3.74                                | 00'0        | 0.07     | 12.33     | 0.00       | 12.33                                   | 0.00   | 0.23        | 2.99                              | 5.99               | 6.21    | 1.27    | 2.50   | 86.6      | -2.35   |
| Nov                                           | 11.29                     | 0.62       | 1.79                                | 13.70  | 3.62               | 3.62                                | 0.00        | 00.00    | 20.94     | 00.00      | 20.94                                   | 0.00   | 0.67        | 2,89                              | 2.89               | 6.45    | 0.04    | 7.16   | 13.65     | .7.29   |
| 3<br>0                                        | 19.04                     | 1.05       | 3.02                                | 23.12  | 3,74               | 3.74                                | 0.00        | 0.04     | 30.63     | 0.00       | 30.63                                   | 00.00  | 1.12        | 299                               | 2,99               | 7.10    | 0.66    | 12.07  | 19.83     | -10.79  |
| Jan                                           | 23.09                     | 1.28       | 3.66                                | 28.03  | 3.74               | 3.74                                | 0.00        | 0.03     | 35.53     | 0.00       | 35.53                                   | 00.00  | 1.36        | 2.99                              | 2.99               | 7.3-1   | 0.49    | 14.63  | 22.47     | 13.06   |
| Feb                                           | 24.40                     | 1.35       | 3.87                                | 29.62  | 3.38               | 3.38                                | 0.00        |          | 36.39     | 0.00       | 36.39                                   | 00.00  | 1.44        | 2.70                              | 2.70               | 6.84    | 0.30    | 15.47  | 22.61     | -13.78  |
| Mar                                           | 14.55                     | 0.81       | 2.31                                | 17.66  | 3.74               | 3.74                                | 0.00        | 0.03     | 25.15     | 0.00       | 25.15                                   | 00.00  | 0.86        | 2.99                              | 2.99               | 6.84    | 0.27    | 9.22   | 16.33     | -8.82   |
| γk                                            | 4.08                      | 0.23       | 0.65                                | 4.95   | 3.62               | 3.62                                | 0.00        | 0.0      | 12.18     | 0.00       | 12.18                                   | 00'0   | 0.24        | 2.89                              | 2.89               | 6.03    | 0.03    | 2.58   | 8.64      | -3.54   |
| May                                           | 1.23                      | 0.07       | 0.20                                | 1.50   | 3.74               | 3.74                                | 00.00       | 0.05     | 8.99      | 0.00       | 8.99                                    | 0000   | 0.07        | 2.99                              | 2.99               | 6.05    | 0.31    | 0.78   | 7.14      | -1.84   |
| Total                                         | 220.37                    | 12.20      | 34.96                               | 267.53 | 44.00              | 44.00                               | 0.00        | 1.05     | 356.58    | 00.00      | 356.58                                  | 0.00   | 13.0        | 35.2                              | 35.20              | 83.4    | 18.00   | 139.70 | 241.10    | -115.5  |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | o. 10 = Colum             | m no.(5+6  | 17+8+9).                            | Colur  | nn No. 12          | Column No. 12 = Column no. (10 + 11 | To. (10 + 1 | )        | umn no.20 | = Сојшти п | Column no.20 = Column no.(13+17+18+19). |        | dumn no. 21 | Column no. 21 = Column no.(20-12) | No.(20-12).        |         |         |        |           |         |

Table 4.10.8(a): Chinnar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                            | ļ            |                                       |            |        |                    |                   |                                      |          |            |                                       |             |        | la<br>la   |                                  |                    |       |           | Unit      | Unit: MCM |
|--------------------------------------------|--------------|---------------------------------------|------------|--------|--------------------|-------------------|--------------------------------------|----------|------------|---------------------------------------|-------------|--------|------------|----------------------------------|--------------------|-------|-----------|-----------|-----------|
|                                            |              |                                       |            |        | <u>ئە</u>          | Water Utilisation | sation                               |          |            |                                       |             |        |            | W                                | Water Availability | lity  |           |           |           |
| Month                                      |              |                                       |            | Watı   | Water requirements | nents             |                                      |          |            |                                       | Gross       |        | <b>.</b>   | Regeneration from uses           | from uses          |       | Surface   | Gross     | Monthly   |
|                                            | Utilisatic   | Utilisation under irrigation projects | gation pro |        | Dome.              | Ludus.            | Hydro.                               | Environ- |            | Export                                | total       | Import | Imica-     | Готе                             | Indus-             | -     | Water     | water     | Walcr     |
|                                            | Proposed     | Existing Ongoing                      | guiogi     | Total  | stic               | trial             | power                                | mental   | l ota l    |                                       | utilisation |        | tion       | stic                             | triat              | lota  | yields    | available | oalstice  |
| Ξ                                          | (3)          | (3)                                   | (4)        | (5)    | 9                  | (J)               | (8)                                  | (6)      | (10)       | (E)                                   | (12)        | (13)   | (F)        | (15)                             | (91)               | (7)   | (81)      | (61)      | (20)      |
| Jun                                        | 39.00        | 10.83                                 | 0.00       | 49.83  | 7.15               | 10.11             | 00.0                                 | 0.10     | 67.24      | 418.84                                | 486.09      | 0.00   | 1.83       | 5.72                             | 8.09               | 15.63 | 10.28     | 25.91     | -160.17   |
| Į.                                         | 20.76        | 5.76                                  | 000        | 26.52  | 7.39               | 10.45             | 000                                  | 0.03     | 41.41      | 130.79                                | 175.20      | 00.0   | 0.97       | 5.91                             | 8.36               | 15.24 | 3.21      | 18.45     | -156.75   |
| γng                                        | 14.20        | 3 94                                  | 0.00       | 18.14  | 7.39               | 10.45             | 000                                  | ±0.0     | 36.02      | 152.79                                | 188.81      | 0.00   | 99.0       | 5.91                             | 8.36               | 14.93 | 3.75      | 18.68     | .170.13   |
| Şep                                        | 49.94        | 13.86                                 | 00.00      | 63.80  | 7.15               | 10.11             | 0.00                                 | 0.79     | 81.88      | 3216.71                               | 3298.59     | 0.00   | 234        | 5.72                             | 60.8               | 16.14 | 78.95     | 95.09     | -3203.49  |
| Ö                                          | 40.88        | 11.35                                 | 00.00      | \$2.23 | 7.39               | 10.45             | 0.00                                 | 1.07     | 71.16      | 4375.0\$                              | 4446.21     | 00.0   | 161        | 16.5                             | 8.36               | 16.18 | 107.38    | 123.56    | 4322.64   |
| Nov                                        | 48.41        | <br>4                                 | 000        | 61.85  | 7.15               | 10.11             | 00:0                                 | 0.72     | 79.86      | 2949.43                               | 3029.29     | 0.00   | 2,27       | 5.72                             | 60.8               | 16.07 | 72.39     | 88.46     | -2940.83  |
| De.                                        | 57.01        | 15.82                                 | 000        | 72.84  | 7.39               | 10,45             | 00:0                                 | 0.15     | 90.85      | 596.89                                | 687.75      | 00.00  | 2.67       | 5.91                             | 8.36               | 16.94 | 14.65     | 31.59     | -656.16   |
| Jan                                        | 28.13        | 7.81                                  | 8.0        | 35.93  | 7.39               | 10.45             | 0.00                                 | 0.05     | 53.84      | 185.38                                | 239.22      | 00.00  | 1.32       | 16.5                             | 8.36               | 15.58 | 4.55      | 20.13     | -219.08   |
| <del>1</del> 0                             | 58.33        | 16.19                                 | 000        | 74.52  | 6.67               | 9.44              | 00.0                                 | 0.03     | 90.72      | 124.27                                | 214.99      | 0.00   | 2.73       | 5.34                             | 7.55               | 15.62 | 3.05      | 18.67     | .196.32   |
| Mar                                        | 91.17        | 19.76                                 | 0.00       | 90.95  | 7.39               | 10.45             | 00'0                                 | 0.03     | 108.9      | 134.45                                | 243.4       | 0.00   | 3.33       | 5.91                             | 8 36               | 17.60 | 3.30      | 20.90     | -222 45   |
| Apr                                        | 54.80        | 15.21                                 | 0.00       | 70.01  | 7.15               | 10.11             | 00:0                                 | 0.02     | 87.36      | 99.82                                 | 187.18      | 00.00  | 2 56       | 5.72                             | 8,09               | 16.37 | 2.45      | 18.82     | .168.36   |
| May                                        | 51.57        | 14 31                                 | 0.00       | 65.88  | 7.39               | 10,45             | 00.0                                 | 800      | 83.86      | 327.58                                | 41.14       | 00.0   | 2.41       | 5.91                             | 8.36               | 16.68 | ₹0.8<br>8 | 24.72     | -386.71   |
| Total                                      | 534.22       | 148.27                                | 0.00       | 682.49 | 87.0               | 123.0             | 00.0                                 | 3.12     | 896.1      | 12712.00                              | 13608.1     | 00.0   | 25.0       | 69.60                            | 98.40              | 193.0 | 312.00    | 505.00    | .13103.1  |
| Note: Column no.10 = Column no.(5+6+7+8+9) | >.10 = Colum | us no.(5+6+                           | 7+8+9).    | Colum  | m No. 12 =         | - Column n        | Column No. 12 = Column pp. (10 + 11) |          | umn no. 19 | Column no. 19 = Column no. (13+17+18) | (13+17+18)  | Column | no.20 = Co | Column no.20 = Column no.(19-12) | 12).               |       |           |           |           |

Table 4.10.8(b): Chinnar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

| [CM       | 111                | Monthly                | Walcr                                 | oglance                   | (21)  | 447.75 | -150.43 | 10.66.01 | 3187.45 | 4309.64 | .2925.30 | -637.78 | -210.32 | -177,42 | -199.32. | 150.67 | 370.12 | 129317   |                                               |
|-----------|--------------------|------------------------|---------------------------------------|---------------------------|-------|--------|---------|----------|---------|---------|----------|---------|---------|---------|----------|--------|--------|----------|-----------------------------------------------|
| Unit: MCM |                    | Gross                  | water                                 | available D               | (02)  | 41.25  | 27.80   | 25.85    | 114.06  | 139.60  | . (6.901 | 52.99   | 31.93   | 40.27   | 10.74    | 39.41  | 44.31  | 711.4    | !                                             |
| <b>1</b>  |                    | Ground G               | water                                 | yrelds ava                | ) (61 | 12.97  | 6.90    | 4.72     | 16.60   | 13.59   | 16.09    | 18.95   | 9.35    | 19.39   | 23.67    | 18.22  | 17.14  | 177.6    |                                               |
|           |                    | Surface   Gr           | water                                 |                           | (8)   | 10.23  | 3.21    | 3.75     | 78.95   | 07.38   | 72.39    | 14.65   | 1.55    | 3.05    | 330      | 2.45   | 1-0.8  | 312.0    |                                               |
|           | Į.                 | Su                     | _                                     | l ota                     | (17)  | 18.00  | 17.69   | 17.38    | 18.51   | 18.63   | 18,44    | 19.38   | 18.03   | 17.83   | 20.05    | 18.74  | 19.13  | 221.8    |                                               |
|           | Water Availability | uses                   | L                                     |                           |       | 8.09   | 8.36    | 8.36     | 8.09    | 8.36    | 8.09     | 8.36    | 8.36    | 7.55    | 8.36     | 8.09   | 8.36   | 98.40    | 12.                                           |
|           | Water              | Regeneration from uses | - Indus                               |                           | (16)  | 8.09   | 8.36    | 8.36     | 8.09    | 8.36    | 8.09     | 8.36    | 8.36    | 7.55    | 8.36     | 8.09   | 8.36   | 98.40    | Column no. 21 = Column no. (20-12)            |
|           |                    | Regene                 | Dome                                  |                           | (51)  |        |         |          |         |         |          |         |         |         |          |        | L      |          | 21 = Colu                                     |
|           |                    |                        | Irriga-                               | tion                      | (14)  | 1.83   | 0.97    | 99:0     | 2.34    | 161     | 2.27     | 2.67    | 1.32    | 2.73    | 3.33     | 2.56   | 2.41   | 25.00    | ol umn no.                                    |
|           |                    |                        | Import                                |                           | (13)  | 00.0   | 00'0    | 00'0     | 00.0    | 000     | 00:00    | 0.00    | 000     | 000     | 000      | 0.00   | 00:0   | 0.00     |                                               |
| i         |                    | Gross                  | total                                 | ulilisation               | (12)  | 489.00 | 178.23  | 191.86   | 3301.52 | 4149.24 | 3032.22  | 690.77  | 242.26  | 217.69  | 246.33   | 190.08 | 414,43 | 13643.61 | Column no.20 = Column no.(13+17+18+19)        |
|           |                    |                        | Export                                | Ť                         | (11)  | 418.84 | 130.79  | 152.79   | 3216.71 | 4375.05 | 2949.43  | \$96.89 | 185 38  | 124.27  | 134.45   | 59.82  | 327.58 | 12712 00 | Column no.                                    |
|           |                    |                        | i                                     | Lotal                     | (01)  | 70.15  | 47.45   | 39.07    | 84.81   | 74.19   | 82.79    | 93.88   | 56.87   | 93.42   | 111.83   | 90.25  | 86.85  | 931.61   | mn no.20 =                                    |
| ,         |                    |                        | Environ-                              | mental                    | (6)   | 0.10   | 0.03    | 0.04     | 0.79    | 1.07    | 0.72     | 0.15    | 0.05    | 0.03    | 0.03     | 0.02   | 0.08   | 3.12     | Colu                                          |
|           | ation              |                        | Hydro                                 | power                     | (61)  | 00.00  | 00.0    | 0.00     | 00.00   | 00.00   | 00.00    | 0.00    | 00.0    | 00.00   | 0.00     | 00.0   | 000    | 0.00     | 0. (10 + 11)                                  |
|           | Water Utilisation  | ents                   | Inchus.                               | trial                     | (C)   | 10.11  | 10.45   | 10.45    | 10.11   | 10.45   | 10.11    | 10.45   | 10,45   | 9.44    | 10.45    | 10.11  | 10.45  | 123.0    | Column n                                      |
| П         | 5                  | Water requirements     | Dome-                                 | stic                      | (9)   | 10.11  | 10.45   | 10.45    | 10.11   | 10.45   | 10.11    | 10.45   | 10,45   | 9.4     | 10.45    | 10.11  | 10.45  | 123.0    | Column No. 12 = Column no. (10 + 11           |
|           |                    | Wal                    | ojects                                | Total                     | (5)   | 49.83  | 26.52   | 18.14    | 63.80   | 52,23   | 61.85    | 72.84   | 35.93   | 74.52   | 90.95    | 70.01  | 65.88  | 682.49   | Colun                                         |
|           |                    |                        | Utilisation under irrigation projects | ngoing .                  | (4)   | 80.0   | 000     | 0.0      | 00:0    | 0.00    | 0.00     | 0.00    | 000     | 0.00    | 000      | 0.00   | 0.00   | 0.00     | +7+8+9).                                      |
|           | İ                  |                        | on under in                           | Existing C                | (3)   | 10.83  | 5.76    | 3.94     | 13.86   | 11.35   | 77       | 15.82   | 7.81    | 16.19   | 19.76    | 15.21  | 14.31  | 148,27   | n no.(5+6                                     |
|           |                    |                        | Utilisatio                            | Proposed Existing Ongoing | (2)   | 39.00  | 20.76   | 14.20    | 49.94   | 40.88   | 48.41    | 57.01   | 28.13   | 58.33   | 71.19    | £      | 51.57  | 534.22   | 10 = Colun                                    |
|           |                    | Month                  |                                       |                           | Ξ     | ur(    | 12      | Aug      | Ş       | ್ಷ      | Ng       | 3       | Lan     | Fcb     | Mar      | Эрг    | Max    | Total    | Note: Column no. 10 = Column no. (5+6+7+8+9). |

Table 4.10.8(c): Chinnar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

3604.8 -186.19 -5307. Monthly water balance 19.55 148.34 available Gross water 132,16 18.03 Surface water yi**elds** 3 16.18 16.07 16.94 15.58 15.62 17.60 14.93 Total

Unit: MCM

Water Availability

Regeneration from uses

Indus-trial

Domestic

Imiga-tion (14)

Import (33)

Ехроп

Total

Environmental 9

Hydro-<u>∞</u>

Industrial

Utilisation under imigation projects

Month

Existing Ongoing

Proposed

ε

Water requirements Dome St.C 9

Water Utilisation

utilisation Gross total

(33)

.224.29 .252,72 .190.83

19.37 19.39

> 4.06 384 00

> > 16.37

5.91

888

3709.95 825.49 282.00 243.66

734.61

0.15

10.45 10.45

61.85 72.84 35.93 74.52

8 8 8

49.94 48.41 57.01 28.13 58.33 71.19

8 5

S S S S

152.95 228.16

> 0.03 0.03

> > 10.45

90.95 70.01 65.88

88 8

> 80.80 51.57

Apr Apr

10.11 10.45

53.84 90.72 108.9

3630.07

8000

40-10-90 5455.83

224.07

205.38

160.97 3959.02 5384.67

0.03

0.00

10.11

49.83

0.00

63.80 52.23

888

14.20

0.00

260.82

Column no.19 = Column no.(13+17+18)

Column No. 12 = Column no. (10 + 11)

Note: Column no. 10 = Column no. (5+6+7+8+9).

15645.5

Column no.20 = Column no.(19-12).

000

487.03

403.17

Table 4.10.8(d): Chinnar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

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|                                              |                           |                                       |            |        |                    |                   |                                      |          |            |             |                                        |        |                                   |                        |                    |        |          |        |           | MCM                |
|----------------------------------------------|---------------------------|---------------------------------------|------------|--------|--------------------|-------------------|--------------------------------------|----------|------------|-------------|----------------------------------------|--------|-----------------------------------|------------------------|--------------------|--------|----------|--------|-----------|--------------------|
|                                              |                           |                                       |            |        |                    | Water Utilisation | sation                               |          |            |             |                                        |        |                                   |                        | Water Availability | bility |          |        |           |                    |
| 4,000,4                                      |                           |                                       |            | Wai    | Water requirements | nents             |                                      |          |            |             | Gross                                  |        | IK.                               | Regeneration from uses | from uses          |        | Surface  | Ground | Gross     | Monthly            |
| Limbia                                       | Utilisator                | Utilisation under irrigation projects | gation pro | jects  | Dome-              | -supul            | Hydro-                               | Environ- | Total      | Export      | total                                  | Import | Lriga-                            | Domc-                  | -sapur             | 1      | water    | water  | w'alcr    | Water              |
|                                              | Proposed Existing Ongoing | xusting On                            | going      | Total  | stic               | trial             | power                                | mental   | TOPA       |             | utilisation                            |        | tion                              | Stic                   | Fial               |        | yields   | yields | available | osimuce<br>osimuce |
| (i)                                          | (2)                       | (3)                                   | (4)        | (S)    | (9)                | (D)               | (61)                                 | (6)      | (01)       | (11)        | (12)                                   | (13)   | (14)                              | (15)                   | (16)               | (1.7)  | (81)     | (£)    | (20)      | (21)               |
| Ոսո                                          | 39.00                     | 10.83                                 | 0.00       | 49.83  | 10.11              | 10.11             | 0.00                                 | 0.10     | 67.24      | 515.50      | 582,74                                 | 0.00   |                                   | 5.72                   | 8.09               | 15.63  | 12.65    | 12.97  | 41.25     | -541.49            |
| Jul                                          | 20.76                     | 5.76                                  | 0.00       | 26.52  | 10.45              | 10.45             | 0.00                                 | 0.03     | 44.41      | 160.97      | 205.38                                 | 0.00   | 0.97                              | 5.91                   | 8.36               | 15.24  | 3,95     | 6.90   | 26.09     | -179.29            |
| Aug                                          | 14.20                     | 3.94                                  | 0.00       | 18.14  | 10.45              | 10.45             | 0.00                                 | 0.04     | 36.02      | 188.05      | 224.07                                 | 0.00   | 0.66                              | 163                    | 8.36               | 14.93  | 462      | 4.72   | 24.27     | .199.80            |
| Sep                                          | 49.94                     | 13.86                                 | 0.00       | 63.80  | 10.11              | 10.11             | 0.00                                 | 0.79     | 81.88      | 3959.02     | 4040,90                                | 00.0   | 2.34                              | 5.72                   | 8.09               | 16.14  | 11 16    | 16.60  | 129.92    | 3910.99            |
| Oct                                          | 40.88                     | 11.35                                 | 0.00       | 52.23  | 10.45              | 10.45             | 0.00                                 | 1.07     | 71.16      | 5384.67     | 5455.83                                | 0.00   | 16.1                              | 16.5                   | 8.36               | 16.18  | 132.16   | 13.59  | 161.93    | .5293.90           |
| Nov                                          | 48.41                     | 13.44                                 | 000        | 61.85  | 10.11              | 10,11             | 00.00                                | 0.72     | 79.86      | 3630.07     | 3709.93                                | 0.00   | 2 2 7                             | 5.72                   | 8.09               | 16.07  | 01 68    | 16.09  | 121.26    | -3588.67           |
| ညိ                                           | 10.72                     | 15.82                                 | 8          | 72.84  | 10.45              | 10.45             | 00:00                                | 0.15     | 90.85      | 734.64      | 825.49                                 | 00:0   | 2.67                              | 16'5                   | 8.36               | 16.94  | 18.03    | 18.95  | 53.92     | 72.157             |
| Jan                                          | 28.13                     | 7.81                                  | 0.00       | 35.93  | 10.45              | 10.45             | 0.00                                 | 0.03     | 53.84      | 228.16      | 282.00                                 | 00.0   | 1.32                              | 16.2                   | 8.36               | 15.58  | 260      | 9.35   | 30.54     | -251.46            |
| Fcb                                          | 58.33                     | 16.19                                 | 0.00       | 74.52  | 116                | 4.6               | 0.00                                 | 0.03     | 90.72      | 152.95      | 243.66                                 | 00.0   | 2.73                              | 5.34                   | 7.55               | 15.62  | 3.75     | 19.39  | 38.76     | 201.90             |
| Mar                                          | 71,19                     | 19.76                                 | 000        | 90.95  | 10.45              | 10.45             | 00.00                                | 0.03     | 108.9      | 165.48      | 274.38                                 | 0.00   | 3.33                              | 16.2                   | 8,36               | 17.60  | 4.06     | 23.67  | 45.33     | -229.05            |
| Apr                                          | \$4.80                    | 15.21                                 | 8          | 70.01  | 10.11              | 10.11             | 0.00                                 | 0.02     | 87.36      | 122.86      | 210.22                                 | 00:0   | 2.56                              | 5.72                   | 8.09               | 16.37  | 3.02     | 18.22  | 37.61     | -172.61            |
| May                                          | 51.57                     | 133                                   | 8          | 65.88  | 10.45              | 10.45             | 000                                  | 0.08     | 83.86      | 403.17      | 487.03                                 | 0.00   | 2.41                              | 16.5                   | 8.36               | 16.68  | 06.6     | 17.14  | 43.72     | 113.31             |
| Total                                        | 534.22                    | 148.27                                | 000        | 682.49 | 123.0              | 123.0             | 0.00                                 | 3.12     | 931.6      | 15645.5     | 16577.2                                | 0.00   | 25.00                             | 69.60                  | 98.40              | 193.0  | 384.00   | 177.6  | 754.6     | .15822.6           |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colum             | n no.(5+6+                            | 7+8+9).    | Colun  | nn No. 12          | = Column r        | Column No. 12 = Column no. (10 + 11) |          | тпп по. 20 | ≃ Column no | Column no 20 = Column no (13+17+18+19) |        | Column no. 21 = Column no.(20-12) | = Column n             | 5(20-12).          |        | <b>.</b> |        |           |                    |

Table 4.10.8(e): Chinnar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                    | Monthly                | Male:                               |                           | (20) | .355 25  | -124.16   | .131.97 | -2399.08 | -3228.50 | -2203.19 | -506.72  | -172 58 | -165.32  | .188.67  | .143.32 | -304.84  | -13183.1  |                                              |
|--------------------|------------------------|-------------------------------------|---------------------------|------|----------|-----------|---------|----------|----------|----------|----------|---------|----------|----------|---------|----------|-----------|----------------------------------------------|
|                    | Gross                  | water                               | avaitable                 | (19) | 23 27    | 17.63     | 17.72   | 74.85    | 96.03    | 06.69    | 27.83    | 96.81   | 17.89    | 20.05    | 18.19   | 22.66    | 425.00    |                                              |
|                    | Surface                |                                     | yields 8                  | (18) | 7.64     | 2.39      | 2.79    | 12.85    | 79.85    | 53.83    | 68.01    | 3.38    | 2.27     | 2.45     | 1.82    | 86.8     | 232.00    |                                              |
| Į.                 |                        | -                                   |                           | (11) | 15.63    | 15,24     | 14,93   | 16.14    | 16.18    | 16.07    | 16.94    | 15.58   | 15 62    | 17.60    | 16.37   | 16.68    | 193.0     |                                              |
| Water Availability | from uses              | Indus•                              | trial                     | (91) | 8.09     | 8.36      | 8.36    | 8:09     | 8.36     | 60.8     | 8.36     | 8.36    | 7.55     | 8.36     | 8.09    | 8.36     | 98.40     | 12).                                         |
| Wa                 | Regeneration from uses | Dome-                               | stic                      | (51) | 5 72     | 16'5      | 16.5    | 5.72     | 16'5     | 5.72     | 116'S    | 16'5    | 5.34     | 16.8     | 5.72    | 5.91     | 09.69     | Column no.20 = Column no.(19-12)             |
|                    | 22                     | Irriga-                             | tion                      | (14) | 1.83     | 0.97      | 99.0    | 2.34     | 16:      | 2.27     | 2.67     | 1.32    | 2.73     | 3.33     | 2.56    | .2.41    | 25.0      | no.20 = Col                                  |
|                    |                        | Import                              |                           | (3)  | 0.00     | 00.0      | 00.0    | 00.00    | 00.0     | 00.0     | 0.00     | 000     | 00.0     | 0.00     | 0.00    | 00'0     | 00:0      | Column                                       |
|                    | Gross                  | letot                               | utilisation               | (12) | 378.52   | 141.70    | 149.70  | 2473.94  | 3324.53  | 2273.09  | 534.55   | 191.55  | 183.21   | 208.7    | 161.51  | 327.50   | 13608.1   | 13+17+18)                                    |
|                    |                        | Export                              | 3                         | (E)  | 311.28   | 97.38     | 113.67  | 2392.06  | 3253.38  | 2193.23  | 443,70   | 137.71  | 92.49    | 99.82    | 74.15   | 243.65   | 12712.00  | Column no.19 = Column no.(13+17+18)          |
|                    |                        | ŀ                                   | 1019                      | (10) | 67.24    | 44.41     | 36.02   | 81 88    | 71.16    | 79.86    | 90.85    | 53,84   | 20.72    | 6'801    | 87.36   | 83.86    | 1.968     | nn no.19 = (                                 |
|                    |                        | Environ-                            | mental                    | (6)  | 0.10     | 0.03      | 30      | 6.79     | 1.07     | 0.72     | 0.15     | 0.05    | 0.03     | 0.03     | 0.02    | 80.0     | 3.12      |                                              |
| sation             |                        | Hydro-                              | power                     | (8)  | 0.00     | 00:0      | 0.00    | 000      | 00:0     | 0.00     | 00.0     | 0.00    | 00.0     | 00.0     | 00:00   | 0.00     | 00.00     | Column No 12 = Column no. (10+11)            |
| Water Utilisation  | ments                  | Indus                               | trial                     | (2)  | 10.11    | 10.45     | 10.45   | 10.11    | 10.45    | 10.11    | 10.45    | 10.45   | 6.44     | 10.45    | 10 11   | 10.45    | 123.0     | = Column n                                   |
|                    | Water requirements     | Dome-                               | stic                      | (9)  | 7.15     | 7.39      | 7.39    | 7.15     | 7.39     | 7.15     | 7 39     | 7.39    | 1979     | 7.39     | 7.15    | 7.39     | 87.0      | или No 12                                    |
|                    | 3                      | projects                            | Total                     | (5)  | 0 49.83  | 26.52     | 0 18.14 | 08.80    | 52.23    | 61.85    | 0 72.84  | 35.93   | 0 74.52  | 0 90.95  | 10.07   | 0 65.88  | 0 682 49  |                                              |
|                    |                        | rimgation                           | 2 Ongoing                 | (4)  | 3 0.00   | 00'0      | 0.00    | 00.0     | 00:0     | 4 0.00   | 2 0.00   | 0.00    | 0.00     | 6 0.00   | 0.00    | 0.00     | 0.00      | 6+8+2+9+                                     |
|                    |                        | Utilisation under impation projects | Proposed Existing Ongoing | (3)  | 00 10.83 | 37.5 3.76 | 3.94    | 13.86    | 88 11.35 | 41 13.44 | 01 15.82 | 13 7.81 | 33 16.19 | 19 19.76 | 15.21   | 57 [4,3] | 22 148.27 | lumn no.(5                                   |
|                    |                        | Utilis                              | Propose                   | (2)  | 39.00    | 20.76     | 14,20   | 49.94    | 40.88    | 48 41    | 57.01    | 28.13   | 58.33    | 71.19    | 54.80   | 51.57    | 534.22    | o. 10 = Co                                   |
|                    | Adouth                 | SI III OFAT                         |                           | (1)  | Jun      | Jul       | Aug     | Sep      | Ş        | Nov      | <u>≫</u> | Jan     | Feb      | Mar      | Apr     | May      | Total     | Note: Column no. 10 = Column no. (5+6+7+8+9) |

Table 4.10.8(f): Chinnar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                            |               |            |                                       |        |                    | Water Utilisation                   | sation       |          |              |             |                                          |        |            | =                                 | Water Availability | ility |         |        |           |          |
|--------------------------------------------|---------------|------------|---------------------------------------|--------|--------------------|-------------------------------------|--------------|----------|--------------|-------------|------------------------------------------|--------|------------|-----------------------------------|--------------------|-------|---------|--------|-----------|----------|
| Manth                                      |               |            |                                       | Wal    | Water requirements | ments                               | ľ            |          |              |             | Gross                                    |        | 2          | Regeneration from uses            | from uses          | 8     | Surface | Ground | Gross     | Monthly  |
| Month                                      | Utilisati     | on under n | Utilisation under irrigation projects | sjects | Dome-              | Indus-                              | Hydro        | Environ- | E            | Export      | total                                    | Import | Impa-      | Dome-                             | Indus-             | Γ     | water   | water  | water     | Water    |
|                                            | Proposed      | Existing   | Ongoing                               | Total  | stic               | trial                               | power        | mental   | leno i       |             | utilisation                              |        | tion       | stic                              | Inial              |       | yields  | yields | available | 30000    |
| (1)                                        | (2)           | (3)        | (4)                                   | (5)    | (9)                | 8                                   | (61)         | 6)       | (01)         | (11)        | (12)                                     | (13)   | (1-1-)     | (15)                              | (91)               | (11)  | (81)    | (6)    | (30)      | (21)     |
| unj                                        | 39.00         | 10.83      | 00.0                                  | 49.83  | 10.11              | 10,11                               | 000          | 010      | 70.15        | 311.28      | 381.43                                   | 00.0   | 1.83       | 8.09                              | 8.09               | 18.00 | 7.6     | 12.97  | 38.61     | -342.83  |
| Jul                                        | 20.76         | 5.76       | 00.00                                 | 26.52  | 10.45              | 10.45                               | 00.0         | 0.03     | 47.45        | 97.38       | 144.82                                   | 00'0   | 0.97       | 8.36                              | 8.36               | 17.69 | 2.39    | 89     | 26.98     | -117.85  |
| Aug                                        | 14.20         | 3.94       | 00.0                                  | 18.14  | 10.45              | 10.45                               | 000          | 0.04     | 39,07        | 113.67      | 152,74                                   | 00.00  | 99.0       | 8.36                              | 8.36               | 17.38 | 2.79    | 4.72   | 24.89     | -127.85  |
| Sep                                        | 49.94         | 13.86      | 00:0                                  | 63.80  | 10.11              | 10.11                               | 00.0         | 0.79     |              | 2392.06     | 2476.87                                  | 00'0   | 2.34       | 8.09                              | 8.09               | 18.51 | 58 71   | 16.60  | 93.82     | -2383.04 |
| Oct                                        | 40.88         | 11.35      | 0.00                                  | 52.23  | 10.45              | 10.45                               | 00.0         | 1.07     | 74.19        | 3253.38     | 3327.57                                  | 00.0   | 16.1       | 8.36                              | 8.36               | 18.63 | 79.85   | 13.59  | 112.07    | -3215.50 |
| Nov                                        | 48.41         | 13.44      | 0.00                                  | 61.85  | 10.11              | 10.11                               | 0.00         | 0.72     | 82.79        | 2193.23     | 2276.02                                  | 00.0   | 2.27       | 8.09                              | 8.09               | 18.44 | 53.83   | 16.09  | \$8.37    | -2187.66 |
| Dee                                        | 57.01         | 15.82      | 0.00                                  | 72.84  | 10.45              | 10.45                               | 0.00         |          | 93.88        | 443.70      | 537.57                                   | 00.0   | 2.67       | 8.36                              | 8.36               | 19.38 | 10.89   | 18.95  | 49.23     | 488.35   |
| Jan                                        | 28.13         | 7.81       | 000                                   | 35.93  | 10.45              | 10.45                               | 00.00        | 0.05     | 56.87        | 137.71      | 194.59                                   | 00.0   | 1.32       | 8.36                              | 8.36               | 18.03 | 3.38    | 9.35   | 30.76     | -163.82  |
| Fcb                                        | 58.33         | 16.19      | 00.00                                 | 74.52  | 941                | 4.0                                 | 000          | 0.03     | 93.42        | 92,49       | 185.91                                   | 0.0    | 2.73       | 7.55                              | 7.55               | 17.83 | 2.27    | 19.39  | 39.49     | -146.42  |
| Mar                                        | 91.19         | 19.76      | 0.00                                  | 90.95  | 10.45              | 10.45                               | 0.00         | 0.03     | 111.9        | 99.83       | 211.70                                   | 0.00   | 3.33       | \$.36                             | 8.36               | 20.02 | 2.45    | 13.67  | 46.16     | -165,54  |
| Apr                                        | 2.80          | 15.21      | 0.00                                  | 70.01  | 10.11              | 10.11                               | 00.0         | 0.03     | 90.25        | 74,15       | 164.41                                   | 000    | 2.56       | 8.09                              | 8.09               | 18.74 | 1.82    | 18.22  | 38.78     | -125.63  |
| May                                        | 51.57         | 1431       | 0.00                                  | 65.88  | 10.45              | 10.45                               | 0.00         | 80.0     | 86.85        | 243.65      | 330.50                                   | 0.00   | 2.41       | 8.36                              | 8.36               | 19.13 | \$6.5   | 17.14  | 42.25     | .288.25  |
| Total                                      | 534.22        | 148.27     | 0.00                                  | 682.49 | 123.0              | 123.0                               | 000          | 3.12     | 931.6        | 127121      | 13643.6                                  | 00.0   | 25.00      | 04.86                             | 98.40              | 221.8 | 232.00  | 177.6  | 631.4     | -13012.2 |
| Note: Column no.10 = Column no.(5+6+7+8+9) | 10.10 = Colur | nn no.(5+¢ | (6+8+4+)                              | Colur  | nn No 12           | Column No. 12 = Column no. (10 + 11 | 10. (10 + 11 |          | umn no. 20 4 | - Column no | Column no. 20 = Column no. (13+17+18+19) |        | amn no. 21 | Column no. 21 = Column no.(20-12) | (20-12).           |       |         |        |           |          |

Table 4.10.8(g): Chinnar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                                               |               |                                       |            |        |                    |                   |                                      |          |            |           |                                        |        |                                    |                        |                    | :     |          | Cuit       | Unit: MCM |
|-----------------------------------------------|---------------|---------------------------------------|------------|--------|--------------------|-------------------|--------------------------------------|----------|------------|-----------|----------------------------------------|--------|------------------------------------|------------------------|--------------------|-------|----------|------------|-----------|
|                                               |               |                                       |            |        |                    | Water Utilisation | ation                                |          |            |           |                                        |        |                                    | 15                     | Water Availability | ility |          | }<br> <br> | \[ \ :    |
| 41.00                                         |               |                                       |            | Wate   | Water requirements | nents             |                                      |          |            |           | Gross                                  |        |                                    | Regeneration from uses | from uses          |       | Surface  | Gott       | Monthly   |
| นากอเก                                        | Utilisation   | Utilisation under irrigation projects | gation pro |        | Dome-              | Indus-            | Hydro-                               | Environ- | 1,44.1     | Export    | total                                  | Import | Linga-                             | Dome-                  | Indus-             | -     | water    | Water      | water     |
|                                               | Proposed F    | Existing Ongoing                      |            | Total  | stic               | trial             | power                                | mental   | 10(3)      |           | utilisation                            |        | tion                               | stic                   | trial              | 10 3  | yields   | available  | Dalance   |
| (1)                                           | 3             | (3)                                   | ŧ          | (5)    | 9                  | (J)               | <u>(8</u>                            | 8        | (10)       | <u>(1</u> | (12)                                   | (13)   | (14)                               | (3)                    | (91)               | (1)   | (18)     | (6)        | (20)      |
| Jun                                           | 39.00         | 10.83                                 | 0.00       | 49.83  | 7.15               | 10.11             | 0.00                                 | 0.10     | 67.24      | 119.38    | 186.62                                 | 0.00   | 1.83                               | 5.72                   | 8.09               | 15.63 | 2.93     | 18.56      | .163.06   |
| Jul                                           | 20.76         | 5.76                                  | 000        | 26.52  | 7.39               | 10.45             | 000                                  | 0.031    | 44.41      | 37.48     | 81.90                                  | 0.00   | 0.97                               | 5.91                   | 8.36               | 15.24 | 0.92     | 16.16      | -65.74    |
| Aug                                           | 14.20         | 3.94                                  | 000        | 18.14  | 7.39               | 10.45             | 00.0                                 | 0.0      | 36.02      | 43.60     | 79.62                                  | 00.0   | 99.0                               | 5.91                   | 8.36               | 14.93 | 1.07     | 16.00      | -63.62    |
| Sep                                           | 49.94         | 13.86                                 | 0.0<br>0.0 | 63.80  | 7.15               | 10,11             | 0.00                                 | 0.79     | 81.88      | 917.55    | 999.43                                 | 000    | 2.34                               | 5.72                   | 8.09               | 16.14 | 22.52    | 38.66      | -960.76   |
| Oct                                           | 40.88         | 11.35                                 | 0.00       | 52.23  | 7.39               | 10.45             | 0.00                                 | 1.07     | 71.16      | 1248.0    | 1319.1                                 | 00:0   | 1.91                               | 163                    | 8.36               | 16.18 | 30.63    | 18.97      | -1272.3   |
| Nov                                           | 48.41         | 13.44                                 | 000        | 61.85  | 7,15               | 10.11             | 00.0                                 | 0.72     | 79.86      | 841.36    | 921.22                                 | 0.00   | 2.27                               | 5.72                   | 8.09               | 16.07 | 20.65    | 36.72      | -884.49   |
| Dec                                           | 57.01         | 15.82                                 | 900        | 72.84  | 7.39               | 10.45             | 0.00                                 | 0.15     | 90.85      | 170.31    | 261.16                                 | 00.0   | 2.67                               | 163                    | 8.36               | 16.91 | 7.18     | 21.12      | -240.05   |
| Jun                                           | 28.13         | 7.83                                  | 000        | 35.93  | 7.39               | 10.45             | 0.00                                 | 0.05     | 53.84      | 52.97     | 106.80                                 | 0.00   | 1.32                               | 16.5                   | 8.36               | 15.58 | 1.30     | 16.88      | 89.92     |
| Feb                                           | 58.33         | 16.19                                 | 90°        | 74.52  | 6.67               | 9.44              | 0.00                                 | 0.03     | 20,72      | 35.45     | 126.16                                 | 0.00   | 2,73                               | 5.34                   | 7.55               | 15.62 | 0.87     | 16.49      | -109.68   |
| Mar                                           | 71.19         | 19.76                                 | 000        | 90.95  | 7.39               | 10.45             | 9.0<br>8.0                           | 0.03     | 6.801      | 38.30     | 147.2                                  | 0.00   | 3.33                               | 5.91                   | 8.36               | 17.60 | r6'0     | 18.54      | -128.66   |
| Apr                                           | 24.80         | 15.21                                 | 000        | 70.01  | 7.15               | 10.11             | 0.00                                 | 0.02     | 87.36      | 28.52     | 115.88                                 | 0.00   | 2.56                               | 5,72                   | 8.09               | 16.37 | 0.70     | 17.07      | -98.81    |
| May                                           | 51.57         | 14.31                                 | 000        | 65.88  | 7.39               | 10,45             | 000                                  | 0.08     | 83.86      | 93.30     | 177.16                                 | 0.00   | 2.41                               | 163                    | 8.36               | 16.68 | 2.29     | 18.97      | -158.19   |
| Total                                         | 534.22        | 148.27                                | 0.00       | 682.49 | 87.0               | 123.0             | 0000                                 | 3.12     | 1.968      | 12712     | 13608.1                                | 000    | 25.0                               | 09.69                  | 04.86              | 193.0 | 89.00    | 282.0      | .13326    |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 1, 10 = Colum | n no.(5+6+                            | 7+8+9).    | Colum  | in No. 12 a        | Column n          | Column No. 12 = Column no. (10 + 11) |          | mn no.19 = | Column no | Johnna no. 19 = Column no. (13+17+18). | Column | Column no, 20 = Column no. (19-12) | Jumn no.(15            | -12).              |       | <b>!</b> |            |           |

Table 4.10.8(h): Chinnar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                               |                |                                       |             |        | 13                 | Water Utilisation | noite                                |          |             |                                          |            |        |           |                                    | Water Availability | bility |          |          |           |          |
|-----------------------------------------------|----------------|---------------------------------------|-------------|--------|--------------------|-------------------|--------------------------------------|----------|-------------|------------------------------------------|------------|--------|-----------|------------------------------------|--------------------|--------|----------|----------|-----------|----------|
| 1,62201                                       |                |                                       |             | Wat    | Water requirements | rents             |                                      |          |             |                                          | Gross      |        |           | Regeneration from uses             | from uses          |        | Surface  | Ground   | Gross     | Monthly  |
| תומסזע —                                      | Utilisatio     | Utilisation under irrigation projects | igation pro | yects  | Dome-              | Indus-            | Hydro-                               | Environ- | 1           | Export                                   | total      | Import | frriga-   | Dome-                              | Indus-             |        | water    | water    | Waler     | water    |
|                                               | Proposed       | Existing Ongoing                      | SuroSu      | Total  | stic               | trial             | power                                | mental   | I Ola       |                                          | wilisation |        | tion      | stic                               | rial               | 1013   | yiclds   | yields   | available | balance  |
| (1)                                           | (3)            | (3)                                   | (F)         | (S)    | (9)                | (£)               | (61)                                 | (6)      | (01)        | (11)                                     | (13)       | (13)   | (14)      | (15)                               | (16)               | (11)   | (81)     | <u>6</u> | (30)      | (12)     |
| Jun                                           | 39.00          | 10.83                                 | 0.00        | 49.83  | 10.11              | 10.11             | 0.00                                 | 01.0     | 70.15       | 119.38                                   | 189.53     | 00:0   | 1.83      | 8.09                               | 8.09               | 18.00  | 2.93     | 13.97    | 33.80     | -155.63  |
| Jul                                           | 20.76          | 5.76                                  | 0.00        | 36.52  | 10.45              | 10.45             | 0.00                                 | 0.03     | 47.45       | 37.48                                    | 84.93      | 00.0   | 0.97      | 8.36                               | 8.36               | 17.69  | 0.92     | 89       | 25.51     | -59.42   |
| Aug                                           | 14.20          | 3.94                                  | 00'0        | 18.14  | 10.45              | 10.45             | 000                                  | 900      | 39.07       | 43.60                                    | \$2.66     | 00.0   | 99'0      | 8.36                               | 8.36               | 17.38  | 1.07     | 4.72     | 13.17     | -59.49   |
| Se<br>Se                                      | 49.94          | 13.86                                 | 0.00        | 63.80  | 10,11              | 10.11             | 00.0                                 | 0.79     | 84.81       | 917.55                                   | 1002.35    | 0.00   | 2,34      | 8.09                               | 8.09               | 18.51  | 22.52    | 16.60    | 57.63     | -941.72  |
| Oct                                           | 40.88          | 55.                                   | 000         | 52.23  | 10.45              | 10.45             | 0.00                                 | 1.07     | 74,19       | 1248.0                                   | 1322.2     | 0.00   | 161       | 8.36                               | 8.36               | 18.63  | 30.63    | 13.59    | 62.85     | -1259.3  |
| Nov                                           | 48.41          | 13.4                                  | 000         | 61.85  | 10.11              | 10.11             | 000                                  | 0.72     | 82.79       | 841,36                                   | 924.15     | 00.0   | 2.27      | 8.09                               | 8.09               | 18.11  | 20.65    | 16.09    | \$5.19    | 96.898-  |
| De<br>Se                                      | 57.01          | 15.82                                 | 800         | 72.84  | 10,45              | 10.45             | 0.00                                 | 0.15     | 93.88       | 170.31                                   | 264.18     | 00:0   | 2.67      | 8.36                               | 8.36               | 19.38  | 4.18     | 18.95    | 42.52     | .221.67  |
| Jan                                           | 28.13          | 7.81                                  | 00.0        | 35.93  | 10.45              | 10.45             | 000                                  | 0.05     | 56.87       | 52.97                                    | 109.84     | 00.00  | 1.321     | 8.36                               | 8.36               | 18.03  | <u>6</u> | 9.35     | 28.68     | -81.16   |
| 5                                             | 58.33          |                                       | 0.00        | 74.52  | 9.4                | 9.44              | 000                                  | 0.03     | 93.42       | 35,45                                    | 128.87     | 00.0   | 2.73      | 7.55                               | 7.55               | 17.83  | 0.87     | 19.39    | 38.09     | .90.78   |
| Mar                                           | 71.19          | 9.76                                  | 89          | 90.95  | 10.45              | 10.45             | 000                                  | 0.03     | 111.9       | 38.30                                    | 150.18     | 0.00   | 3.33      | 8.36                               | 8.36               | 20.05  | 16'0     | 23.67    | 44.65     | .105.52  |
| Apr                                           | 3,             | 15.21                                 | 0.0         | 70.01  | 10.11              | 10.11             | 0.00                                 | 0.02     | 90.25       | 28.52                                    | 118.77     | 0.00   | 2.56      | 8.09                               | 8.09               | 18.74  | 0.70     | 18.22    | 37.66     | \$1.12   |
| May                                           | 51.57          | 1.31                                  | - 1         | 65.88  | 10.45              | 10.45             | 000                                  | 0.08     | 86.85       | 93.30                                    | 180.15     | 0.00   | 2.41      | 8.36                               | 8.36               | 19.13  | 2.29     | 17.14    | 38.56     | -141.59  |
| Total                                         | 534.22         | 148.27                                | 0.00        | 682.49 | 133.0              | 123.0             | 0.00                                 | 3.12     | 931.6       | 12712                                    | 13643.6    | 0.00   | 25.00     | 98.40                              | 98.40              | 221.8  | 89.00    | 177.6    | 488.4     | -13155.2 |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 20. 10 = Colun | n no.(5+6+                            | .7+8+9).    | Colun  | 20 No. 12 ×        | Column            | Column No. 12 = Column no. (10 + 11) | _        | umn no.20 = | Column no $20 = Column no (13+17+18+19)$ | (13+17+18+ |        | umn no 21 | Column no $21 = Column no (20.12)$ | (012)              |        |          |          |           |          |

Table 4.10.9(a): Bhavani Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water Unit : MCM

| Monthly            | Gross                  |                                       | available        | (19) (20) | 204.85 -84.52 | 494.00    | 336.54 -61.01 | 190.65   |        |         | 199.83   | 113.37   | 93.17     | 83.68 -164.53 | 72,12  | 97.10 -22.55 | 2402.74       |  |
|--------------------|------------------------|---------------------------------------|------------------|-----------|---------------|-----------|---------------|----------|--------|---------|----------|----------|-----------|---------------|--------|--------------|---------------|--|
|                    | Surface                | water                                 | yields           | (18)      | 158.17        | 439.54    | 284.47        | 153,00   | 202.28 | 253.97  | 168.00   | 73 57    | 47.54     | 32.91         | 36.91  | 63,75        | 1917.2        |  |
| olity              |                        | - Te                                  | inus i           | (7)       | 45.19         | 52.45     | 50.24         | 36.84    | 28.49  | 27.55   | 31.52    | 40.67    | 44.08     | 49.03         | 34.58  | 32.92        | 473.6         |  |
| Water Availability | from uses              | Indus-                                | trial            | (91)      | 15.06         | 15.56     | 15.56         | 15.06    | 15.56  | 15.06   | 15.56    | 15.56    | 14.05     | 15.56         | 15.06  | 15.56        | 183.2         |  |
| W                  | Regeneration from uses | Соще                                  | stic             | (51)      | 11.77         | 12.16     | 12.16         | 11.77    | 12.16  | 11.77   | 12.16    | 12.16    | 10.99     | 12.16         | 77.13  | 12 16        | 143.2         |  |
|                    | 2                      | lrriga-                               | tion             | (14)      | 18.36         | 24.72     | 22 52         | 10.01    | 0.77   | 0.73    | 3.80     | 12.95    | 3001      | 21.31         | 7.75   | 5 20         | 147.2         |  |
|                    |                        | Import                                |                  | (13)      | 1.50          | 2.02      | 1.84          | 0.82     | 90.0   | 900     | 0.31     | 1.06     | 1.55      | 1.74          | 0.63   | 0.43         | 12.0          |  |
|                    | Gross                  | total                                 | utilisation      | (12)      | 289.37        | 502.84    | 397.55        | 211.10   | 155.87 | 182,78  | 164.391  | 193,97   | 232,36    | 248.21        | 126.82 | 119.65       | 2827.7        |  |
|                    |                        | Export                                | 1,               | (E)       | 85.47         | 237.52    | 153.72        | 82.68    | 109.31 | 137.24  | 90.78    | 38.71    | 25.69     | 17.78         | 19.95  | 34.45        | 1036.0        |  |
|                    |                        | 1010                                  | 1003             | (10)      | 203.90        | 265.33    | 243.83        | 128.42   | 46.57  | 45.54   | 73.61    | 155.25   | 206.67    | 230.43        | 106.87 | 85 20        | 1791.7        |  |
|                    |                        | Environ-                              | mental           | (6)       | 1.58          | 4.40      | 2.84          | 1.53     | 2.02   | 2.54    | 1.68     | 0.72     | 0.48      | 0.33          | 0.37   | 790          | 19.2          |  |
| sation             |                        | Hydro-                                | power            | (8)       | 2.92          | 2.92      | 2.92          | 292      | 2.92   | 2.92    | 2.92     | 2.92     | 2.92      | 2.92          | 2.92   | 26.2         | 35.0          |  |
| Water Utilisation  | ments                  | Indus-                                | trial            | 6         | 18.82         | 19.45     | 19,45         | 18.82    | 19.45  | 18.82   | 19.45    | 19.45    | 17.57     | 19.45         | 18.82  | 19.45        | 229.0         |  |
|                    | Water requirements     | Dome-                                 | \$tic            | 9         | 14.71         | 15.20     | 15.20         | 14.71    | 15.20  | 14.71   | 15.20    | 15.20    | 13.73     | 15.20         | 14.71  | 15.20        | 179.0         |  |
|                    | A                      | projects                              | Total            | (3)       | 1 165.87      | 6 223.37  | 7 203.42      | 48       | 86.9   | 2 6.55  | 34.36    | 8 116.97 | 9 171.98  | 4 192.53      | 70.05  | 5 47.00      | 9 1329.5      |  |
|                    |                        | Utilisation under irrigation projects | Existing Ongoing | <b>€</b>  | 3 15.7        | 3 21.16   | 3 19.27       | 8.57     | 0.66   | 9 0.62  | 3.25     | 11.08    | 91 16.29  | 18.24         | 5 6.64 | 3 4.45       | 5 125.9       |  |
|                    |                        | ation under                           |                  | 8         | 22 128.93     | 58 173.63 | 02 158.13     | 57 70.30 |        | 84 5.09 | 10 26.71 | 96 90 92 | 00 133.69 | 53 149.66     | \$4.45 | 36.53        | 170.09 1033.5 |  |
|                    |                        | Utilis                                | Proposed         | 3         | 21.22         | 28.58     | 26.02         | 11.57    | 3.0    | 0.84    | 4.40     | 14.96    | 22.00     | 24.63         | 8.98   | 10.9         | 170.0         |  |
|                    | 7.                     | Month                                 |                  | Ξ         | Lin's         | Jul.      | Aug           | Seo      | ĕ      | Nov     | 200      | Jan      | Est.      | Mar           | Apr    | May          | Total         |  |

Table 4.10.9(b): Bhavani Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

Table 4.10.9(c): Bhavani Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| Unit: MCM | , (e-a)            | SS Western             | _                                     | available         | 9) (20)   | 293.68 -43.69 | 268.46 -112.51 | 32.68- 10.212 | 289.65 25.06 | 415.56 159.87 | 234.61 77.21 | 197.83 34.52 | 142.73 -67.10 | 178,63       | 271.77       | 132.21     | 234.35 40.53 | 2929.6 101.9  |                                             |
|-----------|--------------------|------------------------|---------------------------------------|-------------------|-----------|---------------|----------------|---------------|--------------|---------------|--------------|--------------|---------------|--------------|--------------|------------|--------------|---------------|---------------------------------------------|
|           |                    | Surface Gross          | water                                 | _                 | (18) (19) | 247.00        | 214.00         | 223.00        | 252.00       | 387.00        | 207.00       | 166.00       | 101.00        | 133,00       | 221.00       | 97.00      | 201.00       | 2444.00       |                                             |
|           | lity               |                        | Total                                 | 1200              | (12)      | 45.19         | 52.45          | 50.24         | 36.84        | 28,49         | 27.55        | 31.52        | 10.67         | 44.08        | 49.03        | 34.58      | 32.92        | 473.6         |                                             |
|           | Water Availability | from uses              | Indus-                                | trial             | (91)      | 15.06         | 15.56          | 15.56         | 15.06        | 15.56         | 15.06        | 15.56        | 15.56         | 14.05        | 15.56        | 15.06      | 15.56        | 183.2         |                                             |
|           | W                  | Regeneration from uses | Dame-                                 | stic              | (15)      | 11.77         | 12.16          | 12.16         | 11.77        | 12.16         | 11.77        | 12.16        | 12.16         | 10.99        | 12.16        | 11.77      | 12.16        | 143.2         |                                             |
|           |                    |                        | Imiga-                                | tion              | (14)      | 18.36         | 24.72          | 22.52         | 10.01        | 0.77          | 0.73         | 3.80         | 12.95         | 19.04        | 21.31        | 1.75       | 5.20         | 147.2         |                                             |
|           |                    |                        | Import                                |                   | (13)      | 1.50          | 2.02           | 1.84          | 0.82         | 90'0          | 90.0         | 0.31         | 1.06          | 1.55         | 1.74         | 0.63       | 0.43         | 12.0          |                                             |
|           |                    | Gross                  | tota                                  | utilisation       | (12)      | 337.37        | 380.97         | 364.34        | 264.60       | 255.69        | 157.40       | 163.31       | 209.83        | 278.54       | 349.85       | 159.29     | 193.82       | 2827.7        | (19-12)                                     |
|           |                    |                        | Export                                |                   | (11)      | 133.47        | 115.64         | 120.50        | 136.17       | 209.12        | 111.86       | 89.70        | 54.58         | 71.87        | 119.42       | \$2.42     | 108.61       | 1036.0        | Column no.20 = Column no.(19-12)            |
|           |                    |                        | Total                                 | 1000              | (10)      | 203.90        | 265.33         | 243.83        | 128.42       | 46.57         | 45.54        | 73.61        | 155.25        | 206.67       | 230.43       | 106.87     | 85.20        | 1791.7        | lumn no.20                                  |
|           |                    |                        | Environ-                              | mental            | (6)       | 1.58          | 4.40           |               | 1.53         | 2.02          |              | 1.68         | 0.72          | 0.48         | 0.33         |            | 0.64         | 19.2          |                                             |
|           | ilisation          |                        | Hydro-                                | power             | (8)       | 2 2.92        |                | 5 2.92        | 2 2.92       | 5 2.92        | 2 2.92       | 5 2.92       | 5 2.92        | 7 2.92       | 3,92         | 2 2.92     | 5 2.92       | 35.0          | (13+17+18                                   |
|           | Water Utilisation  | rements                | -snpul                                | trial             | $\omega$  | 1 18.82       | 0 19.45        | 0 19.45       | 1 18.82      | 0 19.45       | 1 18.82      | 0 19.45      | 0 19.45       | 3 17.57      | 0 19.45      | 1 18.82    | 0 19.45      | 0 229.0       | Column no                                   |
|           |                    | Water requirements     | Dome-                                 | stic              | (9)       | 14.71         | 37 15.20       | 15.70         | 14.7         | 6.98 15.20    | 6.55 14.71   | 36 15.20     | 97 15.20      | 13.73        | 53 15.20     | 5 14.7     | 00 15.20     | 179.0         | Column no.19 = Column no.(13+17+18)         |
|           |                    |                        | ion projects                          | ing Total         | (S)       | 15.71 165.87  | 21.16 223.37   | 19:27 203.42  | 8.57 90.4    | 99.0          | 0.62         | 3.25 34.36   | 11.08 116.97  | 16.29 171.98 | 18.24 192.53 | 6.64 70.05 | 1,45 47,00   | 125.95 1329.5 |                                             |
| •         | <u>'</u>           |                        | Utilisation under irrigation projects | cisting Ongoing   | (3) (4)   | 128.93        | 173.63         | 158.13        | 70.30        | 5.42          | 5.09         | 26.71        | 50.92         | 133.69       | 39.64        | 54.45      | 36.53        | 1, 153.51     | no.(5+6+7+                                  |
|           |                    |                        | Utilisation                           | Proposed Existing | (2)       | 21.22         | 28.58          | 26.02         | 11.57        | 68.0          | 0.84         | 4.40         | 2.8           | 22.00        | 24.63        | 8.96       | 10.9         | 170.09        | 10 a Column                                 |
|           |                    |                        | dinoin                                |                   | Ξ         | lun           | 70             | thus<br>such  | Sea          | g             | No.          | 300          | Jan           | ę.           | Mar          | Apr        | Nay          | Total         | Note: Column no. 10 a Column na (5+6+7+8+9) |

Table 4.10.9(d): Bhavani Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                             |                           |            |                                       |        |                    | Water Philipation                    | sation        |          |              |             |                                       |        |               | 2                                  | Water Availability                     | hility |         |        |           |         |
|---------------------------------------------|---------------------------|------------|---------------------------------------|--------|--------------------|--------------------------------------|---------------|----------|--------------|-------------|---------------------------------------|--------|---------------|------------------------------------|----------------------------------------|--------|---------|--------|-----------|---------|
|                                             |                           |            |                                       |        |                    | 200                                  | aution        |          |              |             |                                       |        |               |                                    | יייייייייייייייייייייייייייייייייייייי | 1000   |         |        |           | Monthly |
| 3                                           |                           |            |                                       | Wa     | Water requirements | ments                                |               |          |              |             | Gross                                 |        |               | Regeneration from uses             | from uses                              |        | Surface | Ground | Gross     | months  |
| Mon                                         | Utilisatio                | n under in | Utilisation under irrigation projects | yects  | Dome-              | Indus.                               | Hydro-        | Environ- | Tabal        | Export      | toral                                 | Import | lmga.         | Dome-                              | Judus-                                 | Total  | waler   | water  | water     | halance |
|                                             | Proposed Existing Ongoing | xisting C  | 'ngoing                               | Total  | stic               | Ç                                    | power         | mental   | 1001         |             | utilisation                           |        | tion          | stic                               | trial                                  | 101    | yields  | _      | available |         |
| ε                                           | <u></u>                   | <u> </u>   | £                                     | (3)    | (9)                | (1)                                  | (61)          | (6)      | (10)         | (11)        | (12)                                  | (13)   | (14)          | (15)                               | (16)                                   | (I)    | (81)    | (61)   | (20)      | (17)    |
| Jun                                         | 21.22                     | 128.93     | 15.71                                 | 165.87 | 18.82              | 18.82                                | 2.92          | 1.58     | 208.01       | 133.47      | 341.48                                | 1.50   | 18.34         | 11.77                              | 15.06                                  | 45.17  | 247.00  | 23.42  | 317.08    | -24,40  |
| 3                                           | 28.58                     | 173.63     | 21.16                                 | 223.37 | 19.45              | 19.45                                | 2.92          | 4.40     | 269.58       | 115.64      | 385.22                                | 2.02   | 24.68         | 12.16                              | 15.56                                  | \$2.41 | 214.00  | 31.53  | 299.96    | -85.26  |
| Aug                                         | 36.02                     | 158.13     | 19.27                                 | 203.42 | 19.45              | 19.45                                | 2.92          | 2.84     | 248.08       | 120.50      | 368.58                                | 1.84   | 22.48         | 12,16                              | 15.56                                  | 50.20  | 223.00  | 28.72  | 303.76    | -64.83  |
| Sep                                         | 11.57                     | 20.30      | 8.57                                  | 25,42  | 18,82              | 18.82                                | 2.92          | 1.53     | 132.53       | 136.17      | 268.70                                | 0.82   | 666           | 11.77                              | 15.06                                  | 36.82  | 252.00  | 12.77  | 302,41    | 33.70   |
| ğ                                           | 0.89                      | 5.42       | 99.0                                  | 86.9   | 19.45              | 19.45                                | 2.92          | 2.02     | 50.81        | 209,12      | 259.94                                | 0.06   | 0.77          | 12.16                              | 15.56                                  | 28.49  | 387.00  | 0.98   | 416.54    | 156.60  |
| Soc                                         | 0.84                      | 5.09       | 0.62                                  | 655    | 18.82              | 18.82                                | 2.92          | 2.54     | 49.65        | 111.86      | 161.51                                | 90.0   | 0.72          | 11.77                              | 15.06                                  | 27.55  | 207.00  | 0.93   | 235.54    | 74.02   |
| ដ្ឋ                                         | 4,40                      | 26.71      | 3.25                                  | 71.36  | 19.45              | 19.45                                | 2.92          | 1.68     | 77.85        | 89.70       | 167.55                                | 0.31   | 3.76          | 12.16                              | 15.56                                  | 31.49  | 166.00  | 4.85   | 202.64    | 35.09   |
| Jan                                         | 14.96                     | 26.0%      | 11.08                                 | 116.97 | 19.45              | 19,45                                | 2.92          | 0.72     | 159.50       | 54.58       | 214.08                                | 90'1   | 13.00         | 12.16                              | 15.56                                  | 40.73  | 101.00  | 16.51  | 159.30    | -54.78  |
| Feb                                         | 22.00                     | 133.69     | 16.29                                 | 171.98 | 17.57              | 17.57                                | 2.92          | 0.48     | 210.51       | 78.17       | 282.38                                | 1.55   | 10.01         | 10,99                              | 14,05                                  | 3      | 133.00  | 24.28  | 202.88    | 05.6Z   |
| Mar                                         | 24.63                     | 99.64      | 18.24                                 | 192.53 | 19.45              | 19.45                                | 2.92          | 0.33     | 234.67       | 119.42      | 354,10                                | 1.74   | 21.28         | 12.16                              | 15.56                                  | 49.00  | 221.00  | 27.18  | 298.92    | -55.18  |
| Apr                                         | 8.96                      | \$7.45     | 6.64                                  | 70.05  | 18.82              | 18.82                                | 292           | 0.37     | 110.98       | \$2.42      | 163.40                                | 0.63   | 7.74          | 11.77                              | 15.06                                  | 34.57  | 97.00   | 68.6   | 142.09    | -21.31  |
| May                                         | 6.01                      | 36.53      | 4.45                                  | 47.00  | 19.45              | 19.45                                | 2.92          | 0.64     | 89.45        | 108.61      | 198.06                                | 0.43   | 5.21          | 12.16                              | 15.56                                  | 32.93  | 201.00  | 6.63   | 240.99    | 42.93   |
| Total                                       | 170.09                    | 1033.5     | 125.95                                | 1329.5 | 229.0              | 229.0                                | 35.0          | 19.2     | 1841.7       | 1036.0      | 2877.7                                | 12.0   | 147.0         | 143.2                              | 183.20                                 | 473.4  | 2444.00 | 187.7  | 3117.1    | 239.43  |
| Note: Column no 10 = Column no (5+6+7+8+9). | 10 = Colum                | n no.(5+6  | +7+8+9).                              | Colu   | mn No. 12          | Column No. 12 = Column no. (10 + 11) | 10. (10 + 11) |          | umn no. 19 : | = Column no | Column no. 19 = Column no. (13+17+18) |        | un no. 21 ≖ C | Column no. 21 = Column no. (20-12) | )-12)                                  |        |         |        |           |         |

Table 4.10.9(e): Bhavani Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                                               |              |                                       |             |         |                                     | Water Utilisation | sation    |          |            |           |                                     |        |               |                                  | Water Availability | Hity   |         |           | -           |
|-----------------------------------------------|--------------|---------------------------------------|-------------|---------|-------------------------------------|-------------------|-----------|----------|------------|-----------|-------------------------------------|--------|---------------|----------------------------------|--------------------|--------|---------|-----------|-------------|
| - Annah A                                     |              |                                       |             | Wa      | Water requirements                  | nents             |           |          |            |           | Gross                               |        |               | Regeneration from uses           | n from uses        |        | Surface | Gross     | Monthly     |
| THE COLOR                                     | Utilisati    | Utilisation under irrigation projects | rgation pro | )jects  | Боте.                               | Indus-            | Hydro-    | Environ- | ŀ          | Export    | total                               | Import | Imiga-        | Dome                             | Indus-             | -      | water   | water     | Walci       |
|                                               | Proposed     | Proposed Existing Ongoing             | ngoing      | Total   | stic                                | E.S               | power     | mental   | l otal     |           | utilisation                         |        | tran          | stic                             | trial              | e jo   | yrelds  | available | Delinite Co |
| Θ                                             | (2)          | 9                                     | (+)         | (5)     | (9)                                 | (3)               | (8)       | 8        | (01)       | (11)      | (21)                                | (63)   | (14)          | ((1)                             | (91)               | (13)   | (31)    | (61)      | (20)        |
| Jun                                           | 21 22        | 128.93                                | 15.71       | 165.87. | 14,71                               | 18.82             | 2.62      | 1.58     | 203.90     | 53.70     | 257.60                              | 1.50   | 18.36         | 11.77                            | 15.06              | 45.19  | 99.38   | 146.06    | -111.54     |
| <u>a</u>                                      | 28.58        | 173.63                                | 21.16       | 223.37  | 15.20                               | 19.45             | 26.2      | 4.40     | 265.33     | 36.75     | 302 08                              | 2.02   | 24.72         | 12.16                            | 15.56              | \$2.45 | 10.89   | 122,47    | 19.61       |
| Aug                                           | 26.02        | 158,13                                | 19.27       | 203.42  | 15.20                               | 19.45             | 2.92      | 2.84     | 243.83     | 117.81    | 361.64                              | 1.84   | 22.52         | 12.16                            | 15.56              | 50.24  | 218.01  | 270.08    | -91.56      |
| Sep.                                          | 11.57        | 70,30                                 | 8.57        | 2.4     | 14.71                               | 18.82             | 292       | 1.53     | 128.42     | 1679      | 196.33                              | 0.82   | 10.01         | 11.77                            | 15.06              | 36.84  | 125.67  | 163.32    | -33.01      |
| Oct                                           | 0.89         | 5.42                                  | 99.0        | 86.9    | 15.30                               | 19.45             | 2.92      | 2.02     | 46.57      | 74.01     | 120.58                              | 0.06   | 0.77          | 12.16                            | 15.56              | 28.49  | 136.97  | 165.53    | 45,24       |
| Nov                                           | 0.8          | \$.09                                 | 0.62        | 6.55    | 14.71                               | 18.82             | 2.92      | 2.54     | 45.54      | 72.78     | 118.32                              | 90.0   | 0.73          | 11.77                            | 15.06              | 27.55  | 134.68  | 162.29    | 43.97       |
| <u>Б</u>                                      | 4.40         | 26.71                                 | 3.25        | 34.36   | 15.20                               | 19.45             | 2.92      | 1.68     | 13.61      | 102.18    | 175.78                              | 0.31   | 3.80          | 12.16                            | 15.56              | 31.52  | 189.09  | 220.92    | 45.14       |
| Jan                                           | 14.96        | \$0.92                                | 11.08       | 116.97  | 15.20                               | 19.45             | 2.92      | 0.72     | 155.25     | 122.25    | 277.50                              | 1.06   | 12.95         | 12.16                            | 15.56              | 40.67  | 226.23  | 267.96    | -9.54       |
| Feb                                           | 22.00        | 133.69                                | 16 29       | 171.98  | 13.73                               | 17.57             | 2.92      | 0.48     | 206.67     | 77.37     | 284.04                              | 1.55   | 19.61         | 10.99                            | 14.05              | 44.08  | 143.18  | 18.881    | -95.23      |
| Mar                                           | 24.63        | 149.66                                | 18.24       | 192.53  | 15.20                               | 19.45             | 2.92      | 0.33     | 230.43     | 8.55      | 36.882                              | 1.74   | 21.31         | 12.16                            | 15.56              | 49.03  | 15.83   | 66.60     | -1 72.38    |
| Apr                                           | 8.96         | \$ .45                                | 6.64        | 70.05   | 14.71                               | 18.82             | 2.92      | 037      | 106.87     | 27.56     | 134.44                              | 0.63   | 7.75          | 11 77                            | 15.06              | 85.H   | 10.12   | 86.22     | 12.87       |
| May                                           | 10'9         | 36.53                                 | 4.45        | 47.00   | 15,20                               | 19.45             | 2.92      | 0.64     | 85.20      | 56.70     | 141.90                              | 0.43   | 5.20          | 12.16                            | 15.56              | 32.92  | 101.92  | 138.27    | -3.63       |
| Total                                         | 170.09       | 1033.5                                | 125.95      | 1329.5  | 179.0                               | 229.0             | 35.0      | 19,17    | 1791.7     | 1036.0    | 2827.7                              | 12.0   | 147.2         | 143.2                            | 183.2              | 473.6  | 1513.0  | 9.8661    | -829.1      |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 0.10 = Coluc | nn no.(5+6                            | +7+8+9).    | Colui   | Column No. 12 = Calumn no. (10 + 11 | ≂ Calumn n        | 0. (10+11 | Coli     | mn no.19 * | Column no | Column no.19 = Column no.(13+17+18) | ١.     | 1 TO. 20 = C. | Column no.20 = Column no.(19-12) | 2-12).             |        |         |           |             |
|                                               |              |                                       |             |         |                                     |                   |           |          |            |           |                                     |        |               |                                  |                    |        |         |           |             |

Table 4.10.9(f): Bhavani Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                             |               |                  |                                       |        |                                      | 1.10.1            |            |          |              |           |                                       |        |              |                                    |                    |                |         |        |           |           |
|---------------------------------------------|---------------|------------------|---------------------------------------|--------|--------------------------------------|-------------------|------------|----------|--------------|-----------|---------------------------------------|--------|--------------|------------------------------------|--------------------|----------------|---------|--------|-----------|-----------|
|                                             |               |                  |                                       |        |                                      | water Utilisailon | Sallon     |          |              |           |                                       |        | .            |                                    | Water Availability | AJIIO          |         |        |           | Monthly   |
| Month                                       |               |                  |                                       |        | Water requirements                   | cnts              |            |          |              |           | Gross                                 |        | 4            | Regeneration from uses             | from uses          |                | Surface | Ground | Gross     | , and the |
|                                             | Utilisati     | on under 1       | Utilisation under irrigation projects | )jects | Dome-                                | Indus             | Hydro-     | Environ- | J.           | Export    | total                                 | Import | Imga.        | Dome                               | Indus-             |                | water   | water  | water     | hallann   |
|                                             | Proposed      | Existing Ongoing | Ongoing                               | Total  | stic                                 | trial             | power      | menta    | 1063:        |           | utilisation                           |        | lion         | Stic                               | ris!               | ego<br>O       | yields  | yields | available | 2011      |
| Ξ                                           | (2)           | (3)              | (4)                                   | (5)    | (9)                                  | (7)               | (61)       | (6)      | (01)         | (11)      | (12)                                  | (13)   | (14)         | (15)                               | (91)               | (F)            | (38)    | (61)   | (07)      | (17)      |
| Зuл                                         | 21.22         | 128.93           | 15.71                                 | 165.87 | 18.82                                | 18.87             | 2.92       | 1.58     | 208.01       | 53.70     | 261.71                                | 1.50   | 18,34        | 15.06                              | 15.06              | 94.8           | 98.38   | 23.42  | 172.75    | 96 38-    |
| E                                           | 28.58         | 173.63           | 21.16                                 | 223.37 | 19.45                                | 19.45             | 2.93       | 4.40     | 269.58       | 36.75     | 306.33                                | 2.02   | 24.68        | 15.56                              | 15.56              | 55.80          | 10.89   | 31.53  | 157.36    | -148.96   |
| Aug                                         | 26.02         | 158.13           | 19.27                                 | 203,42 | 19.45                                | 19.45             | 2,92       | 2.84     | 243.08       | 117.81    | 365.89                                | 1,84   | 22.48        | 15.56                              | 15.56              | 53.60          | 218,01  | 28.72  | 302.16    | -63.72    |
| Sep                                         | 11.57         | 70.30            | 8.57                                  | 90.44  | 18.82                                | 18.82             | 2.92       | 1.53     | 132.53       | 16.79     | 200.44                                | 0.82   | 66.6         | 15.06                              | 15.06              | ફ<br>= -       | 125.67  | 12.77  | 179.36    | -21.08    |
| Ç                                           | 68.0          | 5.42             | 0.66                                  | 86.9   | 19.45                                | 19.45             | 2.92       | 2.02     | 50.81        | 74.01     | 124.83                                | 0.06   | 0.77         | 15.56                              | 15.56              | 31.89          | 136.97  | 0.98   | 16.691    | 45.08     |
| Nov                                         | 0.84          | \$.09            | 0.62                                  | 6.55   | 18.82                                | 18.82             | 2.92       | 2.54     | 19.65        | 72.78     | 122.43                                | 90.0   | 0.72         | 15.06                              | 15.06              | 30.84          | 134.68  | 0.93   | 166.50    | 44.07     |
| Dc.                                         | 4.40          | 26.71            | 3.25                                  | 34.36  | 19.45                                | 19.45             | 2.92       | 1.68     | 77.85        | 102.18    | 180.03                                | 0.31   | 3.76         | 15.56                              | 15.56              | 34.88<br>74.88 | 189.09  | 1.85   | 229.13    | 49.10     |
| Jar                                         | 14.96         | 90.92            | 11.08                                 | 116.97 | 19.45                                | 19.45             | 2.92       | 0.72     | 159.50       | 122.25    | 281.75                                | 1.06   | 13.00        | 15.56                              | 15.56              | 4.12           | 226.23  | 16.51  | 287.93    | 6.18      |
| Fcb                                         | 22.00         | 133.69           | 16.29                                 | 171.98 | 17.57                                | 17.57             | 2.92       | 0.48     | 210.51       | 77.37     | 287.88                                | 1.55   | 10.61        | 14.05                              | 14.05              | 47.11          | 143.18  | 24.28  | 216.12    | 71.75     |
| Mas                                         | 24.63         | 149.66           | 18.24                                 | 192.53 | 19.45                                | 19.45             | 2.92       | 0.33     | 234.67       | 8.55      | 243.23                                | 1.74   | 21.28        | 15.56                              | 15.56              | 52,40          | 15.83   | 27.18  | 97.14     | 146.08    |
| Арг                                         | 8.96          | 54.45            | 6.64                                  | 70.05  | 18.82                                | 18.82             | 2.93       | 0.37     | 110.98       | 27.56     | 138.55                                | 0.63   | 7.74         | 15.06                              | 15.06              | 37.86          | 51.01   | 68.6   | 98.39     | -39.16    |
| \fav                                        | 6.01          | 36.53            | 4.45                                  | 47.00  | 19.45                                | 19.45             | 2.92       | 0.64     | 89.45        | 56.70     | 146,14                                | 0.43   | 5.21         | 15.56                              | 15.56              | 36.33          | 104.92  | 6.63   | 148.31    | -         |
| Total                                       | 170.09        | 1033.5           | 125.95                                | 1329.5 | 229.0                                | 229.0             | 35.0       | 19.2     | 1841.7       | 1036.01   | 2877.7                                | 12.0   | 147.0 183.2  | 83.2                               | 183.20             | 513.4          | 1513.0  | 187.7  | 1236.1    | -651.57   |
| Note : Column no 10 = Column no (5+6+7+8+9) | 10.10 = Colun | nn no.(5+≀       | 6+7+8+6)                              | Colur  | Column No. 12 = Column no. (10 + 11) | : Column n        | 0. (10+11) |          | 19 an no. 19 | Column no | Column no. 19 = Column no. (13+17+18) | L      | 1 no. 21 = C | Column no. 21 = Column no. (20-12) | 7-12).             |                |         |        |           |           |

Table 4.10.9(g): Bhavani Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|            |                  |                                                |        |                    |                                    |            |          | -           |                                     |             |        |                                    |                        |                    |                    |         |           |           |
|------------|------------------|------------------------------------------------|--------|--------------------|------------------------------------|------------|----------|-------------|-------------------------------------|-------------|--------|------------------------------------|------------------------|--------------------|--------------------|---------|-----------|-----------|
|            |                  |                                                |        |                    | Water Utilisation                  | ation      |          |             |                                     |             |        |                                    | *                      | Water Availability | ility              |         |           |           |
|            |                  |                                                | Wa     | Water requirements | nents                              |            |          |             |                                     | Gross       |        |                                    | Regeneration from uses | from uses          |                    | Surface | Gross     | Monthly   |
| Š          | n under i        | Utilisation under irrigation projects          | yects  | Dome-              | Indus-                             | Hydro-     | Environ- | - 1         | Export                              | total       | Import | Irriga-                            | Боте-                  | Indus-             | ŀ                  | water   | water     | William   |
| Proposed E | Existing Ongoing | Ongoing                                        | Total  | stic               | trial                              | power      | mental   | LOIZI       | 1                                   | utilisation |        | tion                               | stic                   | urial              | 10131              | yields  | available | oai erice |
| Н          | (3)              | (4)                                            | (5)    | (9)                | (2)                                | (8)        | (6)      | (10)        | (11)                                | (13)        | (13)   | (14)                               | (15)                   | (16)               | (1)                | (81)    | (61)      | (20)      |
| 21.22      | 128.93           | 15.71                                          | 165.87 | 14.71              | 18.82                              | 2.92       | 1.58     | 203.90      | 42.94                               | 246.84      | 1.50   | 18,36                              | 11.77                  | 15.06              | 45.19              | 75.47   | 126.15    | 1 20.69   |
| 28.58      | 173.63           | 21.16                                          | 223.37 | 15.20              | 19.45                              | 2.92       | 4.40     | 265.33      | 73.00                               | 338.33      | 2.02   | 24.72                              | 12.16                  | 15.56              | 52.45              | 135.10  | 95.681    | -148.77   |
| 26.02      | 158.13           | 19.27                                          | 203.42 | 15.20              | 19.45                              | 2.92       | 2.84     | 243.83      | 24.00                               | 267.84      | 1,84   | 22.52                              | 12.16                  | 15.56              | 50.24              | 44.42   | 96.49     | -171.34   |
| 11.57      | 70.30            | 8.57                                           | 90.44  | 14.71              | 18.82                              | 2.92       | 1.53     | 128.42      | 43.22                               | 171.64      | 0.82   | 10.01                              | 11.77                  | 15.06              | 36.84              | 79.98   | 117.63    | -54.01    |
| 0.89       | 5.42             | 99:0                                           | 869    | 15.20              | 19.45                              | 2.92       | 2.02     | 46.57       | 85.00                               | 131.57      | 0.06   | 0.77                               | 12.16                  | 15.56              | 28.49              | 157.30  | 185.86    | 54.29     |
| 0.84       | 5.09             | 0.62                                           | 6.55   | 14.71              | 18.82                              | 2.92       | 2.54     | 45.54       | 28.26                               | 73.80       | 90.0   | 0.73                               | 11.77                  | 15.06              | 27.55              | 52.29   | 79.90     | 6.10      |
| 01.10      | 26.71            | 3.25                                           | 34.36  | 15.20              | 19.45                              | 2.92       | 1 68     | 73.61       | 142.82                              | 216.43      | 0.31   | 3.80                               | 12.16                  | 15.56              | 31.52              | 26430   | 296.13    | 17.67     |
| 14.96      | 90.92            | 11.08                                          | 116.97 | 15.20              | 19.45                              | 2,92       | 0.72     | 155.25      | 25.27                               | 180.53      | 1.06   | 12.95                              | 12.16                  | 15.56              | 40.67              | 17.77   | 88.50     | -92.03    |
| 22.00      | 133.69           | 16.29                                          | 171.98 | 13.73              | 17.57                              | 2.92       | 0.48     | 206.67      | 22.10                               | 228.77      | 1.55   | 19:04                              | 10.99                  | 14.05              | \$0. <del>11</del> | 40.90   | 86.53     | -142.24   |
| 24.63      | 1+9.66           | 18.24                                          | 192.53 | 15.20              | 19.45                              | 2.92       | 0.33     | 230.43      | 14.53                               | 244.95      | 1.74   | 21.31                              | 12.16                  | 15.56              | 49.03              | 26.88   | 77.65     | -167.30   |
| 8.96       | 54.45            | 6.64                                           | 70.05  | 14.71              | 18.82                              | 2.92       | 0.37     | 106.87      | 100.67                              | 207.54      | 0.63   | 7.75                               | 11.77                  | 15.06              | 34.58              | 186.30  | 121.51    | 13.97     |
| 601        | 36.53            | 4.45                                           | 47.00  | 15.20              | 19.45                              | 2,92       | 0.64     | 85.20       | 29.01                               | 114.21      | 0.43   | 5.20                               | 12.16                  | 15.56              | 32.92              | \$3.69  | 87.04     | .27.18    |
| 60.021     | 1033.5           | 125.95                                         | 1329.5 | 179.0              | 229.0                              | 35.0       | 19.17    | 1791.7      | 1036.0                              | 2827.7      | 12.0   | 147.2                              | 143.2                  | 183.2              | 473.6              | 1218.0  | 1703.6    | -1124.1   |
| Dan lo     | n no.(5+t        | Note : Column no. 10 = Column no. (5+6+7+8+9). | Colu   | mn No. 12          | Column No. 12 = Column no. (10+11) | 3. (10+11) |          | mn no. 19 = | Column no.19 * Column no.(13+17+18) | (13+17+18). | Column | Column no. 20 = Column no. (19-12) | Vanna no.(19           | -13)               |                    |         |           |           |

Table 4.10.9(h): Bhavani Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                             |              |                                       |             |        |                    |                                      |             |          |           |             |                                              |        |              |                                           | 1                  |        |         |        | Unit: MCM | MCM      |
|---------------------------------------------|--------------|---------------------------------------|-------------|--------|--------------------|--------------------------------------|-------------|----------|-----------|-------------|----------------------------------------------|--------|--------------|-------------------------------------------|--------------------|--------|---------|--------|-----------|----------|
|                                             |              |                                       |             |        | N.                 | Water Utilisation                    | ation       |          |           |             |                                              |        |              |                                           | Water Availability | bility |         |        |           |          |
| 1                                           |              |                                       | į           | Water  | Water requirements | ents                                 |             |          |           |             | Gross                                        |        |              | Regeneration from uses                    | from uses          |        | Surface | Ground | Gross     | Montray  |
| MOTHE                                       | Utilisatio   | Utilisation under irrigation projects | gation proj | _      | Ооте-              | Indus-                               | Hydro-      | Environ- | -         | Export      | 10(4)                                        | Import | Imign-       | Dome-                                     | Indus-             | ŀ      | Water   | waler  | water     | Water    |
| -                                           | Proposed I   | Proposed Existing Ongoing             | guing       | Total  | stic               | Lial                                 | power       | mental   | C.F.      |             | utilisation                                  |        | tion         | ştic                                      | trial              | I Otal | yields  | yields | available | Odlanic  |
| (i)                                         | (2)          | (3)                                   | (4)         | (5)    | (9)                | (7)                                  | (61)        | (6)      | (10)      | (11)        | (12)                                         | (13)   | (14)         | (13)                                      | (91)               | (11)   | (81)    | (61)   | (02)      | (21)     |
| յու                                         | 21.22        | 128.93                                | 15.71       | 165.87 | 18.82              | 18.82                                | 292         | 1.58     | 208.01    | 45.94       | 250.95                                       | 1.50   | 18,34        | 15.06                                     | 15.06              | 48.46  | 79.47   | 23.42  | 152.84    | -98.11   |
| Jul                                         | 28.58        | 173.63                                | 21.16       | 223.37 | 19.45              | 19.45                                | 2.92        | 4.40     | 269.58    | 73.00       | 342.58                                       | 2.02   | 24.68        | 15.56                                     | 15,56              | 55.80  | 135.10  | 31.53  | 224.45    | -118.13  |
| Aug                                         | 26.02        | 158.13                                | 19.27       | 203.42 | 19.45              | 19.45                                | 2.92        | 2.84     | 248.08    | 24.00       | 272.08                                       | 1.84   | 22.48        | 15.56                                     | 15.56              | 53.60  | 4.42    | 28.72  | 128.57    | -143.51  |
| Sep                                         | 11.57        | 70.30                                 | 8.57        | 90.44  | 18.82              | 18.82                                | 2.92        | 1.53     | 132.53    | 43.22       | 175.75                                       | 0.82   | 66.6         | 15.06                                     | 15.06              | 40.11  | 79.98   | 12.77  | 133.67    | 42.08    |
| Ş                                           | 0.89         | 5.42                                  | 0.66        | 6.98   | 19.45              | 19.45                                | 26.2        | 2.02     | 50.81     | 85.00       | 135.81                                       | 90.0   | 0.77         | 15.56                                     | 15.56              | 31.89  | 157.30  | 0.98   | 190.24    | \$4.42   |
| Nov                                         | 0.84         | \$.09                                 | 0.62        | 6.55   | 18.82              | 18.82                                | 2.92        | 2.54     | 49.65     | 28.26       | 16.77                                        | 0.06   | 0.72         | 15.06                                     | 15.06              | 30.84  | 52.29   | 0.93   | 84.11     | 6.20     |
| Dec                                         | 4.40         | 26.71                                 | 3.25        | 34.36  | 19,45              | 19.45                                | 2.92        | 1.68     | 77.85     | 142.82      | 220.67                                       | 0.31   | 3.76         | 15.56                                     | 15.56              | 34.88  | 264.30  | 4.85   | 304.32    | 83.67    |
| Jan                                         | 14.96        | 20.92                                 | 11.08       | 116.97 | 19.45              | 19.45                                | 2.92        | 0.72     | 159.50    | 25.27       | 184.77                                       | 1.06   | 13.00        | 15.56                                     | 15.56              | 44.12  | 46.77   | 16.51  | 108.47    | -76.31   |
| Feb                                         | 22.00        | 133.69                                | 16.29       | 171.98 | 17.57              | 17.57                                | 292         | 0.48     | 210.51    | 22.10       | 232.61                                       | 1.55   | 19.01        | 14.05                                     | 14.05              | 47.11  | 40.90   | 24.28  | 13.82     | -118.76  |
| Mar                                         | 24.63        | 149.66                                | 18.24       | 192.53 | 19.45              | 19.45                                | 2.92        | 0.33     | 234.67    | 14.53       | 249.20                                       | 1.74   | 21.28        | 15.56                                     | 15.56              | 52.40  | 26.88   | 27.18  | 61.80     | -141.01  |
| Apr                                         | 8.96         | 54.45                                 | 6.64        | 70.05  | 18.82              | 18.82                                | 2.92        | 0.37     | 110.98    | 100.67      | 211.65                                       | 0.63   | 7.74         | 15.06                                     | 15.06              | 37.86  | 186.30  | 68.6   | 234.68    | 23.02    |
| May                                         | 6.01         | 36.53                                 | 4.45        | 47.00  | 19.45              | 19.45                                | 2.92        | 0.64     | 89.45     | 29,01       | 118.46                                       | 0.43   | 12.21        | 15.56                                     | 15.56              | 36.33  | 53.69   | 6.63   | 97.08     | -21.38   |
| Total                                       | 170.09       | 1033.5                                | 125.9       | 1329.5 | 229.0              | 229.0                                | 35.0        | 19.3     | 1841.7    | 1036.0      | 2877.7                                       | 12.0   | 147.0        | 183.2                                     | 183.20             | 513.4  | 1218.0  | 187.7  | 1931.1    | -9-46.57 |
| Note : Column no.10 * Column no.(5+6+7+8+9) | 1.10 * Colum | m no.(5+6+                            | 7+8+9).     | Colum  | 1 No. 12 =         | Column No. 12 = Column no. (10 + 11) | 5, (10 + 11 |          | 91 on nmi | = Column no | Column no $19 = \text{Column no} (13+17+18)$ |        | n no. 21 = C | Column no. $21 = \text{Column no}(20.12)$ | 0.12)              |        |         |        |           |          |

Table 4.10.10(a): Noyil Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                               | -             |                  |                                       |          |                                      | Water Utilisation | sation       |          |             |           |                                     |        |            | 3                                  | Water Availability | ility |              |           | , f     |
|-----------------------------------------------|---------------|------------------|---------------------------------------|----------|--------------------------------------|-------------------|--------------|----------|-------------|-----------|-------------------------------------|--------|------------|------------------------------------|--------------------|-------|--------------|-----------|---------|
| :                                             |               |                  |                                       | Wal      | Water requirements                   | cnts              |              |          |             |           | Gross                               |        |            | Regeneration from uses             | i from uses        |       | Surface      | Gross     | water   |
| Month                                         | Uilisati      | יוו ושמתע תכ     | Utilisation under irrigation projects | ojects   | Dome-                                | Indus-            | Hydro        | Environ- |             | Export    | total                               | Import | lrriga-    | Dome-                              | -subuj             | Total | water        | water     | balance |
|                                               | Proposed      | Existing Ongoing | Jakoing                               | Total    | stic                                 | trial             | power        | mental   | 1001        |           | utilisation                         |        | tion       | stic                               | trial              |       | yields       | available |         |
| =                                             |               | (?)              | €                                     | <u>S</u> | 9                                    | 6                 | (8)          | 6)       | (01)        | (H)       | (12)                                | (13)   | (14)       | (15)                               | (16)               | (17)  | (18)         | (61)      | (S)     |
| Jun                                           | 31.84         | 117.29           | 423                                   | 153.36   | 17.26                                | 20.71             | 000          | 0.00     | 188.14      | 000       | 188.14                              | 96.26  | 11.37      | 13.81                              | 16.57              | 41.74 | 0.38 138.38  | 38.38     | 49.75   |
|                                               | 18.05         | Ί_               | 2.40                                  | 86.94    | 17.84                                | 21 40             | 0.00         | 000      | 124.041     | 00.0      | 134.04                              | \$4.35 | 6.44       | 14.27                              | 17.12              | 37.83 | 1.15 93.34   | 3.34      | -30,70  |
| A Line                                        | 14.08         | 1                | 82                                    | 67.80    | 17 84                                | 21 40             | 000          | 00.0     | 105.30      | 900       | 105.30                              | 42.35  | 5.02       | 14.27                              | 17.13              | 36.42 | 77.87 00:0   | 8.77      | -26.51  |
| 5                                             | 7117          | ļ                | 960                                   | 7.7      | 17.26                                | 20.71             | 0.00         | 0.06     | 71.42       | 000       | 71.42                               | 21.40  | 2.55       | 13.81                              | 16.57              | 32.92 | 5.90 60.23   | 0.23      | -11 19  |
| 3 2                                           | 260           | 3.57             | 0.13                                  | 466      | 17.84                                | 21.40             | 000          | 1.17     | 44 95       | 000       | 44.95                               | 2.91   | 0.35       | 14.27                              | 17.12              | 31,74 | 116.7 151.34 | 51.34     | 106.39  |
| 2                                             | 2             | ļ                | 0 16                                  | 5.77     | 17.26                                | 20.71             | 00'0         | 0.63     | 44.22       | 000       | 44,22                               | 3.60   | 0.43       | 13.81                              | 16.57              | 30.81 | 63.20 97.61  | 7.61      | 53.38   |
| i d                                           | 474           | Ι_               | 0.63                                  | 22.82    | 17.84                                | 21.40             | 00.00        | 0.38     | 19.19       | 000       | 61.61                               | 14.10  | 1.69       | 14.27                              | 17.12              | 33.08 | 37.69 84.87  | 7.87      | 23 26   |
| Jan                                           | 9.20          | 33.89            | 1.22                                  | 44.32    | 17.84                                | 21.40             | 00.0         | 0.00     | 82.51       | 0.00      | 82.51                               | 27.74  | 3.28       | 14,27                              | 17.12              | 3468  | 0.00 62.42   | 2.42      | 20 10   |
| eg.                                           | 11.85         | 43,68            | 1.58                                  | 57.11    | 16.11                                | 19.33             | 000          |          | 91.24       | 0000      | 91.24                               | 35.77  | 4.23       | 12.89                              | 15,47              | 32 59 | 0.00 68.36   | 8.36      | -22 89  |
| Į.                                            | 13 13         | (                | 1.75                                  | 63.24    | 17.84                                | 21.40             | 00.0         | 000      | 101.03      | 000       | 101.03                              | 39.61  | 4.69       | 14.27                              | 17.12              | 30'95 | 000          | 5.69      | .25.34  |
| A DE                                          | 666           | ١.               | 1.33                                  | 48.11    | 17.26                                | 20.71             | 00.0         | 0.00     | 84 98       | 000       | 84.98                               | 30.13  | 3.57       | 13.81                              | 16.57              | 33.94 | 0.00 64.08   | 4.08      | 20.90   |
| May                                           | 26.29         | 1                | 3.50                                  | 126.62   | 17.84                                | 21.40             | 000          | 00'0     | 160.56      | 000       | 160.56                              | 77.77  | 9.38       | 14.27                              | 17.12              | 40.77 | 0.00         | 7.81      | -42.01  |
| Total                                         | 148.47        | \ ``             | 19.74                                 | 715.10   | 210.00                               | 252.00            | 00.0         | 2.25     | 1160.00     | 0.00      | 1160.0                              | 146.0  | 53.0       | 168.0                              | 201.6              | 422.6 | 225.0 1093.6 | 093.6     | SF 93   |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 10.10 = Colun | n no.(5+6        | +7+8+9)                               | Colu     | Column No. 12 = Column no. (10 + 11) | -Column n         | No. (10 + 11 |          | umn no.19 = | Column no | Column no.19 = Column no.(13+17+18) |        | no.20 = Co | Column no. 20 = Column no. (19-12) | 7-12).             |       |              |           |         |
|                                               |               |                  |                                       |          |                                      |                   |              |          |             | 1         |                                     |        |            |                                    |                    |       |              |           |         |

Table 4.10.10(b): Noyil Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

| Mydicy requirements         Gross         Regeneration from uses         Surface         Ground         Gross           migation projects         Downe-         Indus-         Hydro-         Environ-         Total         Import         Iriga-         Dorne-         Indus-         Hydro-         Revort water         visitation         Property         Ling         (13)         (14)         (12)         (13)         (14)         (15)         (17)         (18)         water         (19)         (19)         (19)         (19)         (19)         (19)         (19)         (19)         (19)         (19)         (19)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          | į<br>į     |            |             |        |              | Water Utilisation | sation |          |         |        |             |        |         |             | Water Availability | bility |           |     |          | , (and ).        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------------|------------|-------------|--------|--------------|-------------------|--------|----------|---------|--------|-------------|--------|---------|-------------|--------------------|--------|-----------|-----|----------|------------------|
| Troposed Existing Organise   Total Strict   Total | :        |            |            |             | Wa     | ter requiren | nents             |        |          |         |        | Gross       |        | 24      | Centeration | from uses          |        |           |     | _        | Monthly<br>water |
| Proposed Existing Origing   Total   Sic   Urial   Dower   Do | Month    | Utilisatio | n under in | igation pro |        | Dome-        | Indus-            | Hydro- | Environ- | Torol T | Export | total       | Import | Irriga- | Боте-       | -snpul             | Total  |           | _   | Water    | balance          |
| (1) (2) (3) (4) (5) (6) (7) (19) (9) (10) (11) (12) (12) (13) (14) (15) (15) (16) (10) (10) (18) (19) (19) (19) (19) (19) (19) (19) (19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |          | Proposed 1 | Existing O | ngoing 1    | Total  | stic         | Irial             | power  | mental   | Toral   |        | utilisation |        | tion    | stic        | trial              |        |           | +   | allable  |                  |
| 18.05   17.29   4.23   153.36   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.71   20.7 | <b>=</b> | <u> </u>   | <u> </u>   | ₹           | (S)    | (9)          | 6                 | (61)   | (8)      | (10)    | (11)   | (12)        | (13)   | (14)    | (13)        | (16)               | (17)   | (18)      | (3) | ୍ଚି<br>ଆ | <u>3</u>         |
| 18.05         66.49         2.40         86.94         21.40         20.00         1.05.76         6.40         4.23.76         6.45         17.12         17.12         40.69         1.15 6.59           14.08         51.85         1.87         67.80         21.40         20.00         10.60         10.60         11.60         42.35         5.03         17.12         17.12         39.27         0.00         51.40         20.00         11.60         10.60         11.60         42.35         5.03         17.12         17.12         39.27         0.00         51.40         20.00         11.60         42.35         5.03         17.12         17.12         39.27         0.00         50.00         11.60         42.35         5.03         17.12         17.12         39.27         0.00         50.00         42.85         5.03         17.12         17.12         39.27         0.00         50.00         42.85         21.40         2.56         20.00         42.85         21.40         2.56         20.00         42.85         20.00         42.85         20.00         42.85         20.00         12.77         42.71         2.51         12.71         32.71         42.91         12.71         32.71         32.71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |          | 31 84      | 117.29     | 4.23        | 1      | 17.02        | 20.71             | 00.0   |          | 194.79  | 000    | 194.79      | 96.26  | 11.37   | 16.57       | 16.57              | 44.51  |           | .62 | 152.77   | 42.03            |
| 14.08   51.85   1.87   67.80   21.40   21.40   21.40   0.00   0.00   110.60   0.00   110.60   110.60   42.35   5.03   1712   1712   1712   39.27   0.00   5.90   2.60   2.50   1.20   2.55   16.57   16.57   35.69   5.90   2.60   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50   2.50 | 15       | 18 05      | 68 49      | 2.40        | 86 94  | 21.40        | 21.40             | 000    | 10.0     | 129.76  | 000    | 129.76      | 54.35  | 6.45    | 17.12       | 17.12              | 40.69  | 1156      | 6   | 102.78   | -26.97           |
| 7.13         26.26         0.95         34.34         20.71         20.71         0.00         75.82         0.14         2.55         16.57         16.57         18.57         15.69         5.90         2.60         1.00         75.82         21.40         2.55         16.57         16.57         18.57         15.00         1.00         1.00         4.864         2.91         0.35         17.12         17.12         14.50         17.12         14.50         17.12         14.50         17.12         14.50         17.12         14.50         17.12         14.50         17.12         14.50         17.12         17.12         14.50         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sur.     | 14.08      | \$1.85     | 187         | 67.80  | 21.40        | 21.40             | 0.00   | 00'0     | 09011   | 000    | 110.60      | 42.35  | 5.03    | 17.12       | 17,12              | 39.27  | 0000      | 77  | 86.76    | -23.84           |
| 097         3.57         0.13         4.66         21.40         21.40         0.00         1.17         48.64         291         0.35         17.12         17.12         34.59         116.7         0.35         1.67         16.57         34.59         116.7         0.35         1.65         33.57         6.32         0.44         1.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71         20.71                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 69       | 7.13       | 26.26      | 0.95        | 34.34  | 20.71        | 20.71             | 0.00   | 90.0     | 75.82   | 0.00   | 75.82       | 21.40  | 2.55    | 16.57       | 16.57              | 35.69  | 5.90 2.0  | 09  | 65.59    | £101.            |
| 1.20   441   0.16   5.77   20.71   20.71   0.00   0.63   47.83   0.00   4.783   3.60   0.43   16.57   16.57   33.57   63.20   0.44   17.45   0.65   21.40   21.40   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00 | 1        | 76.0       | 3.57       | 0.13        | 7.66   | 21.40        | 21.40             | 0.00   | 1,17     | 48.64   | 000    | 48.64       | 2.91   | 0.35    | 17.12       | 17.12              | 34.59  | 116.70.   | 2   | 15.2     | 105.91           |
| 4.74         17.45         0.65         21.40         21.40         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | No.      | 1 30       | 441        | 0.16        | 533    | 20.71        | 20.71             | 0.00   | 0.63     | 47.83   | 000    | 47.83       | 3.60   | 0.43    | 16.57       | 16.57              | 33.57  | 63.20 0.4 | 4   | 100 81   | 86 58            |
| 920         33.89         1.22         44.32         21.40         0.00         0.00         87.12         27.74         3.29         17.12         17.12         37.31         0.00         3.36           11.86         43.68         1.58         57.11         19.33         0.00         0.00         95.78         35.77         4.24         15.47         15.47         35.17         0.00         4.33           13.13         48.37         1.76         53.24         21.40         0.00         0.00         106.05         39.61         4.69         17.12         17.12         18.47         0.00         4.79         17.12         17.12         17.12         18.79         0.00         4.70         0.00         0.00         0.00         0.00         0.00         106.05         39.61         4.69         17.12         17.12         17.12         17.12         0.00         4.70         0.00         0.00         1.20         0.00         1.20         0.00         0.00         1.20         0.00         1.20         0.00         1.20         0.00         1.20         0.00         1.20         1.20         1.20         1.20         1.20         1.20         1.20         1.20         1.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 250      | 47.4       | 17.45      | 0.63        | 22.82  | 21.40        | 21.40             | 0.00   | 0.38     | 00 99   | 0.00   | 00.99       | 14.10  | 1.69    | 17.12       | 17.12              | 35.94  | 37.69 1.  | 13  | 89.46    | 23.46            |
| 11.86   43.68   1.58   57.11   19.33   19.33   0.00   0.00   95.78   0.00   95.78   35.77   4.24   15.47   15.47   35.17   0.00   4.33   13.13   48.37   1.75   63.24   21.40   21.40   0.00   0.00   106.05   0.00   106.05   39.61   4.69   17.12   17.12   38.93   0.00   15.62   21.40   21.40   0.00   0.00   169.42   0.00   169.42   77.77   9.39   17.12   17.12   43.63   0.00   9.60   126.29   18.47   18.47   15.10   252.00   252.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00   225.00 | g g      | 9 20       | 33.89      | 1 22        | 44.32  | 21.40        | 21.40             |        | 0.00     | 87.12   | 000    | 87.12       | 27.74  | 3.29    | 17.12       | 17.12              | 37.53  | 0.00      | 98  | 68.63    | 6.8I.            |
| 13.13   48.37   1.75   63.24   21.40   21.40   0.00   0.00   106.05   0.00   106.05   39.61   4.69   17.12   17.12   38.93   0.00   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1.77   1 |          | 11.86      | 43.68      | 1.58        | 57.11  | 19.33        | 19.33             |        | 0.00     | 95.78   | 000    | 95.78       | 35.77  | 4.24    | 15.47       | 15.47              | 35.17  | 0.00      | 13  | 75.27    | -20 51           |
| 959         36.79         1.33         48.11         20.71         20.71         0.00         89.54         0.00         89.54         30.13         3.57         16.57         16.57         36.71         0.00         36.59         96.58         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12         17.12<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Į.       | 13.13      | 48.37      | 1.75        | 63.24  | 21.40        | 21.40             |        | 0.00     | 106.05  | 000    | 106.05      | 39.61  | 4.69    | 17.12       | 17.12              | 38.93  | 1000      | 6/  | 83.34    | .22.7            |
| 26.29         96.83         3.50         126.62         21.40         21.40         0.00         169.42         0.00         169.42         77.77         9.39         17.12         17.12         43.63         0.00 9.60           1         148.47         546.89         19.74         715.10         252.00         252.00         2.25         1251.33         0.00         1221.3         446.0         53.03         201.60         456.1         225.0         54.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1        | 86         | 36.79      | 133         | 78 13  | 20.71        | 20.71             | 000    | 0.00     | 89.54   | 000    | 89.54       | 30.13  | 3.57    | 16.57       | 16.57              | 36.71  | 0.00      | 55  | 70.49    | -19.05           |
| 1 148,47 546.89 19.74 715.10 252.00 252.00 252.00 20.00 2.25 10.213 0.00 1221.3 446.0 53.03 201.60 201.6 456.1 225.0 54.20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | (av      | 26.29      | 88.83      | 3.50        | 1      | 21.40        | 21.40             | 00.00  | 00.00    | 169.42  | 00.0   | 169.42      | 17.77  | 9 39    | 17.12       | 17.12              | 43.63  | 0.00      | l   | 131.00   | -38.42           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | otal     | 148.47     | \$46.89    | 19.74       | 715.10 | 252.00       | 252.00            |        |          | 1221.3  | 000    | 1221.3      | 446.0  | 53.03   | 201.60      | 201.6              | 456.2  | 225.0 54  | 50  | 11814    | .39.92           |

Table 4.10.10(c): Noyil Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

|                                               |              |                                       |            | •      |                    |                   | •                                    |          |           |           |                                     |        | , !          |                                  |                    |       |         | Unit      | Unit: MCM |
|-----------------------------------------------|--------------|---------------------------------------|------------|--------|--------------------|-------------------|--------------------------------------|----------|-----------|-----------|-------------------------------------|--------|--------------|----------------------------------|--------------------|-------|---------|-----------|-----------|
|                                               |              |                                       |            |        | -                  | Water Utilisation | sation                               |          |           |           |                                     |        |              | 15                               | Water Availability | ility |         |           |           |
|                                               |              |                                       |            | Water  | Water requirements | ents              |                                      |          |           |           | Gross                               |        | 7            | Regeneration from uses           | from uses          |       | Surface | Gross     | Monthly   |
| Month                                         | Utilis atio  | Utilisation under irrigation projects | tion proje |        | Dome-              | -supul            | Hydro                                | Environ- | Total     | Export    | total                               | Import | Irriga-      | Dome.                            | Indus-             |       | water   | Water     | halance   |
|                                               | Proposed 1   | Proposed Existing Ongoing             | ⊢          | Total  | stic               | rial              | power                                | mental   | Cla       |           | utilisation                         |        | tion         | stic                             | triat              | 1 OFT | yields  | available | 7111111   |
| Ξ                                             | (2)          | (3)                                   | (4)        | (S)    | (9)                | (1)               | (8)                                  | (6)      | (01)      | (11)      | (12)                                | (13)   | (14)         | (15)                             | (16)               | ((1)  | (81)    | (61)      | (S)       |
| Jun                                           | 31.84        | 117.29                                | 4.23       | 153.36 | 17.26              | 20.71             | 00.00                                | 00'0     | 188.14    | 0.00      | 188,14                              | 96.26  | 11.37        | 13.81                            | 16.57              | 41.74 | 0+0     | 138.40    | -19.74    |
| Jaj                                           | 18.05        | 66.49                                 | 2.40       | \$6.94 | 17.84              | 21.40             | 00.00                                | 0.01     | 124.04    | 0.00      | 124 04                              | 54.35  | 6.44         | 14.27                            | 17.12              | 37.83 | 1.20    | 93.38     | -30.66    |
| Aug                                           | 14.08        | 51.85                                 | 1.87       | 67.80  | 17.84              | 21.40             | 0.00                                 | 00'0     | 105.30    | 00:0      | 105,30                              | 42.35  | 5.02         | 14.27.                           | 17.12              | 36.42 | 000     | 78.77     | -26.54    |
| Sep                                           | 7.13         | 26.26                                 | 0.95       | ¥.32   | 17.26              | 20.71             | 00.0                                 | 90.0     | 71.42     | 0.00      | 71.42                               | 21.40  | 2.55         | 13.81                            | 16.57              | 32.92 | 41.9    | 60.46     | -10.96    |
| Ö                                             | 160          | 3.57                                  | 0.13       | 4.66   | 17.84              | 21.40             | 0.00                                 | 1.17     | 44.95     | 00.0      | 44.95                               | 16.2   | 0.35         | 14.27                            | 17.12              | 31.74 | 121.36  | 156.00    | 111.06    |
| Nov                                           | 1.30         | 14.4                                  | 0.16       | 5.77   | 17.26              | 20,71             | 00.00                                | 0.63     | 44.22     | 0.00      | 44.22                               | 3.60   | 0.43         | 13.81                            | 16.57              | 30.81 | 65.73   | 100.13    | 18.58     |
| ä                                             | 4.71         | 17.45                                 | 0.63       | 22.82  | 17.84              | 21.40             | 0.00                                 | 0.38     | 19.19     | 000       | 61.61                               | 14.10  | 1.69         | 14.27                            | 17.12              | 33.08 | 39.20   | 86.38     | 24.77     |
| Jan                                           | 9.20         | 33.89                                 | 1.22       | 44.32  | 17.84              | 21.40             | 0.00                                 | 00.0     | 82.51     | 0.00      | 82.51                               | 27.74  | 3.28         | 14.27                            | 17.12              | 34.68 | 0.00    | 62,42     | -20,10    |
| Feb                                           | 11.86        | 43.68                                 | 1.58       | 57.11  | 16.11              | 19.33             | 00.0                                 | 000      | 91.24     | 0.00      | 91.24                               | 35.77  | 4.23         | 12,89                            | 15.47              | 32.59 | 0.00    | 68.36     | -22.89    |
| Mar                                           | 13.13        | 48.37                                 | 1.75       | 63 24  | 17.84              | 21,40             | 0.00                                 | 00.0     | 101.03    | 00'0      | 101.03                              | 39.61  | 4 69         | 14.27                            | 17.12              | 36.08 | 00:0    | 75.69     | 15.25     |
| Apr                                           | 66.6         | 36.79                                 | 1.33       | 18.11  | 17.26              | 20.71             | 00.00                                | 00.0     | 84.98     | 0.00      | 84.98                               | 30.13  | 3.57         | 13.81                            | 16.57              | 33.94 | 0.00    | \$0.4     | -20.90    |
| May                                           | 26.29        | 96.83                                 | 3.50       | 126.62 | 17.84              | 21.40             | 0.00                                 | 0.00     | 160.56    | 00.0      | 160.56                              | 77.77  | 9.38         | 14.27                            | 17.12              | 40.77 | 0.00    | 118.54    | 42,01     |
| Total                                         | 148.47       | 546.89                                | 19.74      | 715.10 | 210.00             | 252.00            | 0.00                                 | 2.25     | 1160.00   | 000       | 1160.0                              | 446.0  | 53.0         | 168.0                            | 201.6              | 422.6 | 234.00  | 1102.6    | -57.40    |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 5.10 = Colun | n no.(5+6+7+                          | 8+9)       | Colum  | n No. 12 *         | Column n          | Column No. 12 * Column no. (10 + 11) |          | umn no.19 | Column ne | Column no.19 = Column no.(13+17+18) |        | 1 πo.20 = Co | Column 10.20 = Column 10.(19-12) | -12).              |       |         |           |           |

Table 4.10.10(d): Noyil Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                           |               |                           |                                       |        |                    |                                     |              |          |            |           |                                        |        |             |                                    | į                  |        | ļ       |        | Unit: MCM | MCM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------|---------------|---------------------------|---------------------------------------|--------|--------------------|-------------------------------------|--------------|----------|------------|-----------|----------------------------------------|--------|-------------|------------------------------------|--------------------|--------|---------|--------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           |               |                           |                                       |        |                    | Water Utilisation                   | sation       |          |            |           |                                        |        |             |                                    | Water Availability | bility |         |        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| -                                         |               | i                         |                                       | Wa.    | Water requirements | nents                               |              |          |            |           | Gross                                  |        |             | Regeneration from uses             | from uses          |        | Surface | Ground | Gross     | Monthly                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| שומסוא                                    | Utilisatic    | on under it               | Utilisation under irrigation projects | piects | Dome.              | Indus-                              | Hydro-       | Environ- | Toral      | Export    | total                                  | Import | Figs        | Dame-                              | -snpur             | Total  | water   | water  | Waler     | water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                           | Proposed      | Proposed Existing Ongoing | ngoing                                | Total  | stic               | trial                               | power        | mental   | 1001       |           | utilisation                            |        | tion        | stic                               | trial              | 3      | yiclds  | yields | available | Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Salar<br>Sala<br>Sala |
| Ξ                                         | (2)           | 6                         | ( <del>f</del> )                      | (5)    | (9)                | (7)                                 | (61)         | (6)      | (10)       | (11)      | (13)                                   | (13)   | (14)        | (13)                               | (16)               | (11)   | (81)    | (61)   | (30)      | (21)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Jun                                       | 31.84         | 117.29                    | 4.23                                  | 153.36 | 20.71              | 20.71                               | 0.00         | 00.0     | 194.79     | 00.00     | 194.8                                  | 96.3   | 11.37       | 13.81                              | 16.57              | 41.8   | 0.40    | 11.62  | 150.03    | 4.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 7                                         | 18.05         | 66.49                     | 2.40                                  | 86.94  | 21.40              | 21.40                               | 0.00         | 0.01     | 129.76     | 00.0      | 129.8                                  | 54.4   | 6.45        | 14.27                              | 17.12              | 37.8   | 1.20    | 6.59   | 86.66     | -29.78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Aug                                       | 14.08         | \$1.85                    | 1.87                                  | 67.80  | 21.40              | 21.40                               | 0.00         | 0.00     | 110.60     | 00.0      | 110.6                                  | 42.3   | 5.03        | 14.27                              | 17.12              | 36.4   | 000     | 5.14   | 83.91     | -26.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Şeb                                       | 7.13          | 26.26                     | 0.95                                  | 75.75  | 20.71              | 20.71                               | 00.00        | 90.0     | 75.82      | 00.00     | 75.8                                   | 21.4   | 2.55        | 13.81                              | 16.57              | 32.9   | 6.14    | 2.60   | 63.07     | -12.75                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| o d                                       | 10.97         | 3.57                      | 0.13                                  | 4.66   | 21.40              | 21.40                               | 0.00         | 1.17     | 48.64      | 00.00     | 9.84                                   | 2.9    | 0.35        | 14.27                              | 17.12              | 31.7   | 121.36  | 0.35   | 156.36    | 107.72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Nov                                       | 1.20          | 4.41                      | 91.0                                  | 5.77   | 20.71              | 20.71                               | 0.00         | 0.63     | 47.83      | 00.00     | 47.8                                   | 3.6    | 0.43        | 13,81                              | 16.57              | 30.8   | 65.73   | 1      | 100.57    | \$2,74                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 300                                       | 474           | 17.45                     | 0.63                                  | 22.82  | 21.40              | 21.40                               | 0.00         | 0.38     | 00.99      | 00.00     | 0.99                                   | 14.1   | 1.69        | 14.27                              | 17.12              | 33.1   | 39.20   | 1.73   | 88.11     | 22.11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Jan                                       | 9.50          | 33.89                     | 122                                   | 44.32  | 21.40              | 21.40                               | 0.00         | 0.00     | 87.12      | 0.00      | 87.1                                   | 27.7   | 3.29        | 14.27                              | 17.12              | 34.7   | 0.00    | 3.36   | 65.78     | -21.35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Feb                                       | 11.86         | 13.68                     | 1.58                                  | 57.11  | 19.33              | 19.33                               | 0.00         | 000      | 95.78      | 0.00      | 8.56                                   | 35.8   | 4.24        | 12.89                              | 15.47              | 32.6   | 0.00    | 4.33   | 72.69     | 23.09                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Mar                                       | 13.13         | 18.37                     | 1.75                                  | 63.24  | 21.40              | 21.40                               | 0.00         | 0.00     | 106.05     | 000       | 106.0                                  | 39.6   | 4.69        | 14.27                              | 17.12              | 36.1   | 0.00    | 4.79   | \$0.48    | -25.57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Apr                                       | 66.6          | 36.78                     | 133                                   | 128.11 | 20.71              | 20.71                               | 0.00         | 00.0     | 89.54      | 0.00      | 89.5                                   | 30.1   | 3.57        | 13.81                              | 16.57              | 33.9   | 00.0    | 3.65   | 67.72     | -21.81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| May                                       | 1 26.29       | 58.83                     | 3.50                                  | 126.62 | 21.40              | 21.40                               | 0.00         | 0.00     | 169.42     | 0.00      | 169.4                                  | 17.8   | 9.39        | 14,27                              | 17.12              | 40.8   | 0.00    | 09.6   | 128.15    | 41.28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Total                                     | 148.47        | 546.89                    | 19.74                                 | 715.10 | 252.00             | 252.0                               | 0.00         | 2.25     | 1221.3     | 00.0      | 1221                                   | 9##    | 53          | 168                                | 302                | 423    | 234.00  | 54.20  | 1136.8    | -64.52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Note Column no 10 = Column no (5+6+7+8+9) | no.10 = Colun | nn no.(5+6                | +7+8+9)                               | Colur  | mn No. 12          | Column No. 12 = Column no. (10 + 11 | 0. (10 + 11) | Coh      | mn no.20 = | Column no | Column no.20 = Column no.(13+17+18+19) |        | lumn no. 21 | Column no. 21 = Column no. (20-12) | 5.(20-12).         |        |         |        |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 4.10.10(e): Noyil Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|        |                                              |                                    |                  |        |                    |                   |                                      |          |             |           | ļ                                 |        |              |                                   |                    |       |         |           |          |
|--------|----------------------------------------------|------------------------------------|------------------|--------|--------------------|-------------------|--------------------------------------|----------|-------------|-----------|-----------------------------------|--------|--------------|-----------------------------------|--------------------|-------|---------|-----------|----------|
|        |                                              |                                    |                  |        | A                  | Water Utilisation | sation                               |          |             |           |                                   |        |              | 1                                 | Water Availability | ility |         |           | Manchla  |
|        |                                              |                                    |                  | IE/A1  | Water requirements | vents             |                                      |          |             |           | Gross                             |        |              | Regeneration from uses            | from uses          |       | Surface | . sob     | , under  |
| Monin  | Utilisatic                                   | Julisation under impation projects | rigation pro     | spects | Dome-              | Indus-            | Hydro                                | Environ- | Tatal       | Ехроп     | tota                              | Import | Imiga.       | - Остс-                           | Indus-             | Total | Water   | water     | balance. |
|        | Proposed I                                   | Existing Ongoing                   | Suio8n(          | Toxal  | stic               | bial              | power                                | mental   | - Pro-      |           | utilisation                       |        | tion         | stic                              | trial              | 1001  | yields  | available |          |
|        | 3                                            | ව                                  | ( <del>p</del> ) | 3      | 9                  | (7)               | (8)                                  | (6)      | (10)        | (11)      | (12)                              | (3)    | (14)         | (51)                              | (16)               | (17)  | (81)    | (61)      | (20)     |
|        | 31.84                                        | 117.29                             | 4.23             | 153.36 | 17.26              | 20.71             | 0.00                                 | 000      | 188.14      | 0.00      | 158.14                            | 96.26  | 11.37        | 13.81                             | 16.57              | 4].74 | 0.36    | 138,36    | 49,77    |
|        | 18.05                                        | 66.49                              | 2.40             | 86.94  | 17.84              | 21.40             | 0.00                                 | 0.011    | 124.04      | 000       | 124.04                            | 54.35  | 6.44         | 14.27                             | 17.12              | 37.83 | 1.09    | 93.28     | -30.76   |
|        | 14.08                                        | 51.85                              | 1.87             | 67.80  | 17.84              | 21.40             | 00.0                                 | 0.00     | 105.30      | 0.00      | 105.30                            | 42.35  | 5.02         | 14.27                             | 17.12              | 36.42 | 000     | 78.77     | .26,54   |
|        | 7.13                                         | 26.26                              | 0.95             | ¥34    | 17.26              | 20.71             | 00.0                                 | 90.0     | 71.42       | 00.0      | 71.42                             | 21.40  | 2.55         | 13.81                             | 16.57              | 32.92 | 5.59    | 59.93     | -11.50   |
|        | 0.97                                         | 3.57                               | 0.13             | 4.66   | 17.84              | 21,40             | 0.00                                 | 1.17     | 44.95       | 00.0      | 44.95                             | 2.91   | 0.35         | 14.27                             | 17.12              | 31.74 | 110.5   | 145.11    | 100.16   |
|        | 1.20                                         | 4.4                                | 0.16             | 5.77   | 17.26              | 20.71             | 0.00                                 | 69.0     | 41.22       | 0.00      | 44.22                             | 3.60   | 0.43         | 13.81                             | 16.57              | 30.81 | 59.83   | 94 24     | 50.01    |
|        | 4.74                                         | 17.45                              | 0.63             | 22.82  | 17.84              | 21.401            | 0.00                                 | 0.38     | 61.61       | 000       | 61.61                             | 14.10  | 1.69         | 14.27                             | 17.12              | 33.08 | 35.68   | 82.86     | 21.25    |
|        | 9.20                                         | 33.89                              | 1.23             | 732    | 17.84              | 21.40             | 00.0                                 | 000      | 82,51       | 000       | 82.51                             | 27.74  | 3.28         | 14.27                             | 17.12              | 89.X  | 00.0    | 62.42     | -20.10   |
|        | 11.86                                        | 13.68                              | 1.58             | 57.11  | 16.1.              | 19,33             | 0.00                                 | 0.00     | 91.34       | 000       | 91.24                             | 35.77  | 4.23         | 12.89                             | 15.47              | 32.59 | 0.00    | 68.36     | -22 89   |
|        | 13.13                                        | 48.37                              | 1.75             | 63.24  | 17.84              | 21.40             | 00:0                                 | 000      | 101.03      | 000       | 101.03                            | 19.61  | 4.69         | 14.27                             | 17.12              | 36.08 | 000     | 75.69     | .25.34   |
|        | 666                                          | 36.79                              | 1.33             | 48.31  | 17.36              | 20.71             | 0.00                                 | 000      | 86.48       | 0.00      | 84.98                             | 30.13  | 3.57         | 13.81                             | 16.57              | 33.94 | 0.00    | 64.08     | .20.90   |
|        | 26.29                                        | \$6.83                             | 3.50             | 126.62 | 17.84              | 31.40             | 0.00                                 | 0000     | 160.56      | 0.00      | 160.56                            | 77.77  | 9.38         | 14.27                             | 17.12              | 70°21 | 000     | 118 54    | 42.01    |
|        | 148 +7                                       | \$46.89                            | 19.74            | 715.10 | 210,00             | 252.00            | 0.00                                 | 2.25     | 1160.00     | 0.00      | 1160.0                            | 446.0  | 53.0         | 0.891                             | 201.6              | 422 6 | 213.0   | 1081.6    | -78.40   |
| umn nc | Note: Column no. 10 = Column no. (5+6+7+8+9) | 11 no.(5+6                         | +7+8+9)          | Colur  | - 12 No. 12        | Column n          | Column No. 12 = Column no. (10 + 11) | ်        | = 61 on trm | Column no | umn no 19 = Column no. (13+17+18) |        | n no.20 = C. | Column no.20 = Column no.(19-12). | 0-12).             |       |         |           |          |
|        |                                              |                                    |                  |        |                    |                   |                                      |          |             |           |                                   | l      |              |                                   |                    |       |         |           |          |

Table 4.10.10(f): Noyil Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                              |               |                                      |            |        |                    |                   |                                    |          |           |             |                                        |        |            | ŀ                                  |                    |        |              |          | Unit: MCM | MCM      |
|----------------------------------------------|---------------|--------------------------------------|------------|--------|--------------------|-------------------|------------------------------------|----------|-----------|-------------|----------------------------------------|--------|------------|------------------------------------|--------------------|--------|--------------|----------|-----------|----------|
|                                              |               |                                      |            |        |                    | Water Utilisation | sation                             |          |           |             |                                        |        |            |                                    | Water Availability | bility |              |          |           | 1 ( )    |
|                                              |               |                                      |            | Wat    | Water requirements | nents             |                                    |          |           |             | Gross                                  |        |            | Regeneration from uses             | from uses          |        | Surface      | Ground   | Gross     | Nionally |
| Month                                        | Utilisatic    | Julisation under irrigation projects | galion pro | )ects  | Dome-              | -shpul            | Hydro-                             | Environ- | 1,000     | Export      | total                                  | Import | Irriga-    | Doine.                             | fudus-             | l P    | water        | w'ater   | walcr     | halance  |
|                                              | Proposed      | Proposed Existing Ongoing            | gniogr     | Total  | Stre               | trial             | power                              | mental   | 1083      |             | utilisation                            |        | tion       | stic                               | trial              | TOTAL  | yields       | yields a | available |          |
| Ξ                                            | (i)           | (3)                                  | Ŧ          | (5)    | (9)                | 9                 | (61)                               | (6)      | (01)      | (1)         | (13)                                   | (33)   | (14)       | (15)                               | (91)               | (11)   | (81)         | (19)     | (20)      | (21)     |
| Jun                                          | 31.84         | 117.29                               | 4.23)      | 153 36 | 17 05              | 20.73             | 0.00                               | 0.00     | 194 79    | 0.00        | 194.79                                 | 96.26  | 11.37      | 16.57                              | 16.57              | 44.51  | 96.0         | 11.62    | 152.75    | 42.04    |
| <u>1</u>                                     | 18 05         | 67.99                                | 2.40       | 86.94  | 21.401             | 21.40             | 0.00                               | 100      | 129.76    | 00'0        | 129.76                                 | 54.35  | 6.45       | 17.12                              | 17.12              | 40.69  | <b>1</b> .09 | 6.59     | 102.72    | -27.03   |
| Aug                                          | 14.08         | 53.85                                | 1.87       | 67.50  | 21.401             | 21.40,            | 000                                | 000      | 110.60    | 000         | 09:011                                 | 42.35  | 5.03       | 17.12                              | 17.12              | 39.27  | 00.00        | 5.14     | 86.76     | .23.84   |
| Sep                                          | 7.13          | 26.26                                | 0.95       | 法法     | 20.71              | 20.71             | 00.0                               | 0.00     | 75.82     | 0.00        | 75.82                                  | 21.40  | 2.55       | 16.57                              | 16.57              | 35.69  | 3.59         | 2.60     | 65.28     | -10.54   |
| Oct                                          | 1 0.97        | 337                                  | 0.13       | 4.661  | 21.40              | 21.40             | 00.0                               | 1.17     | 48.61     | 00.0        | 18.64                                  | 2.91   | 0.35       | 17.12                              | 17.12              | 34.59  | 110.5        | 0.35     | 148.31    | 89 68    |
| Nov                                          | 1 20          | 4.41                                 | 91.0       | 5.77   | 20.73              | 17.02             | 0.00                               | 0.63     | 47.83     | 00.0        | 47.83                                  | 3,60   | 0.43       | 16.57                              | 16 57              | 33.57  | 59.83        | 0.44     | 97.44     | 19.61    |
| <u> </u>                                     | 474           | 17.45                                | 0.63       | 22.82  | 21.40              | 21.40             | 00.0                               | 0.38     | 00.99     | 00:0        | 00.99                                  | 14.10  | 1.69       | 17.12                              | 17.12              | 35.94  | 35.68        | 1.73     | 87.45     | 21.45    |
| Jan                                          | 9.20          | 33.89                                | 1 22       | 44,32  | 21.40              | 21,40             | 00.00                              | 000      | 87.12     | 00.0        | 87.12                                  | 27.74  | 3.29       | 17.12                              | 17.12              | 37.53  | 0.00         | 3.36     | 68.63     | -18.49   |
| Feb                                          | 11.86         | 43.68                                | 1.58       | 57.11  | 19.33              | 19.33             | 00.0                               | 000      | 95.78     | 00.0        | 95.78                                  | 35.77  | 77         | 15.47                              | 15.47              | 35.17  | 0.00         | 4.33     | 75.27     | .20.51   |
| Mar                                          | 1313          | 48.37                                | 1.75       | 63.24  | 21.40              | 21.40             | 00.0                               | 00.0     | 106.05    | 000         | 106.05                                 | 39.61  | 4.69       | 17.12)                             | 17.12              | 38.93  | 000          | 4.79     | 83.34     | -22.7!   |
| Apr                                          | 66.6          | 36.79                                | 1.35       | 48.11  | 20.71              | 20.71             | 0.00                               | 0.00     | £5.68     | 000         | 89.54                                  | 30.13  | 3.57       | 16.57                              | 16.57              | 36.71  | 0.00         | 3.65     | 70.49     | -19.05   |
| May                                          | 26.29         | 96.83                                | 3.50       | 126.62 | 21.40              | 21.40             | 00.0                               | 0.00     | 169.42    | 0.00        | 24.691                                 | 17.77  | 9.39       | 17.12                              | 17.13              | 43.63  | 0.00         | 9.60     | 131.00    | -38.42   |
| Total                                        | 1-18-17       | 68.945                               | 19.74      | 715.10 | 252.00             | 252.00            | 00'0                               | 2.25     | 1231.3    | 00.00       | E.1521                                 | 416.0  | 53.03      | 201.6                              | 2016               | 456.2  | 213.0        | ¥.20     | 1169.4    | -51.92   |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 ~ Colum | m no.(5+6+                           | (6+8+2     | Colun  | n No. 12           | = Column r        | Column No. 12 = Column no. (10+11) |          | umn no 20 | = Column no | Column no.20 = Column no (13+17+18+19) |        | umn no. 21 | Column no. 21 = Column no. (20-12) | 7.(20-12).         |        |              |          |           |          |

Table 4.10.10(g): Noyil Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                                              |                |                                      |            |          | W.                   | Water Utilisation                    | tion    |           |            |                                       |             |        |                                  | 12                     | Water Arraitability | Tibre |         |           |            |
|----------------------------------------------|----------------|--------------------------------------|------------|----------|----------------------|--------------------------------------|---------|-----------|------------|---------------------------------------|-------------|--------|----------------------------------|------------------------|---------------------|-------|---------|-----------|------------|
|                                              |                |                                      |            | 10/20    |                      | -                                    |         |           |            |                                       |             |        |                                  |                        | and Availan         | A     | }       |           | Monthly    |
| Month                                        |                |                                      |            | Water    | water requirentality | TUES                                 |         |           |            |                                       | 2000        |        |                                  | Regeneration from uses | trom uses           |       | Surface | Gross     | (pipelora: |
|                                              | Utilisation    | Julisation under irrigation projects | tion proje |          | Dome-                | Indus-                               | Hydro-  | Environ-  | i de la    | Export                                | total       | Import | Imiga-                           | Dome-                  | Indus-              |       | water   | water     | water      |
|                                              | Proposed E     | Proposed Existing Ongoing            |            | Total st | stic                 | lein                                 | power   | mental    | 16131      |                                       | utilisation |        | tion                             | stic                   | trial               | elo]  | vields  | available | balance    |
| (1)                                          | (2)            | (3)                                  | ·          | (5) (6   | (9)                  | (3)                                  | (8)     | (6)       | (10)       | (11)                                  | (12)        | (13)   | (14)                             | (35)                   | (16)                | (1)   | (38)    | (61)      | (20)       |
| Jun                                          | 31.84          | 117.29                               | 4.23       | 153.36   | 17.26                | 20.71                                | 00.00   | 000       | 188.14     | 00.0                                  | 188.14      | 96.26  | 11.37                            | 13.81                  | 16.57               | 41.74 | 77.0    | 138 35    | P. OF      |
| Jul                                          | 18.05          | 66.49                                | 2.40       | 86.94    | 17.84                | 21.40                                | 00.00   | 0.01      | 124.04     | 00.0                                  | 124.04      | \$4.35 | 6.44                             | 14.27                  | 17.12               | 37.83 | 103     | 93.22     | -30.87     |
| Aug                                          | 14.08          | \$1.85                               | 1.87       | 67.80    | 17.84                | 21.40                                | 00.0    | 000       | 105.30     | 00:00                                 | 105.30      | 42.35  | 5.02                             | 14.27                  | 17.12               | 35.45 | 000     | 78.77     | -26.54     |
| Sep                                          | 7.13           | 26.26                                | 0.95       | 34.34    | 17.26                | 20.71                                | 00.0    | 90.0      | 71.42      | 00.0                                  | 71.42       | 21.40  | 2.55                             | 13.81                  | 16.57               | 32.92 | 5.27    | 59 60     | 11.8       |
| 25                                           | 0.97           | 3.57                                 | 0.13       | 4.66     | 17.84                | 21.40                                | 00.0    | 1.17      | 44.95      | 00:0                                  | 44.95       | 2.91   | 0.35                             | 14.27                  | 17.12               | 31.74 | 3       | 138.89    | 70 56      |
| Nov                                          | 1.20           | 141                                  | 0.16       | 5.77     | 17.26                | 20.71                                | 0.00    | 0.63      | 44.22      | 000                                   | 44,22       | 3.60   | 0.43                             | 13.81                  | 16.57               | 30.81 | \$6.46  | 20.87     | \$         |
| Ď                                            | 4.74           | 17.45                                | 0.63       | 22.82    | 17.84                | 21.40                                | 00.0    | 0.38      | 19.19      | 000                                   | 19.19       | 14.10  | 1.69                             | 14.27                  | 17.12               | 33.08 | 33.67   | \$0.85    | 19.24      |
| Jan                                          | 9.20           | 33.89                                | 1.22       | 44.32    | 17.84                | 21.40                                | 0.00    | 000       | 82.51      | 000                                   | 82.51       | 27.74  | 3.28                             | 14.27                  | 17.12               | 34.68 | 000     | 62.42     | 20.10      |
| Feb                                          | 11.86          | 43.68                                | 1.58       | 57.11    | 16.11                | 19.33                                | 00.00   | 0.00      | 91.24      | 0.00                                  | 91.24       | 35.77  | 4.23                             | 12.89                  | 15.47               | 32.59 | 000     | 68.36     | -22.80     |
| Mar                                          | 13.13          | 48.37                                | 1.75       | 63.24    | 17.84                | 21.40                                | 00.0    | 0.00      | 101.03     | 0.00                                  | 101.03      | 39.61  | 4.69                             | 14.27                  | 17.12               | 36.08 | 000     | 75.69     | 25.34      |
| Apr                                          | 66.6           | 36.79                                | 1.33       | 48.11    | 17.26                | 20.71                                | 00:0    | 0.00      | 84.98      | 0.00                                  | 84.98       | 30,13  | 3.57                             | 13.81                  | 16.57               | 33.94 | 000     | 20.08     | 20 80      |
| May                                          | 26.29          | 96.83                                | 3.50       | 126.62   | 17.84                | 21.40                                | 00:0    | 0.00      | 160.56     | 0.00                                  | 160.56      | 17.77  | 9.38                             | 14.27                  | 17.12               | 40.77 | 000     | 138.52    | 47.01      |
| Total                                        | 148.47         | \$46.89                              | 19.74 7    | 715.10 2 | 210.00               | 252.00                               | 00.00   | 2.25      | 1160.00    | 0.00                                  | 1160.0      | 446.0  | 53.0                             | 168.0                  | 201.6               | 422.6 | 201.0   | 1069.6    | 00 06      |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | , 10 = Column. | 1 no.(5+6+7+                         | (6+8       | Column 1 | Vo. 12 = 1           | Column No. 12 = Column no. (10 + 11) | (10+11) | Tio<br>Co | - 61.on nm | Column no. 19 = Column no. (13+17+18) | (13+17+18)  | Column | Column no.20 = Column no.(19-12) | 1) ou umn              | .12).               |       | i       |           |            |

Table 4.10.10(h): Noyil Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                                       |             |                                     |            |        |                    |                                     |           |          |             | i           |                                           |        |             |                                    |                    |              |         |        | Unit: MCM | MCM     |
|-------------------------------------------------------|-------------|-------------------------------------|------------|--------|--------------------|-------------------------------------|-----------|----------|-------------|-------------|-------------------------------------------|--------|-------------|------------------------------------|--------------------|--------------|---------|--------|-----------|---------|
|                                                       |             |                                     | I          |        | *                  | Water Utilitation                   | tation    |          |             |             |                                           |        |             |                                    | Water Availability | hility       |         |        |           |         |
| Month                                                 |             |                                     |            | Wati   | Water requirements | nents                               |           |          |             |             | Gross                                     |        |             | Regeneration from uses             | from uses          | F            | Surface | Ground | - Jage    | Vonthly |
| FILOTAT                                               | Utilisation | Utilisation under impation projects | ation proj |        | Dome-              | Indus-                              | Hydro-    | Environ- | Table       | Export      | total                                     | Import | Irriga-     | Dome-                              | [ndus-             | Τ            | _       | Water  | water     | water   |
|                                                       | Proposed E  | Existing Ongoing                    |            | Total  | stic               | tria.                               | power     | mental   | 1 OLAS      |             | utilisation                               |        | lion        | <b>X</b>                           | Frial              | otal<br>otal | yields  | •      | avoilable | balance |
| (1)                                                   | 3           | e                                   | €          | (5)    | 9                  | 6                                   | (19)      | (6)      | (10)        | (11)        | (12)                                      | (13)   | (14)        | (15)                               | (91)               | (13)         | (8)     | (61)   | (50)      | (21)    |
| Jun                                                   | 31.84       | 117.29                              | 4.23       | 153.36 | 17.02              | 70.71                               | 0.00      | 0.00     | 194.79      | 0.00        | 194.79                                    | 96.26  | 11.37       | 16.57                              | 16.57              | 44.51        | 0.34    | 11.62  | 152,73    | 75.08   |
| Jal                                                   | 18:05       | \$6.49                              | 9          | 86.94  | 21.40              | 21.40                               | 0.00      | 0.01     | 129.76      | 00.00       | 129.76                                    | 54.35  | 6.45        | 17.12                              | 17.12              | 69.04        | 1.03    | 6.59   | 102.66    | .27.09  |
| Aug                                                   | 14.08       | 51.85                               | 1.87       | 67.80  | 21.40              | 21.40                               | 00'0      | 0.00     | 110.60      | 00.00       | 110.60                                    | 42.35  | 5.03        | 17.12                              | 17.12              | 39.27        | 0.00    | ×14    | 86.76     | 23.82   |
| Sep                                                   | 7.13        | 26.26                               | 0.95       | 34,34  | 20.71              | 17.02                               | 0.00      | 0.06     | 75.82       | 00.00       | 75.82                                     | 21.40  | 2.55        | 16.57                              | 16.57              | 35.69        | 5.27    | 2,60   | 8.3       | -10.86  |
| Oct                                                   | 0.97        | 3.57                                | 0.13       | 4.66   | 21.40              | 21.40                               | 0.00      | 1.17     | 48.64       | 00.00       | 48.64                                     | 2.91   | 0.35        | 17.12                              | 17.12              | 74.59        | 104.2   | 0.35   | 142.09    | 93.46   |
| Nov                                                   | 1.20        | 141                                 | 9.16       | 5.77   | 20,71              | 20.71                               | 0.00      | 0.63     | 47.83       | 00.00       | 47.83                                     | 3.60   | 0.43        | 16.57                              | 16.57              | 33.57        | \$6.45  | 14.0   | 22.07     | 46 24   |
| Dec                                                   | 4.74        | 17.45                               | 0.63       | 22.82  | 21.40              | 21.40                               | 00'0      | 0.38     | 96.00       | 00.00       | 90.99                                     | 14.10  | 1.69        | 17.12                              | 17.12              | 35.94        | 33.67   | 1.73   | \$5.44    | 19.4    |
| Jan                                                   | 9.20        | 33.89                               | 1.22       | 44.32  | 21.40              | 21.40                               | 0.00      | 0.00     | 87.12       | 00.0        | 87.12                                     | 27,74  | 3.29        | 17.12                              | 17.12              | 37.53        | 0.00    | 336    | 68.63     | -18 40  |
| Feb                                                   | 11.86       | 43.68                               | 1.58       | 57.11  | 19.33              | 19.33                               | 0.00      | 0.00     | 95.78       | 00'0        | 95.78                                     | 35.77  | 4.24        | 15.47                              | 15.47              | 35.17        | 000     | 4.33   | 75.27     | -20.51  |
| Mar                                                   | 13.13       | 48.37                               | 2.7        | 63.24  | 21.40              | 21.40                               | 0.00      | 0.00     | 106.05      | 0.00        | 106.05                                    | 39.61  | 4:69        | 17.12                              | 17.12              | 38.93        | 000     | 4.79   | 83.34     | 17.72.  |
| Apr                                                   | 666         | 36.79                               | 1.33       |        | 20.71              | 20.71                               | 0.00      | 0.00     | 89.54       | 00.00       | 89.54                                     | 30.13  | 3.57        | 16.57                              | 16.57              | 36.71        | 000     | 3.65   | 70,49     | -19 05  |
| May                                                   | 26.29       | æ                                   | - 1        | 126.62 | 21.40              | 21.40                               | 0.00      | 0.00     | 169.42      | 00.00       | 169.42                                    | 11.17  | 9.39        | 17.12                              | 17.12              | 43.63        | 0.00    | 9.60   | 131.00    | -38 42  |
| Total                                                 | 148.47      | \$46.89                             | 19.74      | 715.10 | 252.00             | 252.00                              | 0.00      | 2.25     | 1221.3      | 00.00       | 1221.3                                    | +16.0  | 53.03       | 201.6                              | 201.6              | 456.2        | 201.0   | 3      | 1157.4    | -63.92  |
| Note : Column no. $10 = \text{Column no.}(5+6+7+8+9)$ | 10 = Column | n no.(5+6+)                         | (6+8+)     | Colun  | on No. 12          | Column No. 12 = Column no. (10 + 11 | 0. (10+11 | S        | umn no.20 = | = Column no | Column no. 20 = Column no. (13+17+18+19). |        | lumn no. 21 | Column no. 21 = Column no. (20-12) | (20-12)            |              |         |        |           |         |

Table 4.10.11(a): Amaravathi Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

| Water requirements         Gross           Poster         Lindus-         Hydro-         Environ-         Total         Export         total           Total         stic         trial         power         mental         Total         Export         total           17         (5)         (7)         (8)         (9)         (10)         (11)         (12)           278 84         18.90         25.07         0.08         0.03         322.93         0.00         418.00           371.64         19.53         25.90         0.08         0.84         418.00         0.00         418.00           166.72         18.90         25.07         0.08         0.87         362.59         0.00         418.00           166.72         18.90         25.07         0.08         0.87         362.59         0.00         365.59           166.72         18.90         25.07         0.08         0.87         36.46         0.00         211.66           1.12.23         18.90         25.07         0.08         0.14         64.61         0.00         211.66           1.22.3         18.50         0.08         0.29         113.10         0.00 <t< th=""><th>Water Utilisation</th><th></th><th></th><th>ra .</th><th>Water Availability</th><th></th><th></th><th>1741</th></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Water Utilisation |                     |                                  | ra .                   | Water Availability |               |           | 1741    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|----------------------------------|------------------------|--------------------|---------------|-----------|---------|
| Vilisation under irrigation projects   Done-   Indus-   Hydro-   Environ-   Total   Export   Utilisation   Proposed   Existing Ongoing   Total   Stic   trial   power   mental   Total   (12)   (12)   (12)   (13)   (14)   (15)   (16)   (17)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   (18)   |                   | Gross               |                                  | Regeneration from uses | from uses          | Surface       | Gross     | Monuny  |
| (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (12) (12) (13) (13) (14) (15) (15) (15) (15) (15) (15) (15) (15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Hydro- Environ-   |                     | Import Lrriga-                   | Dome-                  | Indus              | water         | Waler     | halance |
| (i) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (12) (12) (17.26 247.48 6.90 371.64 19.53 25.90 0.08 0.84 418.00 0.00 332.93 (0.00 372.93 0.00 372.93 (0.00 372.93 0.00 372.93 0.00 372.93 (0.00 372.93 0.00 372.93 0.00 372.93 (0.00 372.93 0.00 372.93 0.00 372.93 (0.00 372.93 0.00 372.93 0.00 372.93 (0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 (0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.93 0.00 372.9 | power mental      | utilisation         | tion                             | stic                   | Lrial Lotal        |               | available | }       |
| 87,98         185,68         5.17         278.84         18.90         25.07         0.08         0           117,26         247,48         6.90         371.64         19.53         25.90         0.08         0           52.60         111,02         3.09         166.72         18.90         25.07         0.08         0           5.56         111,02         3.09         166.72         18.90         25.07         0.08         0           5.56         11,73         0.33         17.62         19.53         25.90         0.08         1           20,69         43,67         1,22         65.59         19.53         25.07         0.08         2           52,10         1059.96         3.06         165.12         19.53         25.90         0.08         2           77.37         163.30         4.55         245.22         17.64         23.40         0.08         0           88.94         187.70         5.23         281.87         19.53         25.90         0.08         0           32.44         68.47         1.91         102.83         18.90         25.07         0.08         0           32.11         67.78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | (01) (6) (8)      |                     | (13) (14)                        | ((5)                   | (11) (11)          | (81)          | (61)      | (20)    |
| 117.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.08 0.03         |                     | 62.33 16.97                      | 15.12                  | 20.05 52           | 52.14 3.46    | 117.91    | .204 99 |
| 101.98         215.22         6.00         323.20         19.53         75.90         0.081         0           5.56         11.102         3.09         166.72         18.90         25.07         0.08         1.1           2.66         11.73         0.33         17.62         19.53         25.90         0.08         1.1           2.06         43.67         1.22         65.59         19.53         25.07         0.08         2           52.10         108.96         3.06         165.12         19.53         25.90         0.08         2           77.37         163.30         4.55         245.22         17.64         23.40         0.08         0           88.94         187.70         5.23         281.87         19.53         25.90         0.08         0           32.44         68.47         1.91         102.83         18.90         25.90         0.08         0           32.11         67.78         1.89         10.78         19.53         25.90         0.08         0           6.23         1.24         1.91         102.83         18.90         25.90         0.08         0           7.24         68.47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.08              |                     | 82.79 22.61                      | 15.63                  | 20.72              | 58.96 83.99   | 325.75    | -192.25 |
| 52.60         111.02         3.09         166.72         18.90         25.07         0.08         0           5.56         11.73         0.33         17.62         19.53         25.90         0.08         1.           2.0.69         43.67         1.22         65.59         19.53         25.07         0.08         2           52.10         109.96         3.06         165.12         19.53         25.90         0.08         2           77.37         163.30         4.55         245.22         17.64         23.40         0.08         0           88.94         187.70         5.23         281.87         19.53         25.90         0.08         0           32.44         68.47         1.91         102.83         18.90         25.07         0.08         0           32.11         67.78         1.89         10.78         19.53         25.90         0.08         0           672.91         1.470.2         39.58         2132.6         25.07         0.08         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 0.08 0.87         |                     | 72.00 19.66                      | 56 15.63               | 20.72              | 56.02 87.40   | 3 215.42  | -154.17 |
| 5.56         11,73         0.33         17.62         19,53         25.90         0.08         1.           20,69         43,67         1,22         65.59         19.53         25.90         0.08         2           52,10         109,96         3.06         165.12         19.53         25.90         0.08         2           77,37         163,30         4.55         245.22         17.64         23.40         0.08         0           88,94         187.70         5.23         281.87         19.53         25.90         0.08         0           32,44         68.47         1.91         102.83         18.90         25.07         0.08         0           32,11         67.78         1.89         101.78         19.53         25.90         0.08         0           672.91         1.470.2         39.58         213.26         23.00         0.08         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 68.0 80.0         |                     | 37.14 10.14                      | 14, 15.12              | 20.05              | 45.32 88.89   | 9 171.35  | 40 31   |
| 3.86         8.14         0.23         12.23         18.90         25.07         0.08         2           20,69         43,67         1,22         65.59         19.53         25.90         0.08         2           52,10         109.96         3.06         165.12         19.53         25.90         0.08         2           77.37         163.30         4.55         245.22         17.64         23.40         0.08         0           88.94         187.70         5.23         281.87         19.53         25.90         0.08         0           32.44         68.47         1.91         102.83         18.90         25.07         0.08         0           32.11         67.78         1.89         101.78         19.53         25.90         0.08         0           672.91         1.470.2         39.58         213.26         230.0         35.50         0.08         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.08              |                     | 3,92                             | 1.07 15.63             | 20.72              | 37.42         | 68.881    | 124.28  |
| 20,69         43,67         1,22         65,59         19,53         25,90         0,08         2           52,10         109,96         3,06         165,12         19,53         25,90         0,08         0           77,37         163,30         4,55         245,22         17,64         23,40         0,08         0           88,94         187,70         5,23         281,87         19,53         25,90         0,08         0           32,44         68,47         1,91         102,83         18,90         25,07         0,08         0           32,11         67,78         1,89         101,78         19,53         25,90         0,08         0           672,91         1,430,2         39,58         213,26         23,00         35,59         0,08         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.08 2.10         |                     | 2.74 0.                          | 0.74 15.12             | 30.05              | 35.92 209.50  | 248.16    | 189.79  |
| \$2.10         109.96         3.06         165.12         19.53         25.90         0.68         0           77.37         163.30         4.55         245.22         17.64         23.40         0.08         0           88.94         187.70         5.23         281.87         19.53         25.90         0.08         0           32.44         68.47         1.91         102.83         18.90         25.07         0.08         0           32.11         67.78         1.89         101.78         19.53         25.90         0.08         0           672.91         1470.2         39.58         213.26         230.0         35.50         100         8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.08 2.00         | L                   | 14,63                            | 3.99 15.63             | 20.72              | 40.34 [99.57  | 7 254.54  | 141,44  |
| 77.37         163.30         4.55         245.22         17.64         23.40         0.08         0           88.94         187.70         5.23         281.87         19.53         25.90         0.08         0           32.44         68.47         1.91         102.83         18.90         25.07         0.08         0           32.11         67.78         1.89         101.78         19.53         25.90         0.08         0           672.91         1420.2         39.58         2132.6         230.0         355.0         100         8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.08 0.29         |                     | 36.71                            | 10.05 15.63            | 20.72              | 46 40 28.89   | 111.99    | .98.93  |
| 88 94         187.70         5.23         281.87         19.53         25.90         0.08         0           32.44         68.47         1.91         102.83         18.90         25.07         0.08         0           32.11         67.78         1.89         101.78         19.53         25.90         0.08         0           672.91         14.00.2         39.58         2132.6         230.0         35.50         100         8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0.08              |                     | \$4.63                           | 92 14.12               | 18.72              | 17 75 15.47   | 7 117.85  | -168.65 |
| 32.44 68.47 1.91 102.83 18.90 25.07 0.08 0.32.11 67.78 1.89 101.78 19.53 25.90 0.08 0.08 0.08 0.01 1420.2 39.58 2132.6 230.0 305.0 1.00 8.00 0.00 0.00 0.00 0.00 0.00 0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0.08 0.04         |                     | 62.79 17.15                      | 15.63                  | 20.72              | 53.50 3.85    | 5 120.15  | -207.29 |
| 32.11 67.78 1.89 101.78 19.53 25.90 0.08 0 672.91 1420.2 39.58 2132.6 230.0 305.0 1.00 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 0.08 0.05         |                     | 22.86 6.                         | 6.26 15.12             |                    | 41.43 4.79    | 80:69     | -77.85  |
| 2132.6 230.0 305.0 1.00 8:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 0.08 0.24         |                     | 22,45 6.                         | 6.19 15.63             | 20.72              | 42.54 24.25   | 89.24     | -58.30  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1.00 8.98         |                     | 475.0 129.8                      | 8. 184.0               | 244.0              | 0.863 18.7.52 | 1631      | .746.87 |
| Note: Column no.19 = Column no.(5+6+7+8+9). Column No. 12 = Column no. (40 + 11) Column no.19 = Column no.(13+17+18).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                   | Jump no.(13+17+18). | Column no.20 = Column no.(19-12) | Column no (15          | -12).              |               |           |         |

Table 4.10.11(b): Amaravathi Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

| Unit: MCM | . Manaklii         | Nonuniy                |                                     |                           | (21) | 169.94 | -145.23 | -113.44          | 19.87  | 125.39 | 190.15 | 148.70 | -78.76 | -137.93 | 171.93 | 65.73  | 46.39  | 153.63      |                                               |
|-----------|--------------------|------------------------|-------------------------------------|---------------------------|------|--------|---------|------------------|--------|--------|--------|--------|--------|---------|--------|--------|--------|-------------|-----------------------------------------------|
| Unit      |                    | Gross                  | Waler                               | available                 | (02) | 159.15 | 279.14  | 262.52           | 197.95 | 196.27 | 254 69 | 268.17 | 138.53 | 154,32  | 161.88 | 87.36  | 107.52 | 2299 0      | ,                                             |
|           |                    | Ground                 | water                               | yrelds                    | (61) | 40.27  | 23.67   | 89.94            | 24.08  | 2.54   | 1.77   | 9.47   | 23.85  | 35,42   | 40.71  | 14.85  | 14.70  | 308.0       |                                               |
|           |                    | Surface                | water                               | yiclds                    | (81) | 3.46   | 83.99   | 87.40            | 88.89  | 147.54 | 209.50 | 199.57 | 68 85  | 15.47   | 3.85   | 4.79   | 24 25  | 898.0       |                                               |
|           | bility             |                        | , -, -, F                           | o<br>d                    | (17) | \$3.09 | 69 85   | <del>1</del> 4.8 | 47.84  | 42.26  | 40.68  | 44.49  | 49,09  | 18.81   | 55.32  | 41.87  | 46.12  | 0.819       |                                               |
|           | Water Availability | from uses              | Indus                               | trial                     | (91) | 20.05  | 20.72   | 20.72            | 20.05  | 20,72  | 20.05  | 20.72  | 20.72  | 18.72   | 20.72  | 20.05  | 20.72  | 2.40        | 0.(20-12).                                    |
|           |                    | Regeneration from uses | Dome-                               | stic                      | (15) | 20.05  | 20.72   | 20.72            | 20.05  | 20.72  | 20.05  | 20.72  | 20.72  | 18.72   | 20.72  | 20.05  | 20.72  | 244.0       | Column no. 21 = Column no (20-12)             |
|           |                    |                        | Imga-                               | ion                       | (14) | 12.98  | 17.24   | 14.99            | 7.73   | 0.82   | 0.57   | 3.05   | 7.64   | 11.37   | 13.08  | 4.76   | 4.67   | 130.0 244.0 | umn no. 21                                    |
|           |                    |                        | Import                              |                           | (13) | 62.33  | 82.79   | 87.              | 37.14  | 3.92   | 2.74   | 14.63  | 36.71  | X.63    | 62.79  | 22.86  | 22.45  | 475.0       |                                               |
|           |                    | Gross                  | tota                                | utilisation               | (12) | 329.09 | 424.37  | 375.96           | 217.82 | 36.07  | 64.54  | 119.47 | 217.30 | 292.25  | 333.80 | 153.09 | 153.91 | 2752.6      | Column no. 20 * Column no. (13+17+18+19)      |
|           |                    |                        | Export                              |                           | (E)  | 00'0   | 000     | 00.0             | 00'0   | 00.0   | 000    | 000    | 00.0   | 00'0    | 00'0   | 00'0   | 00'0   | 00'0        | Column no.                                    |
|           |                    |                        | F                                   | 10621                     | (01) | 329.00 | 424.37  | 375.96           | 217.82 | 70.98  | \$2.54 | 119.47 | 217.30 | 292.25  | 333.80 | 153.09 | 183.91 | 2752.6      | umn no.20 **                                  |
|           |                    |                        | Environ-                            | mental                    | (8)  | 0.03   | 0.84    | 0.87             | 68.0   | 1.48   | 2.10   | 200    | 0.29   | 0.13    | 50     | 0.05   | 0.24   | 86.8        |                                               |
|           | sation             |                        | Hydro-                              | power                     | (61) | 0.08   | 0.08    | 0.08             | 0.08   | 0.08   | 80.0   | 0.08   | 0.08   | 0.08    | 0.08   | 0.08   | 80.0   | 1.00        | 0. (10 + 11)                                  |
|           | Water Utilisation  | ents                   | Indus-                              | Frial                     | 0    | 25.07  | 25.90   | 25.901           | 25.07  | 25.90  | 25.07  | 25.90  | 25.90  | 23.40   | 25.90  | 25.07  | 25.90  | 305.0       | Column n                                      |
|           |                    | Water requirements     | Dome-                               | stic                      | (9)  | 25.07  | 25.90   | 25.90            | 25.07  | 25.90  | 25.07  | 25.90  | 25.90  | 23.40   | 25.90  | 25.07  | 25.90  | 305.0       | Column No. 12 = Column no. (10 + 11)          |
|           |                    | W                      | rojects                             | Total                     | (S)  | 278.84 | 371.64  | 323.20           | 166.72 | 17.62  | 12.23  | 65.59  | 165.12 | 245.22  | 281.87 | 102.83 | 101.78 | 2132.6      | Colu                                          |
|           |                    |                        | Utilisation under imgation projects | Ongoing                   | (4)  | 5.17   | 06.90   | 6.00             | 3.09   | 0.33   | 0.23   | 1.22   | 3.06   | 4.55    | 5.23   | 1.91   | 1.89   | 39.58       | 5+7+8+9).                                     |
|           |                    |                        | ion under i                         | Proposed Existing Ongoing | (3)  | 185.68 | 247.48  | 215.22           | 111.02 | 11,73  | 8 14   | 43.67  | 96.601 | 163.30  | 187,70 | 68.47  | 67.78  | 1420.2      | mn no.(5+                                     |
|           | . i                |                        | Utilisati                           | Proposed                  | (2)  | 8678   | 117.26  | 101.98           | \$2.60 | 5.56   | 3.86   | 20.69  | 52.10  | 77.37   | 88.94  | 32.44  | 32.11  | 672.91      | 5. 10 = Colu                                  |
|           |                    | Afonth                 | TOTAL TOTAL                         |                           | (1)  | Jun    | Jul     | Aug              | Sep    | Ö      | Nov    | Dec    | Jan    | Feb     | Mar    | Apr    | May    | Total       | Note: Column no. 10 = Column no. (5+6+7+8+9). |

Table 4.10.11(c): Amaravathi Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water Unit: MCM

|     |                    | Monthly                | water                                 | Dalance          | 8    | -174.05      | -249.64      | -185.27       | 132.30       | 140.74     | 199.89    | -9.43       | -26.92       | -179.32      | -168.54      | 33.55       | 16.95       | -536.87       |                                            |
|-----|--------------------|------------------------|---------------------------------------|------------------|------|--------------|--------------|---------------|--------------|------------|-----------|-------------|--------------|--------------|--------------|-------------|-------------|---------------|--------------------------------------------|
|     |                    | Gross                  | _                                     | <u>u</u>         | (61) | 148.88       | 168.36       | 184.32        | 343.96       | 205.35     | 258.76    | 103.67      | 184.00       | 107.18       | 158.90       | 113.39      | 164.49      | 2141          |                                            |
|     |                    | Surface                | water                                 | yiclds           | (81) | 9 K          | 26.60        | 56.30         | 261.50       | 164.00     | 219.60    | 48.70       | 100.90       | 4.80         | 42.60        | 49.10       | 99.50       | 1108.0        |                                            |
|     | lity               |                        |                                       | T OCBI           | (13) | 52.14        | 58.96        | 56.02         | 45.32        | 37.42      | 35.92     | 40.34       | 04-94        | 47.75        | 53.50        | 41.43       | 42.54       | 557.8         |                                            |
|     | Water Availability | from uses              | Indus-                                | Ligh             | (16) | 20.05        | 20.72        | 20.72         | 20.05        | 20.72      | 20.05     | 20.72       | 20.72        | 18.72        | 20.72        | 20.02       | 20.72       | 241.0         | 12)                                        |
|     | W                  | Regeneration from uses | Dome-                                 | stic             | (15) | 15.12        | 15.63        | 15,63         | 15.12        | 15.63      | 15.12     | 15.63       | 15.63        | 14,12        | 15.63        | 15.12       | 15.63       | 184.0         | Column no.20 = Column no.(19-12)           |
|     |                    | 4                      | Imiga-                                | tion             | (14) | 16.97        | 22.61        | 19.66         | 10.14        | 1.07       | 0.74      | 3.99        | 10.05        | 14.92        | 17.15        | 6.26        | 6.19        | 129.8         | no.20 = Col                                |
|     |                    |                        | Import                                |                  | (13) | 62,33        | 82.79        | 72.00.        | 37.14        | 3.92       | 2.74      | 14,63       | 36.71        | 54.63        | 62.79        | 22.86       | 22,45       | 475.0         | Column                                     |
|     |                    | Gross                  | letot                                 | utilisation      | (12) | 322.93       | 418.00       | 369.59        | 211.66       | 64.61      | 58.37     | 113.10      | 210.93       | 286.50       | 327.43       | 146.93      | 147.54      | 2677.6        | (13+17+18).                                |
|     |                    |                        | Ехроп                                 |                  | (11) | 0.00         | 0.00         | 0.00          | 00:00        | 000        | 0.00      | 0.00        | 0.00         | 000          | 0.00         | 0.00        | 800         | 0.00          | Column no. 19 = Column no. (13+17+18)      |
|     |                    |                        | Talai                                 | 10031            | (10) | 322.93       | 418.00       | 369.59        | 211.66       | 64.61      | 58.37     | 113.10      | 210.93       |              | 327.43       | 146.93      | 147.52      | 2677.60       | = 61.01 mm                                 |
|     |                    |                        | Environ-                              | mental           | (6)  | 0.03         | 0.84         | 0.87          | 0.89         | 1.48       | 2.10      | 2.00        | 0.29         | 61.0         | 0.04         | 0.05        | 0.24        | \$.98         |                                            |
|     | Isation            |                        | Hydro-                                | power            | (8)  | 0.1          | 0.1          | 0.1           | 0.1          | 0.1        | 0.1       | 0.1         | 0.1          | 0.1          | 0.1          | 1.0         | 0.1         | 1.00          | Column No. 12 = Column no. (10 + 11)       |
| 11. | Water Utilisation  | ments                  | Inchis-                               | trial            | (i)  |              | 25.90        | 25.90         | 25.07        | 25.90      | 25.07     | 25.90       | 25.90        | 23.40        | 25.93        | 25.07       | 25.90       | 305.0         | = Column                                   |
|     |                    | Water requirements     | Боле-                                 | stic             | 9    | 18.90        | 19.53        | 19.53         | 18.90        | 19.53      | 18.90     | 19.53       | 19.53        | 1761         | 19.53        | 18.90       | 19.53       | 230.0         | umn No. 12                                 |
|     |                    | 7.7                    | projects                              | Total            | (5)  | 7 278.84     | 371.64       | 323.20        | 9 166.72     | 3 17.62    | 3 12.23   | 2 65.59     | 6 165.12     | 5 245.22     | 3 281.87     | 102.83      | 9 101.78    | 8 2132.6      |                                            |
|     |                    |                        | r irrigation                          | Existing Ongoing | (4)  | 5.17         | 8 6.90       | 2 6.00        | 2 3.09       | 3 0.33     | 4 0.23    | 1.22        | 3.06         | 0 455        | 0 5.23       | 7 191       | 1.89        | 2 39.58       | 6+8+2+9+9                                  |
|     |                    |                        | Utilisation under irrigation projects |                  | 3    | 87.98 185.68 | 17.26 247.48 | 101.98 215.22 | 52.60 111.02 | 5.56 11.73 | 3,86 8.14 | 20.69 43.67 | 52.10 109.96 | 77.37 163.30 | 88.94 187.70 | 32.44 68.47 | 32.11 67.78 | 672.91 1420.2 | Johnman no. (                              |
|     | _                  |                        | T C                                   | Proposed         | (3)  | 36           | =            | 2             | 3.           |            |           | 17          | .5.          | 7            | 36 I         | 23          | 3.          | 67.           | m no.10 = C                                |
|     |                    | Month                  | Importat                              |                  | (1)  | Jun          | J.F.         | Aug           | Şep          | Oct        | Nov       | Dec         | Jan          | Feb          | Mar          | Apr         | May         | Total         | Note: Column no.10 = Column no.(5+6+7+8+9) |

Table 4.10.11(d): Amaravathi Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |             |        | 7                  | Water Utilisation                   | sation       |          |           |             |                                          |        |                                   |                        | Water Availability | bility |         |             |           |          |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|-------------|--------|--------------------|-------------------------------------|--------------|----------|-----------|-------------|------------------------------------------|--------|-----------------------------------|------------------------|--------------------|--------|---------|-------------|-----------|----------|
| 7(0=0)                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                      |             | Wate   | Water requirements | carls                               |              |          |           |             | Gross                                    |        | R                                 | Regeneration from uses | from uses          |        | Surface | Ground      | Sass      | Monthly  |
| Month                                         | Utilisatic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Milisation under irrigation projects | gation proj | _      | Dome-              | Indus-                              | Hydro-       | Environ- | L.        | Export      | total                                    | Import | Irriga-                           | Dome                   | lochus.            |        | water   | water       | water     | water    |
|                                               | Proposed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Proposed Existing Ongoing            | -           | Total  | stic               | triat                               | power        | mental   | 10/31     |             | utilisation                              |        | tion                              | stic.                  | trial              | 10[2]  | yields  | yields      | available | Dalarice |
| (1)                                           | (2)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (3)                                  | <b>(</b> +) | (5)    | (9)                | ( <u>)</u>                          | (61)         | (6)      | (01)      | (11)        | (12)                                     | (13)   | (14)                              | (15)                   | (91)               | (23)   | (81)    | <u>(6</u> ) | (07)      | (21)     |
| Jun                                           | 87.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 185.68                               | 5.17        | 278.84 | 25.07              | 25.07                               | 0.1          | 0.03     | 329.09    | 0.00        | 329.09                                   | 62.33  | 12.98                             | 15.12                  | 20.05              | 48.16  | ¥.      | 40.27       | 185.16    | -143.93  |
| Jul.                                          | 117.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 247.48                               | 9.30        | 371.64 | 25.90              | 25.90                               | 0.1          | 0.84     | 424.37    | 0.00        | 424.37                                   | 82.79  | 17.24                             | 15.63                  | 20.72              | 53.59  | 76.60   | 53.67       | 216.66    | -207.71  |
| Aug.                                          | 101.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 215.22                               | 9.00        | 323.20 | 25.90              | 25.90                               | 0.1          | 0.87     | 375.96    | 0.00        | 375.96                                   | 72.00  | 14.99                             | 15.63                  | 20.72              | 51.34  | 56.30   | 46.68       | 226.32    | -149.64  |
| Sep                                           | 52.60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 111.02                               | 3.09        | 166.72 | 25.07              | 25.07                               | 1.0          | 0.89     | 21 7.82   | 0.00        | 217.82                                   | 37.14  | 7.73                              | 15.12                  | 20.02              | 42.91  | 261,50  | 24.08       | 365.63    | 147.81   |
| Oct                                           | 5.56                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 11.73                                | 0.33        | 17.62  | 25.90              | 35.90                               | 0.1          | 1.48     | 70.98     | 0.00        | 70.98                                    | 3.92   | 0.82                              | 15.63                  | 20.72              | 37.17  | 0.40    | 2.54        | 207.64    | 136.66   |
| Nov                                           | 3.86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 8,14                                 | 0.23        | 12.23  | 25.07              | 25.07                               | 1.0          | 2.10     | 64.54     | 0.00        | 64.54                                    | 2.74   | 0.57                              | 15.12                  | 20.02              | 35.75  | 219.60  | 1.77        | 259.86    | 195.32   |
| Š                                             | 30.69                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 43.67                                | 1.22        | 65.59  | 25.90              | 25.90                               | 0.1          | 2.00     | 119.47    | 000         | 119.47                                   | 14.63  | 3.05                              | 15.63                  | 20.72              | 39.40  | 48.70   | 4.6         | 112.20    | 727      |
| Jan                                           | 52.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 109.96                               | 3.06        | 165.12 | 25.90              | 25.90                               | 0.1          | 0.29     | 217.30    | 0.00        | 217.30                                   | 36.71  | 7.64                              | 15.63                  | 20.72              | 43.99  | 100.90  | 23.85       | 205.45    | -11.85   |
| Feb                                           | 77.37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 163.30                               | 4.55        | 245.22 | 23.40              | 23.40                               | 0.1          | 0.15     | 292,25    | 000         | 292.25                                   | 54.63  | 11.37                             | 14.12                  | 18.72              | 44.21  | 4.80    | 35.42       | 139.05    | -153.20  |
| Mar                                           | 88.94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 187.70                               | 5.23        | 281.87 | 25.90              | 25.90                               | 0.1          | 0.0      | 333.80    | 0.00        | 333.80                                   | 62.79  | 13.08                             | 15.63                  | 20.72              | 49.43  | 42.60   | 17.04       | 195.53    | -138.27  |
| Apr                                           | 32.44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 68.47                                | 16.1        | 102.83 | 25.07              | 25.07                               | 0.1          | 0.03     | 153,09    | 0.00        | 153.09                                   | 22.86  | 4.76                              | 15.12                  | 20.05              | 39.94  | 01.64   | 14.85       | 126.74    | -26.35   |
| May                                           | 32.11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 67.78                                | 1.89        | 101.78 | 3.8                | 25.90                               | 0.1          | 0.24     | 153.91    | 0.00        | 153.91                                   | 22.45  | 4.67                              | 15.63                  | 20.72              | 41.03  | 05.66   | 14.70       | 177.68    | 23.77    |
| Total                                         | 672.91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1420.2                               | 39.6        | 2132.6 | 305.0              | 305.0                               | 1.0          | 0.6      | 2752.6    | 0.00        | 2752.6                                   | 475.0  | 130.0                             | 184.0                  | 344.0              | 558.0  | 1108.0  | 308.0       | 2449.0    | -303.63  |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | o.10 = Columnate Columna | n no.(5+6+                           | 7+8+9)      | Colum  | m No. 12 =         | Column No. 12 = Column no. (10 + 11 | 0. (10 + 11) | _        | umn no.20 | * Column no | Column no. 20 - Column no. (13+17+18+19) |        | Column no. 2) = Column no.(20-12) | = Column ne            | 5.(20-12).         |        |         |             |           |          |

Table 4.10.11(e): Amaravathi Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

-34.98 41.00 147.29 -148.94 -79.57 -178.88 -157.46 Unit: MCM water Monthly 165.47 209.67 220.65 205.66 176.68 124.57 19.501 available Gross water 67.91 92.63 94.22 64.26 167.00 50.99 Surface yields water Total Water Availability

20.05

15.12

16.97

0.00

Regeneration from uses

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Import

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Total

Environmental

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Dome-

Utilisation under irrigation projects

Month

Total

Proposed Existing Ongoing

8

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Water requirements

Water Utilisation

utilisation Gross

131.35 122.38 97.90 69.60 48.25 5.24 5.08 6.08 805.0 40 34 46,40 47,75 41,43 42,54 20.72 20.72 20.72 18.72 20.72 20.72 20.02 24.0 Column no.20 = Column no.(19-12) 15.63 15.63 15.63 10.14 6.26 82.33 37.14 37.14 37.14 37.14 36.77 36.77 37.14 36.77 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 37.14 475.0 322.93 418.00 359.59 211.66 58.37 113.10 210.93 226.50 226.50 146.93 147.54 2677.6 Column no. 19 = Column no. 900 322.93 418.00 369.59 211.66 58.37 113.10 210.93 286.50 327.43 146.93 147.54 2677.60 2.10 0.29 9.24 200 86.8 00. 00000 0 88888 2 = Column no. 25.90 25.90 25.90 25.07 25.90 25.90 25.90 25.90 25.90 19.53 19.53 18.90 19.53 18.90 18.90 19.53 Column No. 17.62 12.23 65.59 165.12 245.22 281.87 166.72 2132.6 6.00 0.23 1.22 3.06 4.55 3.09 0.33 39.58 Note: Column no. 10 = Column no. (5+6+7+8+9) (2) (3) 87.98 185.68 117.26 247.48 101.98 215.22 52.60 111.02 5.56 11.73 8.14 109.96 187,70 1430.2 43.67 68.47 3.86 20.69 52.10 77.37 88.94

Table 4.10.11(f): Amaravathi Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

-105.06 -49.03 22.68

-839.8

|                                            |                           |             |                                       |        | Th.                | Water Utilisation                    | ation     |          |              |              |                                        |        |                                    |                        | Water Availability | bility |         |        |          | 1       |
|--------------------------------------------|---------------------------|-------------|---------------------------------------|--------|--------------------|--------------------------------------|-----------|----------|--------------|--------------|----------------------------------------|--------|------------------------------------|------------------------|--------------------|--------|---------|--------|----------|---------|
| Month                                      |                           |             |                                       | Wat    | Water requirements | ents                                 |           |          |              |              | Gross                                  |        | R                                  | Regeneration from uses | from uses          |        | Surface | Ground | Grass    | Nontray |
|                                            | Utilisatic                | on under in | Utilisation under irrigation projects |        | Dome-              | Indus-                               | Hydro-    | Environ- | 1            | Ехроп        | total                                  | Import | Imga-                              | Dome-                  | Indus-             | 1-6-1  | water   | water  | water    | halance |
|                                            | Proposed Existing Ongoing | Existing C  | ngoing                                | Total  | slic               | leri                                 | power     | mental   | iego<br>Tego |              | utilisation                            |        | tion                               | stic                   | trial .            | 630    | yields  | yields | vailable | }       |
| (1)                                        | (3)                       | (3)         | (4)                                   | (S)    | (9)                | 6                                    | (61)      | (6)      | (01)         | (1)          | (12)                                   | (13)   | (34)                               | (15)                   | (16)               | 65     | (81)    | (61)   | (30)     | (21)    |
| Jun                                        | 87.98                     | 185.68      | 5.17                                  | 278.84 | 25.07              | 25.07                                | 0.1       | 0.03     | 329.69       | 00.0         | 329.09                                 | 62.33  | 12.98                              | 20.05                  | 20.05              | 53.09  | 50.99   | 40.27  | 206.68   | -122.41 |
| Jul                                        | 117.26                    | 247.48      | 6.90                                  | 371.64 | 25.90              | 25.90                                | 0.1       | 0.84     | 424.37       | 000          | 424.37                                 | 82.79  | 17.24                              | 20.72                  | 20.72              | 58.69  | 16.79   | 53.67  | 263.06   | -161.31 |
| Aug                                        | 101.98                    | 215.22      | 0.00                                  | 323.20 | 25.90              | 25.90                                | 1.0       | 0.87     | 375.96       | 00.00        | 375.96                                 | 72.00  | 14,99                              | 20.73                  | 20.72              | 8      | 92.63   | 46.68  | 367.75   | -108.21 |
| Sep                                        | 52.60                     | 111.02      | 3.09                                  | 166.72 | 25.07              | 25.07                                | 0.1       | 0.89     | 217.82       | 000          | 217.82                                 | 37.14  | 7.73                               | 20.05                  | 20.05              | 47.84  | £ 22    | 24.08  | 203.28   | -14.54  |
| Oct                                        | 5.56                      | 11.73       | 0.33                                  | 17.62  | 25.90              | 25.90                                | 0.1       | 1,48     | 20.98        | 00:00        | 70.98                                  | 3.92   | 0.82                               | 20.72                  | 20.72              | 42.26  | 64.36   | 35.1   | 112.99   | 42.01   |
| Nov                                        | 3.86                      | 8.14        | 0.23                                  | 12.23  | 25.07              | 25.07                                | 0.1       | 2.10     | スな           | 000          | 64.54                                  | 274    | 0.57                               | 20.05                  | 20.05              | 40.68  | 167.00  | 1.77   | 212 19   | 147.65  |
| <b>3</b>                                   | 20.69                     | 43.67       | 1.22                                  | 62.59  | 25.90              | 25.90                                | 0.1       | 2.00     | 119.47       | 00:0         | 119.47                                 | 14.63  | 3.05                               | 20.72                  | 20.72              | 4.49   | 09.69   | 9.47   | 138.20   | 18.73   |
| Jan                                        | 52.10                     | 96.601      | 3.06                                  | 165.12 | 25.90              | 25.90                                | 0.1       | 0.29     | 217.30       | 000          | 217.30                                 | 36.71  | 7.64                               | 20.72                  | 20.72              | 49.09  | 48.25   | 23.85  | 157 89   | -59.40  |
| Feb                                        | 77.37                     | 163.30      | 4.55                                  | 245.22 | 23.40              | 23.40                                | 0.1       | 0.15     | 292.25       | 00:00        | 292.25                                 | 54.63  | 11.37                              | 18.72                  | 18.72              | 48.81  | 5.24    | 35.42  | 3        | -148.16 |
| Mar                                        | \$8.94                    | 187.70      | 5.23                                  | 281.87 | 25.90              | 25.90                                | 1.0       | 0.04     | 333.80       | 00.0         | 333.80                                 | 62.79  | 13.08                              | 20.72                  | 20.72              | £ 53   | 809     | 40.71  | 164.11   | -169.70 |
| Apr                                        | 32.44                     | 68.47       | 161                                   | 102.83 | 25.07              | 25.07                                | 0.1       | 0.05     | 153.09       | 00.0         | 153.09                                 | 22.86  | 4.76                               | 20.05                  | 20.05              | 44.87  | 33.61   | 14.85  | 116.18   | -36.91  |
| May                                        | 32.11                     | 67.78       | 68                                    | 101.78 | 25.90              | 25.90                                | 0.1       | 0.24     | 153.91       | 00.0         | 153.91                                 | 22.45  | 4.67                               | 20.72                  | 20 72              | 46.12  | 105.23  | 14,70  | 188.50   | 34.59   |
| Total                                      | 672.91                    | 1420.2      | 39.58                                 | 2132.6 | 305.0              | 305.0                                | 1.0       | 0.6      | 2752.6       | 00.0         | 2752.6                                 | 475.0  | 130.0 244                          | 144                    | 244,0              | 0.819  | 805.0   | 308.0  | 2206.0   | -546.63 |
| Note: Column no.10 = Column no (5+6+7+8+9) | o. 10 = Colun             | տ no (5+6   | +7+8+9).                              | Colun  | ખ No. 12 =         | Column No. 12 = Column no. (10 + 11) | 1 (10+11) |          | mn no.20 :   | = Column no. | Column no.20 = Column no.(13+17+18+19) |        | Column no. 21 = Column no. (20-12) | ≈ Column n             | 0.(20-12).         |        |         |        |          |         |

Table 4.10.11(g): Amaravathi Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                                              |                           |            |                                      |        | =                  | Water Utilisation                    | noite        |          |              |                                       |             |        |            |                                  | Water Availability | ility       |         |           | · Constitution |
|----------------------------------------------|---------------------------|------------|--------------------------------------|--------|--------------------|--------------------------------------|--------------|----------|--------------|---------------------------------------|-------------|--------|------------|----------------------------------|--------------------|-------------|---------|-----------|----------------|
|                                              |                           |            |                                      | Wat    | Water requirements | icnis                                |              |          |              |                                       | Gross       |        |            | Regeneration from uses           | n from uses        |             | Surface | Gross     | Mater          |
| Month                                        | Utilisation               | 1 under ir | Julisation under irrigation projects | ojects | Dome-              | Indus-                               | Hydro-       | Environ- | Total        | Export                                | total       | Impart | Imiga-     | Dome-                            | Indus.             | ,<br>Lefa J | water   | water     | balance        |
|                                              | Proposed Existing Ongoing | Xising     | )ngoing                              | Total  | stic               | le 5                                 | power        | mental   | ipol         |                                       | utilesation |        | tion       | stic                             | trial              | Town !      | yields  | available |                |
| 8                                            | (2)                       | <b>≘</b>   | Ŧ                                    | (5)    | (9)                | E)                                   | ( <u>8</u> ) | (6)      | (10)         | (11)                                  | (12)        | (13)   | (14)       | (15)                             | (91)               | (1)         | (18)    | (61)      | (00)           |
| int.                                         | 87.98                     | 185.68     | 5.17                                 | 278.84 | 18.90              | 25.07                                | 0.1          | 0.03     | 322.93       | 00.0                                  | 322.93      | 62.33  | 16.97      | 15.12                            | 20.05              | 52.14       | 42.09   | 156.57    | 166.36         |
| [a]                                          | 117.26                    | 247.48     | 96.9                                 | 371.64 | 19.53              | 25.90                                | 0.1          | 0.84     | 118.00       | 0.00                                  | 418.00      | 82.79  | 22.61      | 15.63                            | 20.72              | 58.96       | 91.85   | 233.61    | 184.39         |
| Aug                                          | 86 101                    | 215.22     | 9                                    | 323.20 | 19.53              | 25.90                                | 0.1          | 0.87     | 369.59       | 00.00                                 | 369.59      | 72.00  | 19.66      | 15.63                            | 20.72              | 56.02       | 97.27   | 225.29    | -144.30        |
| Sep                                          | 52.60                     | 1.02       | 3.09                                 | 166.72 | 18.90              | 25.07                                | 0.1          | 0.89     | 211.66       | 0.00                                  | 211.66      | 37.14  | 10.14      | 15.12                            | 20.05              | 45.32       | 17.69   | 152,17    | -59.49         |
| Š                                            | 5.56                      | 11.73      | 0.33                                 | 17.62  | 19.53              | 25.90                                | 0.3          | 1.48     | 64.61        | 0.00                                  | 64.61       | 3.92   | 1.07       | 15.63                            | 20.72              | 37.42       | \$6.41  | 97.76     | 33.15          |
| 202                                          | 3.86                      | 8.14       | 0.23                                 | 12.23  | 18.90              | 25.07                                | 0.1          | 2.10     | 58,37        | 00.00                                 | 58.37       | 2.74   | 0.74       | 15.12                            | 20.05              | 35.92       | 32.44   | 71.10     | 12.73          |
| ě                                            | 30.69                     | 43.67      | 1.22                                 | 65.59  | 19.53              | 25.90                                | 0.1          | 2.00     | 113.10       | 00:0                                  | 113.10      | 14.63  | 3.99       | 15.63                            | 20.72              | 40.34       | 50.18   | 105.15    | -7.95          |
| lan.                                         | 52.10                     | 8.89       | 3.06                                 | 165.12 | 19.53              | 25.90                                | 0.1          | 0.29     | 210.93       | 00:0                                  | 210.93      | 36.71  | 10.05      | 15.63                            | 20.72              | 46.40       | 34.43   | 117.53    | .93.39         |
| Feb                                          | 77.37                     | 163.30     | 4,55                                 | 245.22 | 17.64              | 23.40                                | 0.1          | 0.15     | 286.50       | 0.00                                  | 286.50      | 54.63  | 14.92      | 14.12                            | 18.72              | 47.75       | 7.96    | 110.34    | -176.16        |
| Mar                                          | 88.94                     | 187.70     | 5.23                                 | 281.87 | 19.53              | 25.90                                | 0.1          | 0.04     | 327.43       | 000                                   | 327.43      | 62.79  | 17.15      | 15.63                            | 20.72              | 53.50       | 32.48   | 148.78    | -178.66        |
| <b>₽</b> DC                                  | 32.44                     | 68.47      | 191                                  | 102.83 | 18.90              | 25.07                                | 0.1          | 0.05     | 146.93       | 000                                   | 146.93      | 22.86  | 6.26       | 15.12                            |                    | 41.43       | 10.18   | 145.30    | .1.63          |
| May                                          | 32.11                     | 67.78      | 1.89                                 | 101.78 | 19.53              | 25.90                                | 0.1          | 0.24     | 147.52       | 0.00                                  | 147.54      | 22.45  | 6.19       | 15,63                            | 20.72              | 42.54       | 45.65   | 110.61    | .36.90         |
| Total .                                      | 672.91                    | 1420.2     | 39.58                                | 2132.6 | 230.0              | 305.0                                | 1.00         | 8.98     | 2677.60      | 0.00                                  | 2677.6      | 475.0  | 129.8      | 184.0                            | 244.0              | 557.8       | 641.0   | 1674      | -1003.9        |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10 = Colum                | n no.(5+6  | 1+7+8+9).                            | Coluz  | ru No. 12 =        | Column No. 12 = Column no. (10 + 11) | . (10 + 11)  |          | unn no. 19 = | Column no. 19 = Column no. (13+17+18) | (13+17+18)  | Column | no.20 = Cc | Column no.20 = Column no.(19-12) | 7-12).             |             |         |           |                |

Unit: MCM Table 4.10.11(h): Amaravathi Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                            |               |                  |                                      |        |                                     | Water Dilisation | sation  |          |             |             |                                        |        |            |                                   | Water Availability | bility |         | !<br>    |          |                    |
|--------------------------------------------|---------------|------------------|--------------------------------------|--------|-------------------------------------|------------------|---------|----------|-------------|-------------|----------------------------------------|--------|------------|-----------------------------------|--------------------|--------|---------|----------|----------|--------------------|
|                                            |               |                  |                                      | Wa     | Water requirements                  | nents            |         |          |             |             | Gross                                  |        | R          | Regeneration from uses            | from uses          |        | Surface | Ground   | Gross    | Monthly            |
| Month                                      | Utilisatio    | m under in       | Julisation under irrigation projects | )jects | Dome-                               | lndus-           | Hydro   | Environ- | Total       | Export      | total                                  | Import | Imiga-     | Dome-                             | Indus-             | Total  | Water   | Water    | water    | halance<br>halance |
|                                            | Proposed      | Existing Ongoing | ngomg                                | Total  | stic                                | Cial             | power   | mental   | Dia C       |             | utilisation                            | i      | tion       | stic                              | trial              | T C    | yields  | yields a | vailable |                    |
| Ξ                                          | T             | ê                | €                                    | જ      | (9)                                 | 6                | (61)    | 6)       | (10)        | (11)        | (12)                                   | (13)   | (14)       | (15)                              | (10)               | (17)   | (18)    | (61)     | (20)     | (21)               |
| in the                                     | 87.98         | 185.68           | 5.17                                 | 278.84 | 25.07                               | 25.07            | 0.1     | 0.03     | 329.09      | 00:0        | 329.09                                 | 62.33  | 12.98      | 20.05                             | 20.05              | 53.09  | 42.09   | 40.27    | 137,69   | .191.40            |
| Fig                                        | 117.26        | 247.48           | 069                                  | 371.64 | 25.90                               | 25.90            | 0.1     | 0.84     | 424.37      | 00.00       | 424.37                                 | 82.79  | 17.24      | 20.72                             | 20.72              | 58.69  | 91.85   | 53.67    | 237.24   | -187.13            |
| Aug                                        | 86 101        | 215.22           | 90.9                                 | 323.20 | 25.90                               | 25.90            | 0.1     | 0.87     | 375.96      | 00.0        | 375.96                                 | 72.00  | 14.99      | 20.72                             | 20.72              | 56.44  | 97.27   | 46.68    | 266.97   | 108.99             |
| u.y.                                       | \$2,60        | 1707             | 300                                  | 166.72 | 25.07                               | 25.07            | 0.1     | 0.89     | 217.82      | 000         | 217.82                                 | 37.14  | 7.73       | 20.05                             | 20.05              | 47.84  | 69.71   | 24.08    | 206,33   | 11.49              |
| )<br>O                                     | 5.56          | 1.73             | 0.33                                 | 17.62  | 25.90                               | 25.90            | 0.1     | 1.48     | 70.98       | 000         | 70.98                                  | 3.92   | 0.82       | 20.72                             | 20.72              | 42.26  | 56,41   | 2.54     | 118,44   | 47.46              |
| i e                                        | 3.86          | 8.34             | 0.23                                 | 12.23  | 25.07                               | 25.07            | 0.1     | 2.10     | £ 75        | 00.0        | 64.54                                  | 2.74   | 0.57       | 20.05                             | 20.05              | 40.68  | 32.44   | 1.77     | 101.60   | 37.06              |
| ي ا                                        | 30.69         | 13.67            | 1.23                                 | 65.59  | 25.90                               | 25.90            | 0.1     | 2.00     | 119.47      | 00.0        | 119.47                                 | 14.63  | 3.05       | 20.72                             | 20.72              | 41,49  | 50.18   | 9.47     | 101,01   | .18.43             |
| Jan                                        | \$2.10        | 26.60            | 3.06                                 | 165.12 | 25.90                               | 25.90            | 0.1     | 0.29     | 217.30      | 00.00       | 217.30                                 | 36.71  | 7.64       | 20.72                             | 20.72              | 49.00  | 34.43   | 23.85    | 159.82   | 57.47              |
| Feb                                        | 77.37         | 163.30           | 4.55                                 | 245.22 | 23.40                               | 23.40            | 0       | 0.15     | 292.25      | 000         | 292.25                                 | 54.63  | 11.37      | 18.72                             | 18.72              | 18.81  | 7.96    | 35.42    | 173.28   | -118.97            |
| Mar                                        | \$8.94        | 187.70           | 5.23                                 | 281.87 | 25.90                               | 25.90            | 0.1     | 0.04     | 333.80      | 00.00       | 333.80                                 | 62.79  | 13.08      | 20.72                             | 20.72              | 54.52  | 32.48   | 40.71    | 165.99   | 167.82             |
| Apr                                        | 32.41         | 68 47            | 16.1                                 | 102.83 | 25.07                               | 25.07            | 0.1     | 0.05     | 153.09      | 00'0        | 153.09                                 | 22.86  | 4.76       | 20.05                             | 20.05              | 44.87  | 81.01   | 14.85    | 115.05   | -38.04             |
| Velv                                       | 32.11         | 67.78            | 1.89                                 | 101.78 | 25.90                               | 25.90            | 0.1     | 0.24     | 183.91      | 000         | 183.91                                 | 22.45  | 4.67       | 20.72                             | 20,72              | 46,12  | 45.65   | 14.70    | 164 28   | 10.37              |
| Total                                      | 672.91        | 1420.2           | 39.6                                 | 2132.6 | 305.0                               | 305.0            | 1.0     | 0.6      | 2752.6      | 0.00        | 2752.6                                 | 475.0  | 130.0      | 341.0                             | 244.0              | 618.0  | 641.0   | 308.0    | 2042.0   | -710.63            |
| Note: Column no.10 = Column no.(5+6+7+8+9) | 10.10 = Colum | m no.(5+6        | +3+8+6)                              | Colu   | Column No. 12 = Column no. (10 + 11 | = Column r       | 10 + 11 |          | umn no.20 : | - Column no | Column no.20 = Column no.(13+17+18+19) |        | umn no. 21 | Column no. 21 = Column no (20-12) | 0.(20-12).         |        |         |          |          |                    |

Table 4.10.12(a): Tirumanimuttar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water Unit: MCM

|                                              |               |                  |                                      |              |                                      | Water Utilisation | sation  |          |            |           |                                        |        |                                    | 3                      | Water Availability | ality |         |           | ) feasibly  |
|----------------------------------------------|---------------|------------------|--------------------------------------|--------------|--------------------------------------|-------------------|---------|----------|------------|-----------|----------------------------------------|--------|------------------------------------|------------------------|--------------------|-------|---------|-----------|-------------|
| 1000                                         |               |                  |                                      | W            | Water requirements                   | nents             |         |          |            |           | Gross                                  |        | , ×                                | Regeneration from uses | from uses          |       | Surface | Gross     | water       |
| U ILIQIM                                     | Utilisati     | on under i       | Julisation under irrigation projects | ojects       | Dome-                                | -snpu]            | Hydro-  | Environ- | Total      | Export    | total                                  | Import | Irriga-                            | Dome-                  | Indus-             | - E   | water   | water     | balance     |
|                                              | Proposed      | Existing Ongoing | Omgoing                              | Total        | stic                                 | Lia Li            | power   | mental   | i Ordi     |           | utilisation                            |        | tion                               | stic                   | trial              |       | yields  | available |             |
| (5)                                          | 0             | 3                | €                                    | 8            | (9)                                  | (1)               | (%)     | (6)      | (01)       | (i)       | (12)                                   | (13)   | (14)                               | (15)                   | (16)               | (11)  | (18)    | (61)      | (3 <u>0</u> |
| 5                                            | 23.10         | 126.36           | 00.0                                 | 149,46       | 33.86                                | 43.56             | 00:0    | 0.01     | 226.90     | 000       | 226.71                                 | 8.8    | 15.14                              | 27.09                  | 34.85              | 77.08 | 1.10    | 175.08    | -51.62      |
| Jac.                                         | 17.45         | 95.46            | 00:0                                 | 112.91       | 34.99                                | 45.01             | 0.00    | 0 03     | 192.95     | 00:0      | 192.81                                 | 73.21  | 1.41                               | 27.99                  | 36.01              | 75,44 | 3.30    | 151.95    | -40.86      |
| Aug                                          | 30.50         | 166.85           | 00:0                                 | 197.35       | 7.38                                 | 45.01             | 00.0    | 0.00     | 277.36     | 000       | 277.11                                 | 127.96 | 66.61                              | 27.99                  | 36.01              | 83.99 | 00.0    | 211.95    | -65.16      |
| Sep                                          | 38 59         | 211.05           | 0.00                                 | 249.64       | 33.86                                | 43.56             | 000     | 0.17     | 327.23     | 00.0      |                                        | 161.85 | 25.28                              | 27.09                  | 34.85              | 87,22 | 17.00   | 266.08    | -60.84      |
| č                                            | 30.86         | 168.79           | 000                                  | 2000         | 34.99                                | 45.01             | 000     | 3.37     | 283.02     | 000       |                                        |        | 20.22                              | 27.99                  | 36.01              | 84.23 | 336.57  | \$50.23   | 267.48      |
| Nox                                          | 35.55         | 194.47           | 000                                  | 230.03       | 33.86                                | 43.56             | 000     | 1.82     | 309.27     | 000       | 308.98                                 | 149.14 | 23.30                              | 27.09                  | 34.85              | 85.24 | 182.30  | 416.67    | 107.70      |
| 30                                           | 25.52         | 139.59           | 00.0                                 | 165.11       | 34,99                                | 45.01             | 0.00    | 1.09     | 246,20     | 00'0      | 245.99                                 | 107.05 | 16.72                              | 27.99                  | 36.01              | 80.73 | 108,70  | 296.47    | 50.49       |
| Jan.                                         | 3.14          | 71.85            | 000                                  | 84.98        | 34.99                                | 45.01             | 00.0    | 8        | 164.99     | 000       | 164.88                                 | 55.10  | 19.8                               | 27.99                  | 36.01              | 72.61 | 00.0    | 127.71    | -37.17      |
| Fcb                                          | スス            | 300.52           | 00:0                                 | 355.47       | 31.61                                | 40.66             | 0.00    | 0.00     | 427.73     | 00.0      | 427.27                                 | 230.47 | 36.00                              | 25.28                  | 32.53              | 93.81 | 0.00    | 324.28    | -102.99     |
| Mar                                          | 81.48         | £3.5             | 0.00                                 | 527.11.      | 83                                   | 45.01             | 0.00    | 0.00     | 607.12     | 000       | 606.44                                 | 341.75 | 53.39                              | 27.99                  | 36.01              | 117.4 | 0.00    | 459.14    | -147.29     |
| Apr                                          | 41.73         | 228.26           | 00.0                                 |              | 33.86                                | 43.56             | 00.0    | 000      | 24742      | 000       |                                        |        | 27.35                              | 27.09                  | 34.85              | 89.29 | 0.00    | 264.34    | -82,74      |
| May                                          | 28.87         | 157.89           | 00.0                                 | 0.00 186.76  | 34 99                                | 45.01             | 800     | 900      | 77.992     | 00.0      | 266.53                                 | 121.09 | 18.92                              | 27.99                  | 36.01              | 82.92 | 0.00    | 204.01    | -62.52      |
| Total                                        | 421.74        | 2306.7           | 00.0                                 | 0.00 2728.47 | 412.0                                | 530.00            | 0.00    | 6.49     | 3676.96    | 000       | 3673.5                                 | 1769.0 | 276.4                              | 329.6                  | 424.00             | 1030  | 649.00  | 3447.92   | -225.54     |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colur | TO.(5+           | (6+8+4+5                             | Colu         | Column No. 12 * Column no. (10 + 11) | * Column n        | 10 + 11 |          | ± 61.00 nm | Column nc | Column no. 19 = Column no. (13+17+18). |        | Calumn no. 20 = Column no. (19-12) | lumn no.(19            | -12)               |       |         |           |             |
|                                              |               |                  |                                      |              |                                      |                   |         |          |            |           |                                        |        |                                    |                        |                    |       |         |           |             |

Table 4.10.12(b): Tirumanimuttar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                              |               |                                       |              |              | 3                                   | Water Hillisation | ation        |          |              |            |                                          |        |            |                                   | Water Availability | bility |         |            | _        |                   |
|----------------------------------------------|---------------|---------------------------------------|--------------|--------------|-------------------------------------|-------------------|--------------|----------|--------------|------------|------------------------------------------|--------|------------|-----------------------------------|--------------------|--------|---------|------------|----------|-------------------|
| ;                                            |               |                                       |              | Wai          | Water requirements                  | rents             |              |          |              |            | Gross                                    |        |            | Regeneration from uses            | from uses          |        | Surface | Ground     | Gross    | Monthly's         |
| Month                                        | Utilisatic    | Utilisation under irrigation projects | rigation pro |              | Dome-                               |                   | Hydro-       | Environ- | Takel        | Export     | total                                    | Import | Irriga-    | -рише-                            | Indus-             | 1      | walcr   | water      | water    | balance           |
|                                              | Proposed      | O autring I                           | Ongoing      | Total        | stic                                | trial             | _            | mental   | 1 OUA        |            | utilisation                              |        | tion       | Stic                              | tria               |        | yields  | yields   0 | vailable |                   |
| Ξ                                            | 3             | S                                     | €            | (5)          | (9)                                 | 6                 | (61)         | 6)       | (01)         | (11)       | (12)                                     | (13)   | (14)       | (15)                              | (91)               | (17)   | (81)    | (61)       | (30)     | (21)              |
| Im                                           | 23.10         | 126.21                                | 000          | 149.27       | 43.56                               | 43.56             | 0.00         | 100      | 226.71       | 0.00       | 226.71                                   | 8.8    | 15.12      | 34.85                             | 34.85              | 84.82  | 1.10    | 19.18      | 202.00   | -24.71            |
| Jag.                                         | 17.45         | 95.35                                 | 000          | 112.77       | 45.01                               | 45.01             | 000          | 0.03     | 197.81       | 000        | 197.81                                   | 73.21  | 11.42      | 36.01                             | 36.01              | 83,44  | 3.30    | 14.49      | 174.45   | .18.37            |
| Aug                                          | 30.50         | 166.65                                | 000          | 197.10       | 45.01                               | 45.01             | 0.00         | 000      | 277.11       | 800        | 277.11                                   | 127.96 | 19.96      | 36.01                             | 36.01              | 65.19  | 0.00    | 25 32      | 245.26   | -31.84            |
| , L                                          | 38 50         | 210.80                                | 000          | 249.32       | 43.56                               | 43 56             | 000          | 0.17     | 326.91       | 000        | 326.91                                   | 161.85 | 25.25      | 34.85                             | 34.85              | £.95   | 17.00   | 32.03      | 305.84   | -21.08            |
| i c                                          | 30.86         | τ                                     | 0.00         | 199.39       | 45.01                               | 45.01             | 000          | 3.37     | 282.76       | 0.00       | 282.76                                   | 129.44 | 20.20      | 36.01                             | 36.01              | 92.22  | 336.57  | 25.62      | 583.84   | 301.08            |
| Nov                                          | 35.55         | 194.24                                | 000          | 229.73       | 43.56                               | 43.56             | 0.00         | 182      | 308 98       | 00.0       | 308.98                                   | 149.14 | 23.27      | 34.85                             | 34.85              | 76.29  | 182.30  | 29.52      | 453.92   | 14.2              |
| 2                                            | 25.52         | 139.42                                | 000          | 64.89        | 45.01                               | 45.01             | 0.00         | 50       | 245.99       | 0000       | 245.99                                   | 107.05 | 16.70      | 36.01                             | 36.01              | 88.72  | 108.70  | 21.19      | 325.66   | 79.67             |
| Jan                                          | 13.14         | 71.76                                 | 000          | 84.87        | 45.01                               | 45.01             | 000          | 900      | 164.88       | 000        | 164.88                                   | 55.10  | 8.60       | 36.01                             | 36.01              | 80.62  | 00:0    | 10.90      | 146.62   | -18.26            |
| 9                                            | J             | 300.16                                | 000          | 355.01       | 40.66                               | 99 07             | 00.00        | 000      | 427.27       | 0.00       | 427.27                                   | 230.47 | 35.96      | 32.53                             | 32.53              | 0.101  | 00'0    | 45.61      | 377.09   | -50.19            |
| Mar                                          | 81.48         | 415.10                                | 000          | 526.43       | 45.01                               | 45.01             | 0.00         | 000      | 606.44       | 000        | 606.44                                   | 341.75 | 53.32      | 36.01                             | 36.01              | 125.3  | 000     | 6764       | 534 73   | 17.17-            |
| Apr                                          | 41.73         | 228.00                                | 000          | 269.66       | 43.56                               | 43.56             | 0.00         | 000      | 347.08       | 000        | 347.08                                   | 175.06 | 17.31      | 32.85                             | 34.85              | 97.01  | 000     | 7.6        | 306.71   | 40.37             |
| May                                          | 78.87         | 157.71                                | 000          | 186.53       | 45.01                               | 45.01             | 0.00         | 000      | 266.53       | 0.00       | 266.53                                   | 121.09 | 18.89      | 36.01                             | 36.01              | 16:06  | 00.0    | 23.96      | 235.97   | -30.56            |
| Total                                        | 421.74        | 2304.0                                | 00.0         | 0.00 2724.97 | 530.0                               | 530.0             | 0.00         | 6.49     | 3791.46      | 00.0       | 3791.5                                   | 0.6971 | 276 0 424  | 124                               | 424.0              | 1134   | 649.0   | 350.1      | 3892.1   | 180<br>180<br>180 |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Colun | nn no.(5+6                            | +7+8+9)      | Colur        | Column No. 12 = Column no. (10 + 11 | - Column n        | 0. (10 + 11) |          | umn no. 20 = | Column no. | Column no. 20 = Column no. (13+17+18+19) |        | นาก คอ. 21 | Column no. 21 = Column no.(20-12) | 0.(20-12).         |        |         |            |          |                   |

Unit: MCM Table 4.10.12(c): Tirumanimuttar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

236.63 127.36 -37.17 -147.29 -82.74 -62.52 233.44 -65.16 -48.81 505.51 water balance Monthly 20) 175.86 154.28 211.95 278.10 788.27 545.60 373.35 127.71 459.14 204.31 Gross water available 0.00 0.00 0.00 0.00 0.00 5.63 0.00 29.02 574.61 0.801 Surface water yields 8 83.99 87.22 87.23 85.24 80.73 72.61 93.81 117.39 89.29 Total Water Availability 34.85 32.53 36.01 36.01 Regeneration from uses Industrial Column no. 20 = Column no. (19-12) 27.09 27.09 27.09 27.09 27.09 27.09 27.09 27.09 27.09 27.09 329.6 Dome-Stic 20.22 20.22 23.30 16.72 8.61 8.61 36.00 15,14 lrigation 149.14 107.05 55.10 127.96 161.85 230.47 129.44 Lmport 308.98 245.99 164.88 427.27 226.71 Column no. 19 = Column no. (13+17+18) 192.81 utilisation Gross total 0.00 0.00 Expon 277.36 327.23 283.02 246.20 164.99 164.99 164.99 164.99 164.99 164.99 164.99 164.99 164.99 164.99 164.99 164.99 166.77 Total Environmental 0.00 0000 800 0000 Hydropower Water Utilisation Column No. 12 = Column no. 43.56 45.01 45.01 Industrial Water requirements 33.86 31.86 X 33.85 Domestic (6) 0.00 186.76 112.91 249.64 199.64 230.03 165.11 355.47 527.11 270.00 149.46 86.48 Total Utilisation under imigation projects 0000000 8888888 Total 421,74 2306.7 0.00 Note: Column no.10 = Column no.(5+6+7+8+9). Proposed Existing Ongoing (2) (3) 23.10 126.36 17.45 95.46 17.45 95.46 30.50 166.85 30.86 18.79 35.55 139.59 13.14 71.85 300.52 41.73 228.26 12 12 81.48 28.87 Month  $\odot$ Jul Aug Sep Oct Nov Doc Jan Feb 결 Š

Unit : MCM Table 4.10.12(d): Tirumanimuttar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

| 4                                             |                                      |             |        | ×                  | Water Utilisation | ation                                |          |           |             |                                         |        | i          |                                    | Water Availability | bility |           |          |           | 1       |
|-----------------------------------------------|--------------------------------------|-------------|--------|--------------------|-------------------|--------------------------------------|----------|-----------|-------------|-----------------------------------------|--------|------------|------------------------------------|--------------------|--------|-----------|----------|-----------|---------|
| 1                                             |                                      |             | Water  | Water requirements | ents              |                                      |          |           |             | Gross                                   |        | -E         | Regeneration from uses             | from uses          |        | Surface ( | Ground   | Gross     | Noniny  |
| _                                             | Julisation under irrigation projects | ation proje | -      | Dome               | -supul            | Hydro-                               | Environ- | ŀ         | Export      | total                                   | Import | lmga-      | Боте-                              | Indus-             | Total  | water     | waler    | water     | halance |
| Proposed Existing Ongoing                     | cisting Ong                          | }-          | ١      | stic               | Te LE             | power                                | mental   |           |             | utilisation                             |        | tron       | stic                               | trial              | 9101   | yields    | yields 2 | available |         |
| (2)                                           | (3)                                  | €           | (5)    | 9                  | 6                 | (61)                                 | 6        | (01)      | (11)        | (12)                                    | ((3)   | (14)       | (15)                               | (16)               | (1)    | (81)      | (61)     | (02)      | (21)    |
| Jun 23.10                                     | 126.21                               | 00.0        | 149.27 | 43.56              | 43.56             | 000                                  | 0.01     | 226.71    | 00.0        | 226.71                                  | 96.90  | [5.12      | 27.09                              | 34.85              | 77.06  | 1.88      | 19.18    | 195.02    | -31.69  |
| 17.45                                         | 95.35                                | 000         | 112,77 | 45.01              | 45.01             | 0.00                                 | 0.03     | 192.81    | 00.0        | 192.81                                  | 73.21  | 11.42      | 27.99                              | 36.01              | 75.43  | 5.63      | 14.49    | 168.75    | -24.05  |
| 30.50                                         | 166.65                               | 000         | 197 10 | 45.01              | 45.01             | 00.0                                 | 00.0     | 277.11    | 000         | 277.11                                  | 127.96 | 19.96      | 27.99                              | 36.01              | 83.97  | 0.00      | 25.32    | 237.25    | -39.86  |
| 38.59                                         | 210.80                               |             | 249 32 | 43.56              | 43.56             | 000                                  | 0.17     | 326.91    | 000         | 326.91                                  | 161.85 | 25.25      | 22.09                              | 34.85              | 87.19  | 29.03     | 32.03    | 310.10    | -16.81  |
| 30.86                                         | 168.58                               | 00.00       | 199 39 | 45.01              | 15.01             | 00'0                                 | 3.37     | 282.76    | 00'0        | 282,76                                  | 129,44 | 20.20      | 27.99                              | 36.01              | 84.20  | 19.4.61   | 25.62    | 813.86    | 531.10  |
| 35.55                                         | 194.24                               | 900         | 229.73 | 43.56              | 43.56             | 00:0                                 | 1.82     | 308.98    | 00.0        | 308.98                                  | 149.14 | 23.27      | 27.09                              | 34.85              | 85.21  | 311.23    | 29.52    | 875.09    | 266.11  |
| 25.52                                         | 139.42                               | 1           | 164 89 | 45.01              | 45.01             | 0.00                                 | 1.09     | 245.99    | 00.0        | 245.99                                  | 107.05 | 16.70      | 27.99                              | 36.01              | 80.71  | 185.58    | 21.19    | 394.51    | 148.53  |
|                                               | 71.76                                | 000         | 24.87  | 45.01              | 45.01             | 000                                  | 0.00     | 1         | 000         | 164.88                                  | 55.10  | 8.60       | 27.99                              | 36.01              | 72.60  | 000       | 10.90    | 138.60    | .26.28  |
| 54.94                                         | 300.16                               | 00:0        | 355.01 | 40.66              | 40.66             | 000                                  | 00.0     | 427.27    | 00.0        | 427.27                                  | 230.47 | 35.96      | 25.28                              | 32.53              | 93.77  | 000       | 45.61    | 369.84    | -57.43  |
| 81.48                                         | 415.10                               | 000         | 526.43 | 45.01              | 45.01             | 000                                  | 0.00     | 606.44    | 00.0        | 606.44                                  | 341.75 | 53.32      | 27.99                              | 36.01              | 117.32 | 00'0      | 67.64    | 526.71    | -79.73  |
| 41.73                                         | 228.00                               | 0.00        | 269.66 | 43.56              | 43.56             | 0.00                                 | 00.0     | 347.08    | 00.0        | 347.08                                  | 175.06 | 27.31      | 27.09                              | 34.85              | 89.25  | 000       | 34.64    | 298.95    | -48.13  |
| Nav 28.87                                     | 157.71                               | 0.00        | 186.53 | 45.01              | 45.01             | 0.00                                 | 0.00     | 266.53    | 00.0        | 266.53                                  | 121.09 | 18.89      | 27.99                              | 36.01              | 82.90  | 00.0      | 23.96    | 27.95     | -38.58  |
| 421.74                                        | 2304.0                               | 0.0         | 2725.0 | 530.0              | 530.0             | 0.00                                 | 6.49     | 3791.46   | 00.00       | 3791.5                                  | 1769,0 | 276.0      | 329.6                              | 424.0              | 1029.6 | 1108.0    | 350.10   | 4256.70   | 465.24  |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | no.(5+6+7                            | +8+9).      | Colum  | n No. 12 ≈         | Column            | Column No. 12 = Column no. (10 + 11) |          | umn no.20 | = Column ne | Column no. 20 = Column no (13+17+18+19) |        | 1чтп №. 21 | Column no. 21 = Column no.(20-12). | 5.(20-12).         |        | ŀ         |          |           |         |

Unit: MCM Table 4.10.12(e): Tirumanimuttar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                                              | <br> -       |                                       |            |         |                                      | Water Utilisation       | ation     |          |            |                                      |             |        |              | **                               | Water Availability | ility  |          |           | N. Constitution |
|----------------------------------------------|--------------|---------------------------------------|------------|---------|--------------------------------------|-------------------------|-----------|----------|------------|--------------------------------------|-------------|--------|--------------|----------------------------------|--------------------|--------|----------|-----------|-----------------|
| :                                            |              |                                       |            | Wa      | Water requirements                   | hends                   |           |          |            |                                      | Gross       |        |              | Regeneration from uses           | from uses          |        | Surface  | Gross     | Montrily        |
| Month                                        | Utilisati    | Utilisation under irrigation projects | ngation pr | ojects  | Dome-                                | -snpu]                  | Hydro-    | Environ- | 4,44.5     | Export                               | total       | Import | Irriga-      | Dome-                            | Indus-             | 1ew_   | water    | water     | balance         |
|                                              | Proposed     | Proposed Existing Ongoing             | Ingoing    | Total   | stic                                 | trial                   | power     | mental   | Total      |                                      | utilisation |        | tion         | stic                             | trial              | Part 1 | yields   | available |                 |
| ε                                            | 3            | (3)                                   | €          | (5)     | (9)                                  | 3                       | (8)       | 6)       | (01)       | (11)                                 | (12)        | (13)   | (14)         | (3)                              | (16)               | (17)   | (18)     | (13)      | (S)             |
| ran C                                        | 23.10        | 126.36                                | 00.0       | 149.46  | 33.86                                | 43.56                   | 00:0      | 10.0     | 226.90     | 00:0                                 | 226.71      | 06.96  | 15.14        | 27.09                            | 34.85              | 77.08  | 1 06     | 175.04    | -51.66          |
| in T                                         | 17.45        | 95.46                                 | 00.0       | 112.91  | 34.99                                | 45.01                   | 00:0      | 0.03     | 192.95     | 00.0                                 | 192.81      | 13.21  | 11.44        | 27.99                            | 36.01              | 75.44  | 317      | 151.82    | -40.99          |
| Aue                                          | 30.50        | 166.85                                | 000        | 197.35  | 34.99                                | 45.01                   | 800       | 0000     | 277.36     | 800                                  | 11.772      | 127.96 | 19.99        | 27.99                            | 36.01              | 83.99  | 00'0     | 211.95    | -65.16          |
| Sep                                          | 38.59        | 211.05                                | 00.0       | 249.64  | 33.86                                | 43.56                   | 000       | 0.17     | 327.23     | 800                                  | 326.91      | 161.85 | 25.28        | 27,09                            | 34.85              | 87.22  | 16.35    | 265.43    | -61.49          |
| Sec.                                         | 30.86        | 168.79                                | 00.0       | 199.64  | 34.99                                | 45.01                   | 00:0      | 337      | 283.02     | 00:00                                | 282.76      | 129.44 | 20.22        | 27.99                            | 36.01              | 84.23  | 323 62   | 537.28    | 254.53          |
| Nov                                          | 35.55        | <u>!</u>                              | 00.0       | 230.03  | 33.86                                | 43.56                   | 000       | 1.82     | 309.27     | 00:00                                | 308.98      | 149,14 | 23.30        | 27.09                            | 34.85              | 85.24  | 175.29   |           | 100.69          |
| 3                                            | 25.52        | 139.59                                | 00.0       | 165.11  | 34.99                                | 45.01                   | 00'0      | 1.09     | 246.20     | 00.0                                 | 245.99      | 107.05 | 16.72        | 27.99                            | 36.01              | 80.73  | 104 52   | 292.29    | 46.3            |
| Jan                                          | 13,14        | 71.85                                 | 800        | 84.98   | 34.99                                | 45.01                   | 000       | 00'0     | 164.99     | 00.00                                | 164.88      | 55.10  | 8.61         | 27.99                            | 36.01              | 72.61  | 00.00    | 127.71    | -37.17          |
| Feb                                          | 2.2          | 300.52                                | 800        | 355.47  | 31.61                                | 40.66                   | 0.00      | 00'0     | 427.73     | 000                                  | 427.27      | 230.47 | 36.00        | 25.28                            | 32.53              | 18.66  | 00.00    | 324.28    | -102.99         |
| Mar                                          | 81.48        | 445.64                                | 0.00       | \$27.11 | 34,99                                | 45.01                   | 00.00     | 0.00     | 607.12     | 0.00                                 | 606.44      | X1.75  | 53.39        | 27.99                            | 36.01              | 117.4  | 00.00    | 459.14    | -147.29         |
| Apr                                          | 41.73        | ᆫ                                     | 000        | 270.00  | 33.86                                | 43.56                   | 0.00      | 00.0     | 347.42     | 0.00                                 | 347.08      | 175.06 | 27.35        | 27.09                            | 34.85              | 89.29  | 0.00     | 264.34    | -82.74          |
| May                                          | 28.87        | 157.89                                | 00.0       | 186.76  | 34.99                                | 45.011                  | 00.0      | 00'0     | 266.77     | 00.0                                 | 266.53      | 121.09 | 18.92        | 27.99                            | 36.01              | 82.92  | 000      | 204.01    | -62.52          |
| Total                                        | 421.74       | 2306.7                                | 0.0        | 2728.5  | 412.0                                | 530.0                   | 00.00     | 6.49     | 36.92      | 00'0                                 | 3673.5      | 1769.0 | 276.4        | 329.6                            | 424.0              | 1030   | 624 (10) | 3423.0    | -250.50         |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colu | mn no.(5+6                            | +7+8+9)    | Coln    | Column No. 12 = Column no. (10 + 11) | = Column p              | 0. (10+11 |          | # 91.00 nn | Column no. 19 = Column no (13+17+18) | (13+17+18)  |        | 1 no.20 = Co | Column no.20 = Column no.(19-12) | -12)               |        |          |           |                 |
|                                              |              | -                                     |            |         |                                      | The same of the same of |           |          |            |                                      |             |        |              |                                  |                    |        |          |           |                 |

Unit: MCM Table 4.10.12(f): Tirumanimuttar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

| ď |                    |                        |                                       |             | 1       | ا, ب   | ادح    | ~      | اجح    |        | 6      | -      | 00     | ++                | 60     | -      | ä      | 7             | _                                         |
|---|--------------------|------------------------|---------------------------------------|-------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|-------------------|--------|--------|--------|---------------|-------------------------------------------|
|   | A Cometation       | water                  | Palkner                               |             | (21)    | -34 45 | -28.52 | 41.87  | -31,4  | 278.11 | 128.23 |        |        | +5'65-            | -81.73 | -50.07 | -40,59 | 75.64         |                                           |
|   |                    | Gross                  | water                                 | available   | (20)    | 201.96 | 174.31 | 245.26 | 305.19 |        | 446.91 | 321.48 | 146.62 | 377.09            | 534.73 | 306.71 | 235.97 | 3867.1        |                                           |
|   |                    | Ground                 | water                                 | yields      | (19)    | 19.18  | 14.49  | 25.32  | 32.03  | 25.62  | 29.52  | 21.19  | 10.90  | 45.61             | 67.64  | 34.64  | 23.96  | 350.10        |                                           |
|   |                    | Surface                | water                                 | yields      | (81)    | 90 1   | 3.17   | 00:0   | 16.35  | 323.62 | 175.29 | 104.52 | 00'0   | 00.0              | 0.00   | 0.00   | 000    | 624.00        |                                           |
|   | bility             |                        |                                       | 10.0        | (17)    | 84.82  | 83.44  | 91.99  | 94.95  | 92.22  | 92.97  | 88.72  | 80.62  | 101.0             | 125.3  | 97.01  | 90.91  | 1134          |                                           |
|   | Water Availability | from uses              | Indus-                                | trial       | (16)    | 34.85  | 36.01  | 36.01  | 34.85  | 36.01  | 34.85  | 36.01  | 36.01  | 32.53             | 36.01  | 34.85  | 36.01  | 424.0         | 0.00-12)                                  |
|   |                    | Regeneration from uses | Dome-                                 | stic        | (15)    | 24.85  | 36.01  | 36.01  | 34.85  | 36.01  | 34.85  | 36.01  | 36.01  | 32.53             | 36.01  | 34.85  | 36.01  | 424.0         | Column no 21 = Column no (20-12)          |
|   |                    | 24                     | Imiga-                                | tion        | (+1)    | 15.12  | 11.42  | 19.96  | 25.25  | 20.20  | 23.27  | 16.70  | 8.60   | 35.96             | 53.32  | 27.31  | 18.89  | 276.0         | C on unuit                                |
|   |                    |                        | mport                                 |             | (13)    | 98.90  | 73.21  | 127.96 | 161.85 | 129.44 | 149.14 | 107.05 | \$5.10 | 230.47            | 341.75 | 175.06 | 121.09 | 1769.0        |                                           |
|   |                    | Gross                  | total                                 | utilisation | (12)    | 236.40 | 202.83 | 287.13 | 336.61 | 292,78 | 318.67 | 256.01 | 174.90 | 436.32            | 616.46 | 356.78 | 276 56 | 3791.5        | Column no 20 = Column no (13+17+18+19)    |
|   |                    |                        | Export                                | 2           | (11)    | 0.00   | 0.00   | 00.0   | 0.00   | 00.0   | 0.00   | 0.00   | 0.00   | 0.00              | 0.00   | 0.00   | 0.00   | 0.00          | Column on                                 |
|   |                    |                        | Total                                 | <u> </u>    | (01)    | 236.40 | 202.83 | 287.13 | 336.61 | 292.78 | 318.67 | 256.01 | 174.90 | 436.32            | 616.46 | 356.78 | 276.56 | 3791.46       | = 00 00 000                               |
|   |                    |                        | Environ-                              | mental      | 6       | 100    | 0.03   | 000    | 0.17   | 3.37   | 1.87   | 60'1   | 000    | 00.0              | 000    | 00:0   | 0.00   | 6.49          | 100                                       |
|   | ation              |                        | Hydro-                                | power       | (61)    | 000    | 00.0   | 000    | 000    | 000    | 000    | 000    | 0.00   | 00.0              | 0.00   | 0.00   | 0.00   | 0.00          | Column No 12 = Column 20 (10+11)          |
|   | Water Utilisation  | cnts                   | Indus-                                | trial       | 6       | 43.56  | 45.01  | 45.01  | 43.56  | 45.01  | 43.56  | 45.01  | 45.01  | <del>1</del> 0.66 | 45.01  | 43.56  | 45.01  | 530.0         | Column                                    |
|   | 3                  | Water requirements     | Боте-                                 | stic        | 9       | 43.56  | 45.01  | 45.01  | 43.56  | 45.01  | 43.56  | 45.01  | 45.01  | 99.07             | 45.01  | 43.56  | 45.01  | 530.0         | 17 NA 17                                  |
|   |                    | Wat                    | ojects                                | Total       | (5)     | 149.27 | 112.77 | 197.10 | 249.32 | 199.39 | 229.73 | 164.89 | 84.87  | 355.01            | 526.43 | 269.66 | 186.53 | 2725.0        | 2                                         |
|   |                    |                        | Utilisation under irrigation projects | Onkoung     | ₹       | 0.00   | 0.00   | 00.0   | 00:0   | 90.0   | 800    | 00.0   | 00.0   | 000               | 00.0   | 00.00  | 00.0   | 0.00          | (0+8+2+8                                  |
|   |                    |                        | on under in                           | Existing    | <u></u> | 126 21 | 95.35  | 166.65 | 210.80 | 85.891 | 194,24 | 139.42 | 71.76  | 300.16            | 445.10 | 228.00 | 157.71 | 421.74 2304.0 | 145/00                                    |
|   |                    |                        | Utilisati                             | Proposed    | [2]     | 23.10  | 17.45  | 30.50  | 38.59  | 30.86  | 35.55  | 25.52  | 13.14  | \$4.94            | 81.48  | 41.73  | 28.87  | 421.74        | of Colum                                  |
|   |                    | 7                      | Month                                 |             | ε       | un/    | Jul.   | Aug    | e S    | 90     | So.    | ğ      | uəj    | Feb               | Nar    | Apr    | May    | Total         | Mote Calumn no 10 = Calumn no (5+5+7+8+0) |

Table 4.10.12(g): Tirumanimuttar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

| Unit: MCM |                    | Monthly                | water                                | Dalance          | (20)             | -51.76       | 62.<br>F    | -65.16       | -63.04       | 223.93       | 11.13        | 36.43        | -37.17      | -103.0       | -147.3       | -82.74       | -62.52       | .309.5        |                                              |
|-----------|--------------------|------------------------|--------------------------------------|------------------|------------------|--------------|-------------|--------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|--------------|--------------|---------------|----------------------------------------------|
| Unit:     |                    | Gross                  | water                                | available        | (61)             | 174.94       | 151.52      | 211.95       | 263.88       | 506.68       | 393.08       | 282.41       | 127.71      | 324.28       | 459.14       | 264.32       | 10.402       | 3364.0        |                                              |
|           |                    | Surface                |                                      |                  | (81)             | 96'0         | 2.87        | 0.00         | 14.80        | 293.02       | 158.71       | 79.73        | 00.0        | 000          | 00.0         | 000          | 000          | \$65.01       |                                              |
|           | sility             |                        | F                                    | 10021            | (17)             | 77.08        | 75.44       | 83.99        | 87.22        | 84,23        | 85.24        | 80.73        | 72.61       | 93.81        | 117.4        | 89.29        | 82.92        | 1030          |                                              |
|           | Water Availability | from uses              | Indus-                               | trial            | (16)             | 34.85        | 36.01       | 36.01        | 24.83        | 36.01        | 34.85        | 36.01        | 36.01       | 32.53        | 36.01        | 34.85        | 36.01        | 424.0         | .12).                                        |
| -         | W                  | Regeneration from uses | Dome-                                | stic             | (15)             | 27.09        | 27.99       | 27.99        | 27.09        | 27.99        | 27.09        | 27.99        | 27.99       | 25.28        | 27.99        | 27.09        | 27.99        | 329.6         | umn no.(19                                   |
|           |                    | F                      | Imiga-                               | tion             | (14)             | 15.14        | 11.44       | 19.99        | 25.28        | 20.22        | 23.30        | 16.72        | 8.61        | 36.00        | 53.39        | 27.35        | 18.92        | 276.4         | Column no. 20 = Column no. (19-12)           |
|           |                    |                        | Import                               |                  | (13)             | 06.96        | 73.21       | 127.96       | 161.85       | 129.44       | 149.14       | 107.05       | 55.10       | 230.47       | 341.75       | 175.06       | 121.09       | 1769.0        | Column                                       |
|           |                    | Gross                  | total                                | utilisation      | (21)             | 226.71       | 192.81      | 277,11       | 326.91       | 282.76       | 308.98       | 245.99       | 164.88      | 427.37       | 606.44       | 347.08       | 266.53       | 3673.5        | 13+17+18)                                    |
|           |                    |                        | Export                               | _                | (11)             | 0.00         | 0.00        | 0.00         | 0.00         | 0.00         | 0.00         | 0.00         | 0.00        | 0.00         | 0.00         | 0.00         | 0.00         | 0.00          | Column no.19 = Column no.(13+17+18)          |
|           |                    |                        | Total                                | 12101            | (10)             | 226.90       | 192.95      | 277.36       | 327.23       | 283.02       | 309.27       | 246.20       | 164.99      | 427.73       | 607.12       | 347,42       | 266.77       | 3676.96       | = 6[.ou naπ                                  |
|           |                    |                        | Environ-                             | mental           | (6)              | 0.03         | 0.03        | 0.00         | 0.17         | 3.37         | 1.82         | 1.09         | 0.00        | 000          | 000          | 0.00         | 0.00         | 6,49          |                                              |
|           | sation             |                        | Hydro                                | power            | (8)              | 000          | 00'0        | 0.00         | 0.00         | 00.00        | 00.0         | 0.00         | 00.0        | 80           | 000          | 0.00         | 00.00        | 0.00          | Column No. 12 = Column no. (10 + 11)         |
|           | Water Utilisation  | ments                  | -snpuI                               | trial            | (2)              | 43.56        | 45.01       | 45.01        | 43.56        | 45.01        | 43.56        | 45.01        | 45.01       | 40.66        | 45.0}        | 43.56        | 45.01        | 530.0         | = Column 1                                   |
|           |                    | Water requirements     | Dome                                 | suc              | (9)              | 33.86        | 85 t        | 34.99        | 33.86        | 34.99        | 33.86        | ¥ 99         | 34.99       | 31.61        | 7.8          | 33.86        | 33,99        | 412.0         | umn No. 12                                   |
|           |                    | -                      | projects                             | Total            | 3                | 0 149.46     | 0 112.91    | 197.35       | 0 249.64     | 0.00 199.64  | 0 230.03     | 165.11       | 84.98       | 355,47       | 527.11       | 0 270.00     | 0 186.76     | 0.0 2728.5    |                                              |
|           |                    |                        | r irrigation                         | Existing Ongoing | ( <del>†</del> ) | 00.0         | 0000        | 5 0.00       | 0.00         |              | 0.00         | 00.0         | 5 0.00      | 1 000        | 0.00         | 6 0.00       | 00.0         |               | 6+8+1+9+                                     |
| '         |                    | į                      | Julisation under irrigation projects |                  | (3)              | 23.10 126.36 | 17.45 95.46 | 30.50 166.85 | 38.59 211.05 | 30.86 168.79 | 35.55 194.47 | 25.52 139.59 | 13.14 71.85 | 54.94 300.52 | 81.48 445.64 | 41.73 228.26 | 28.87 157.89 | 121.74 2306.7 | olumn no.(5                                  |
|           |                    |                        | Util                                 | Proposed         | (2)              | 23           | 17          | £            | 38           | 30           | 35           | 25           | 13          | <b>X</b>     | 38           | 41           | 28           | 42            | no. 10 = C.                                  |
|           |                    | 1 family               | INDOLVI                              |                  | (1)              | Jun          | Jul         | Aug          | Sep          | Oct          | Nov          | Dec          | Jan         | Feb          | Mar          | Apr          | Мау          | Total         | Note: Column no. 10 = Column no.(5+6+7+8+9). |

Table 4.10.12(h): Tirumanimuttar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

| VICIVI      | :                  | Monthly                | Waler                                | Oalance                   | (21) | -34.55 | -28.82 | 41.87  | .32.98 | 247.51  | 111.65 | 55.59  | -28.28 | -59.24 | -81.73 | -50.07 | 40.59  | 16.64   | -                                          |
|-------------|--------------------|------------------------|--------------------------------------|---------------------------|------|--------|--------|--------|--------|---------|--------|--------|--------|--------|--------|--------|--------|---------|--------------------------------------------|
| Unit: MICIN |                    | Gross                  |                                      | <u></u>                   | (S)  | 201.86 | 174.01 | 245.26 | 303.64 | \$40.28 | 430.33 | 311.60 | 146.62 | 377.09 | 534.73 | 306.71 | 235.97 | 3808.1  | 1                                          |
|             | İ                  | Cround                 | water                                | yields                    | (61) | 19.18  | 14.49  | 25.32  | 32.03  | 25.62   | 29.52  | 21.19  | 10.90  | 19:61  | 67.64  | 74.64  | 23.96  | 350.10  |                                            |
|             |                    | Surface                | water                                | yıclds                    | (18) | 96.0   | 2.87   | 000    | 14.80  | 293.02  | 158.71 | 3,     | 0,00   | 000    | 0.0    | 0.00   | 00:0   | \$65.00 |                                            |
|             | pility             |                        |                                      | व्या                      | (11) | 84.82  | 83.44  | 6 6    | 26.95  | 92.22   | 92.97  | 88.72  | 80.62  | 101.0  | 125.3  | 97.01  | 90.91  | 1137    |                                            |
|             | Water Availability | from uses              | Endus-                               | trial                     | (10) | 34.85  | 36.01  | 36.01  | 34.85  | 36.01   | 34.85  | 36.01  | 36.01  | 32.53  | 36.01  | 34.85  | 36.01  | 424.0   | (20-12).                                   |
|             | _                  | Regeneration from uses | Боще-                                | stic                      | (15) | 34.85  | 36.01  | 36.01  | 34.85  | 36.01   | 34.85  | 36.01  | 36.01  | 32.53  | 36.01  | 34.85  | 36.01  | 424.0   | Column no                                  |
|             |                    | ě.                     | Iniga-                               | tion                      | (14) | 15.12  | 11,42  | 19.96  | 25.25  | 20,20   | 23.27  | 16.70  | 8,60   | 35.96  | 53.32  | 27.31  | 18.89  | 276.0   | Column no. 21 = Column no. (20-12)         |
|             |                    |                        | Import                               |                           | (13) | 96.90  | 73.21  | 127.96 | 161.85 | 129.44  | 149.14 | 107.05 | 55.10  | 230.47 | 341.75 | 175.06 | 121.09 | 1769.0  |                                            |
|             |                    | Gross                  | total                                | utilisation               | (12) | 236.40 | 202.83 | 287.13 | 336.61 | 292.78  | 318.67 | 256.01 | 174.90 | 436.32 | 616.46 | 356.78 | 276.56 | 3791.5  | Column no. 20 = Column no. (13+17+18+19).  |
|             |                    | G                      | Export t                             | lim                       | (11) | 0.00   | 00.0   | 0.00   | 0.00   | 0.00    | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 000    | 00.0    | umn no.(13                                 |
|             |                    |                        |                                      | Ocal                      | (10) | 236.40 | 202.83 | 287.13 | 336.61 | 292. 78 | 318.67 | 256.01 | 174.90 | 436.32 | 616.46 | 356.78 | 276.56 | 3791.46 | no.29 = Col                                |
|             |                    |                        | Environ-                             |                           | (6)  |        | 0.03   | 0.00   | ı      |         |        | 1.09   |        | 0.00   | 0.00   | 0.00   | 0,00   | 6.49 37 | Column                                     |
|             | g                  |                        | Hydro- Env                           | power menta               | (61) | 0.00   | 0.00   | 0.00   | 000    | 000     | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 0.00   | 00:0    | 0+11)                                      |
|             | Water Utilisation  | S                      | Indus- Hy                            | trial po                  | 0    | 43.56  | 45.01  | 45.01  | 43.56  | 45.01   | 43.56  | 45.01  | 45.01  | 40.66  | 15.01  | 43.56  | 45.01  | 530.0   | Column No. 12 = Column no. (10 + 11        |
| İ           | Wat                | Water requirements     | Ооте- Іл                             | stic to                   | (9)  | 43.56  | 45.01  | 45.01  | 43.56  | 45.01   | 43.56  | 45.01  | 45.01  | 40.66  | 45.01  | 43.56  | 45.01  | 530.0   | No. 12 = C.                                |
|             |                    | Water                  | Ī                                    | Totals                    | (S)  | 149.27 | 112.77 | 197.10 | 249.32 | 199.39  | 229.73 | 164.89 | 84,87  | 355.01 | 526.43 | 269.66 | 186.53 | 2725.0  | Column                                     |
|             |                    |                        | gation prof                          | Н                         | (3)  | 000    | 0.00   | 0.00   | 0.00   | 000     | 000    | 000    | 000    | 0.00   | 000    | 000    | 000    | 000     | (6+8+7                                     |
|             |                    |                        | Utilisation under imigation projects | Proposed Existing Ongoing | (3)  | 126.21 | 95.35  | 166.65 | 210.80 | 168.58  | ı      | 139.42 | 71.76  | 300.16 | 445.10 | - 1    |        | 2304.0  | 7D DO. (5+6+                               |
|             |                    |                        | Utilisati                            | Proposed                  | (3)  | 23.10  | 17.45  | 30.50  | 38.59  | 30.86   | 35.55  | 25.52  | 13.14  | \$4,94 | 81.48  | 41.73  | 28.87  | 421.74  | . 10 = Colur.                              |
|             |                    | 47.77                  | intioivi                             |                           | (I)  | Jun    | [n[    | Aug    | Sep    | Oct     | Nov    | Dec    | Jan    | Feb    | Mar    | Apr    | May    | Total   | Note: Column no.10 = Column no.(5+6+7+8+9) |

Table 4.10.13(a): Ponnanai Ar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                               |               |                                         |                                       |        | *                                   | Water Utilisation | noi ju     |            |             |            |                                      |        |                                  | l <sub>2</sub>         | Water Availability | iliry |         |           |         |
|-----------------------------------------------|---------------|-----------------------------------------|---------------------------------------|--------|-------------------------------------|-------------------|------------|------------|-------------|------------|--------------------------------------|--------|----------------------------------|------------------------|--------------------|-------|---------|-----------|---------|
|                                               |               |                                         |                                       | Wa     | Water requirements                  | Tents             |            |            |             |            | Gross                                |        |                                  | Regeneration from uses | क्ष्य मध्य         |       | Surface | Gross     | Monthly |
| Monin                                         | Utilisati     | on under is                             | Utilisation under irrigation projects |        | Dome-                               | Indus-            | Hydro      | Environ-   | Tage        | Export     | total                                | Import | Irriga-                          | Domc.                  | Indus-             | Total | water   | waler     | halance |
|                                               | Proposed      | Proposed Existing Ongoing               | Ongoing                               | Total  | \$tic.                              | trial             | power      | mental     | I Otal      |            | utilisation                          |        | tion                             | stic                   | trial              | 10431 | yields  | available |         |
| (1)                                           | (2)           | 6                                       | Ŧ                                     | (5)    | (9)                                 | (2)               | (8)        | <u>(6)</u> | (01)        | (11)       | (12)                                 | (13)   | (14)                             | ((5)                   | (36)               | (11)  | (81)    | (61)      | (20)    |
| lun                                           | 2.31          | 46.82                                   | 00.00                                 | 49.13  | 10.36                               | 12.74             | 0.00       | 0.02       | 72.28       | 00.0       | 72.28                                | 33.10  | 19.8                             | 8.28                   | 10.19              | 24,14 | 2.31    | 59.55     | -12.73  |
| Jul                                           | 3.63          | 73.65                                   | 00:0                                  | 77.28  | 10.70                               | 13.16             | 0.00       | 0.02       | 101.23      | 00.0       | 101 23                               | 52.08  | 8.91                             | 8.56                   | 10.53              | 28.01 | 2.31    | 82.39     | 18.81   |
| Aug                                           | 2.17          | # = = = = = = = = = = = = = = = = = = = | 00.0                                  | 46.29  | 10.70                               | 13.16             | 0.00       | 0.03       | 70.18       | 00.0       | 70.18                                | 31.16  | 5.34                             | 8.56                   | 10.53              | 24.43 | 3.08    | 28.67     | -11 51  |
| Şe                                            | 06:1          | 38.61                                   | 000                                   | 40.51  | 10.36                               | 12.74             | 000        | 0.22       | 63.90       | 90.0       | 63.90                                | 27.32  | 4,67                             | 98.29                  | 10.19              | 23.15 | 22.33   | 72.80     | 8 90    |
| Oct                                           | 4.58          | 93.00                                   | 00:0                                  | 97.58  | 10.70                               | 13.16             | 0.00       | 0.36       | 121.83      | 00.0       | 121.83                               | 65.72  | 11.26                            | 8.56                   | 10.53              | 30.35 | 35.54   | 131.61    | 9.78    |
| 202                                           | 3.77          | 76.51                                   | 00'0                                  | 80,28  | 10,36                               | 12,74             | 000        | 0.66       | 104.05      | 000        | 104.05                               | \$4.06 | 9.26                             | 8.28                   | 10.19              | 27.74 | 66.03   | 147.83    | 43.78   |
| <u>0</u>                                      | 5.10          | 103.45                                  | 00.00                                 | 108.55 | 10.70                               | 13.16             | 000        | 0.26       | 132.70      | 00.0       | 132,70                               | 73.10  | 12.52                            | 8.56                   | 10.53              | 31.61 | 26.40   | 131,12    | -1.59   |
| Jan                                           | 4.03          | 81.73                                   | 0.00                                  | 85.76  | 10.70                               | 13.16             | 000        | 000        | 109.74      | 0.00       | 109.74                               | 57.76  | 68'6                             | 8.56                   | 10.53              | 38.98 | 12.6    | 10'96     | -13.73  |
| Feb                                           | 0.88          | 17.78                                   | 00.0                                  | 18.66  | 19.61                               | 11.89             | 000        | 0.09       | 40.31       | 0.00       | 40.31                                | 12.57  | 2.15                             | 7.73                   | 15.6               | 19.40 | 8.53    | 40.50     | 0.19    |
| Mar                                           | 1.76          | 35.62                                   | 00.0                                  | 37.38  | 10.70                               | 13.16             | 000        | 90.0       | 61.31       | 0.00       | 61.31                                | 25.17  | 4.31                             | 8.56                   | 10.53              | 23.40 | 5.56    | 54.14     | -7.17   |
| Apr                                           | 1.45          | 29.52                                   | 0.00                                  | 30.98  | 10.36                               | 12.74             | 00.0       | 0.02       | Z.          | 0.00       | X. I.I.                              | 20.87  | 3.57                             | 8.28                   | 10.19              | 22.05 | 2.36    | 45.28     | -8 83   |
| May                                           | 86.0          | 19.95                                   | 0.00                                  | 20.93  | 10,70                               | 13.16             | 0000       | 0.07       | 44.87       | 0.00       | 44.87                                | 14.09  | 2.41                             | 8.56                   | 10.53              | 21.51 | 7.28    | 42.88     | 1.99    |
| Total                                         | 32.56         | 92.099                                  | 00.00                                 | 693.32 | 126.0                               | 155.0             | 0.00       | 16:1       | 976.51      | 00.00      | 976.51                               | 467.0  | 80.0                             | 100.8                  | 124.0              | 304.8 | 0.161   | 962.8     | -13.74  |
| Note: Column no. 10 * Column no. (5+6+7+8+9). | o. 10 * Colur | nn no.(5+c                              | 1+7+8+9).                             | Colu   | Column No. 12 = Column no. (10 + 11 | Column n          | 3. (10+11) | Colu       | mn no. 19 = | Column no. | Column no.19 * Column no.(13+17+18). |        | Column no.20 = Column no.(19-12) | 1 umn no.(15           | 7.12).             |       |         |           |         |
|                                               |               |                                         |                                       |        |                                     |                   |            |            |             |            |                                      |        |                                  |                        |                    |       |         |           |         |

Table 4.10.13(b): Ponnanai Ar Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                              |               |                                      |              |        | =                                    | Water Hillisation | colion       |          |             |             |                                        |        |             |                                   | Water Availability | bility   |         |           |           |                   |
|----------------------------------------------|---------------|--------------------------------------|--------------|--------|--------------------------------------|-------------------|--------------|----------|-------------|-------------|----------------------------------------|--------|-------------|-----------------------------------|--------------------|----------|---------|-----------|-----------|-------------------|
| ;                                            |               |                                      |              | Wot    | Water requirements                   | rents             |              |          |             |             | Gross                                  |        | ,,,,        | Regeneration from uses            | from uses          |          | Surface | Ground    | Gross     | Monthly           |
| Month                                        | Utilisati     | Julisation under irrigation projects | rigation pro |        | Dome-                                | -snpu]            | Hydro        | Environ- |             | Export      | total                                  | Import | Imga-       | Dome-                             | -snptij            | Ę        | water   |           | water     | Waller<br>Malance |
|                                              | Proposed      | Existing Ongoing                     | Resolng      | Total  | stic                                 | Lrial             | power        | rmental  | l Ottal     |             | utilisation                            |        | Lion        | stic                              | trial              | <u> </u> | yields  | yields    | available | 7                 |
| (1)                                          | (3)           | (3)                                  | (7)          | (5)    | (9)                                  | 3                 | (61)         | (6)      | (01)        | (11)        | (12)                                   | (13)   | (14)        | (15)                              | (91)               | (11)     | (18)    | (19)      | (30)      | (21)              |
| Jun                                          | 2.31          | 46.82                                | 00.00        | 4913   | 12,74                                | 12,74             | 0.00         | 0.02     | 72.28       | 000         | 72.28                                  | 33,10  | 5.67        | 10.19                             | 10.19              | 26.05    | 231     | 14.70     | 76.16     | 3 88              |
| in.                                          | 3.63          | 73.65                                | 00.00        | 77.28  | 13,16                                | 13,16             | 000          | 0.02     | 101.23      | 000         | 101.23                                 | \$2.08 | 8,92        | 10.53                             | 10.53              | 29.98    | 7.31    | 23.12     | 107,49    | 6.25              |
| Aug                                          | 2.17          | <u>1</u>                             | 00.0         | 46.29  | 13.16                                | 13.16             | 000          | 0.03     | 70.18       | 000         | 70.18                                  |        | 5.34        | 10.53                             | 10.53              | 26.40    | 3.08    | 13.85     | 74.49     | 431               |
| Sep                                          | 06:1          | 38.61                                | 00.0         | 40.51  | 12.74                                | 12.74             | 00.0         | 0.22     | 63.90       | 000         | 63.90                                  | 27.32  | 4.68        | 10.19                             | 10.19              | 25.06    | 22.33   | 17.17     | 86.84     | 22.94             |
| ō                                            | 4.58          | 93.00                                | 000          | 97.58  | 13.16                                | 13.16             | 00.0         | 0.36     | 121.83      | 00.0        | 121.83                                 | 65.72  | 11.26       | 10.53                             | 10.53              | 32.32    | 35.54   | 59.19     | 162.77    | +0.9+             |
| Nov                                          | 3.77          | 76.51                                | 0.00         | 80.28  | 12.74                                | 12.74             | 00.0         | 99.0     | 104.05      | 000         | 104.05                                 | £.06   | 9.26        | 61.01                             | 10.19              | 29.64    | 66.03   | 24.01     | 173.75    | 69.70             |
| ည်း                                          | 5.10          | 103.45                               | 00.00        | 108.55 | 13.16                                | 13.16             | 00.0         | 0.26     | 132.70      | 000         | 132,70                                 | 73.10  | 12.52       | 10.53                             | 10.53              | 33.59    | 26.40   | 32.47     | 165 56    | 32.86             |
| Jzn                                          | 4.03          | 81.73                                | 00:0         | 85.76  | 13,16                                | 13,16             | 000          | 60.0     | 109.74      | 000         | 109.74                                 | 57.76  | 68.6        | 10.53                             | 10.53              | 30.9€    | 9.27    | 25.65     | 123,64    | 13.90             |
| Feb                                          | 0.88          | 17.78                                | 00.0         | 18.66  | 11.89                                | 11.89             | 000          | 60.0     | 40.31       | 000         | 40.31                                  | 12.57  | 2.15        | 9.51                              | 9.51               | 21.18    | 8.53    | 85.58     | 47.86     | 7.55              |
| Mar                                          | 1.76          | 35.62                                | 00.0         | 37.38  | 13.16                                | 13.16             | 900          | 0.06     | 61.31       | 000         | 61.31                                  | 25.17  | 4.31        | 10.53                             | 10.53              | 25.38    | 5.56    | <u>**</u> | 67.29     | \$6.5             |
| Apr.                                         | 1.45          | 29.52                                | 00:0         | 30.98  | 12.74                                | 12.74             | 00.0         | 0.02     | <b>X</b>    | 000         | ニス                                     | 20.87  | 3.57        | 10.19                             | 10.19              | 23.96    | 2.36    | 9.27      | 56 45     | 234               |
| May                                          | 86.0          | 19.95                                | 00.00        | 20.93  | 13.16                                | 13.16             | 000          | 0.07     | 14 87       | 000         | 14.87                                  | 14.09  | 2.41        | 10.53                             | 10.53              | 23.48    | 7.28    | 97.9      | 51.11     | 6.24              |
| Total                                        | 32.56         | 660.76                               | 00.0         | 693.32 | 155.0                                | 155.0             | 00.00        | 16.1     | 1005.23     | 0.00        | 1005.2                                 | 467.0  | 80.0        | 124.0                             | 124.0              | 328.0    | 191.0   | 207.4     | 1193.4    | 188.17            |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colur | nn no.(5+6                           | +7+8+9).     | Colun  | Column No. 12 = Column no. (10 + 11) | Column n          | io. (10 + 11 |          | umn no.20 = | · Column no | Column no.20 = Column no.(13+17+18+19) |        | lumn no. 21 | Column no. 21 = Column no.(30-12) | 0.(20-12).         |          |         |           |           |                   |

Table 4.10.13(c): Ponnanai Ar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

|                                      |                                               | ļ                |        |                    |                                     |            |          |            |             |                                       |        |             |                                    |                        |        |         | Unit      | Unit: MCM |
|--------------------------------------|-----------------------------------------------|------------------|--------|--------------------|-------------------------------------|------------|----------|------------|-------------|---------------------------------------|--------|-------------|------------------------------------|------------------------|--------|---------|-----------|-----------|
|                                      | ļΙ                                            |                  |        | 17.                | Water Utilisation                   | ation      |          |            |             |                                       |        |             |                                    | Water Availability     | bility |         |           | 1         |
|                                      |                                               |                  | Wate   | Water requirements | cnts                                |            |          |            |             | Gross                                 |        |             | Regeneration                       | Regeneration from uses |        | Surface | Gross     | Nioniny   |
| Utilisation under imigation projects | 느앧                                            | ation pro        |        | Dome-              | Inchus-                             | Hydro      | Environ- | ľ          | Ехроп       | total                                 | Import | Imga-       | Dome-                              | Indus-                 | E E    | water   | water     | halance   |
| Existing Ongoing                     | ĕ                                             | _                | Total  | stic               | trial                               | power      | mental   | I CITA     |             | utilisation                           |        | non         | stic                               | trial                  | - O    | yields  | available |           |
| (3)                                  | Ì                                             | ( <del>+</del> ) | (5)    | (9)                | W                                   | (8)        | (6)      | (10)       | (11)        | (12)                                  | (13)   | (14)        | (13)                               | (91)                   | (17)   | (18)    | (61)      | (20)      |
| 46.82                                | _                                             | 00.0             | 49.13  | 10.36              | 12.74                               | 0.00       | 0.02     | 72.28      | 0.00        | 72.28                                 | 33.10  | 5.67        | 8.28                               | 10.19                  | 24.14  | 2.91    | 60.16     | -12.12    |
| 73.65                                | 152                                           | 000              | 77.28  | 10.70              | 13,16                               | 0.00       | 0.02     | 101.23     | 00:0        | 101.23                                | 52.08  | 16'8        | 8.56                               | 10.53                  | 28.01  | 16.2    | 83.00     | -18.34    |
| 11.1                                 | =                                             | 0000             | 46.29  | 10.70              | 13.16                               | 000        | 0.03     | 70.18      | 0.00        | 70.18                                 | 31.16  | 5.34        |                                    | 10.53                  | 24.43  | 3.89    | 59.48     | -10.70    |
| 38.61                                | 61                                            | 0.00             | 40.51  | 10.36              | 12.74                               | 00'0       | 0.22     | 63.90      | 00.00       | 63.90                                 | 27.32  | 4.67        | 8.28                               | 61.01                  | 23.15  | 28.18   | 78.65     | 14.75     |
| 93                                   | 93.00                                         | 0.00             | 97.58  | 07.01              | 13.16                               | 00.0       | 0.36     | 121.83     | 0.00        | 121.83                                | 65.72  | 11.26       | 8.56                               | 10.53                  | 30.35  | 44.84   | 140.91    | 19.08     |
| υ                                    | 76.51                                         | 0.00             | 80.28  | 10.36              | 12.74                               | 00.0       | 99'0     | 104.05     | 0.00        | 104.05                                | 54.06  | 9.26        | 8.28                               | 10.19                  | 27.74  | 83.32   | 165.11    | 61.06     |
| 2                                    | 103.45                                        | 0.00             | 108.55 | 10.70              | 13.16                               | 0.00       | 0.26     | 132,70     | 0.00        | 132.70                                | 73.10  | 12.52       | 8.56                               | 10.53                  | 31.61  | 33.31   | 138.03    | 5.32      |
| *                                    | 81.73                                         | 00'0             | 85.76  | 10.70              | 13.16                               | 0.00       | 0.09     | 109.74     | 0.00        | 109.74                                | 57.76  | 68.6        | 8.56                               | 10.53                  | 28.98  | 11.70   | 14.86     | -11.30    |
|                                      | 17.78                                         | 0.00             | 18.66  | 19.67              | 11.89                               | 0.00       | 0.09     | 40.31      | 00.00       | 40.31                                 | 12.57  | 2,15        | 7,73                               | 9.51                   | 19.40  | 10.76   | 42.73     | 2.42      |
| ~                                    | 35.62                                         | 00:0             | 37.38  | 10.70              | 13.16                               | 0.00       | 90.0     | 61.31      | 000         | 61.31                                 | 25.17  | 4.31        | 8.56                               | 10.53                  | 23.40  | 7.02    | \$5.59    | -5.72     |
| ĆΙ                                   | 29.52                                         | 00:0             | 30.98  | 10.36              | 12.74                               | 0.00       | 0.02     | 22.33      | 0.00        | II X                                  | 20.87  | 3.57        | 8.28                               | 10.19                  | 22.05  | 2.98    | 45.89     | -8.22     |
| 51                                   | 19.95                                         | 00.0             | 20.93  | 10.70              | 13.16                               | 0.00       | 0.07     | 44.87      | 0.00        | 41.87                                 | 14.09  | 2.41        | 8.56                               | 10,53                  | 11.51  | 61.6    | 44.79     | 80.0      |
| 32.56 660                            | 92.099                                        | 000              | 693.32 | 126.0              | 155.0                               | 0.00       | 1.91     | 976.51     | 0.00        | 976.51                                | 467.0  | 80.0        | 100.8                              | 124.0                  | 304.8  | 241.00  | 1012.8    | 36.26     |
| סת תי                                | Note: Column no. 10 = Column no. (5+6+7+8+9). | (6+8+            | Colum  | n No. 12 =         | Column No. 12 = Column no. (10 + 11 | 0. (10+11) | <u> </u> | umn no. 19 | = Column no | Column no. 19 = Column no. (13+17+18) |        | n no 20 = C | Column no. 20 = Column no. (19.12) | 9.12).                 |        |         |           |           |

Table 4.10.13(d): Ponnanai Ar Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                             |            |                                       |            |        | 13                 | Water Utilisation | sation                               |          |              |             |                                        |        |                                  |                        | Water Availability | bility |         |        |           |         |
|---------------------------------------------|------------|---------------------------------------|------------|--------|--------------------|-------------------|--------------------------------------|----------|--------------|-------------|----------------------------------------|--------|----------------------------------|------------------------|--------------------|--------|---------|--------|-----------|---------|
| 17.17                                       |            |                                       |            | Wat    | Water requirements | nents             |                                      |          |              |             | Gross                                  |        | II.                              | Regeneration from uses | from uses          |        | Surface | Ground | Gross     | Monthly |
| MIONG                                       | Utilisatic | Utilisation under irrigation projects | eation pro | jects  | Боше.              | Indus-            | Hydro-                               | Environ- | <br> -<br> - | Export      | total                                  | Import | Irriga-                          | Dome-                  | Indus-             | -      | water   | water  | water     | halonda |
| ·                                           | Proposed   | Existing Ongoing                      | guiosi     | Total  | stic               | trial             | pawer                                | mental   | i neri       |             | utilisation                            |        | tion                             | stic                   | trial              | 1 001  | yields  | yields | available |         |
| Ê                                           | ව          | (3)                                   | €          | (5)    | (9)                | (2)               | (61)                                 | (6)      | (01)         | (11)        | (13)                                   | (13)   | (14)                             | (51)                   | (16)               | (17)   | (81)    | (61)   | (02)      | (21)    |
| uar                                         | 2.31       | 46.82                                 | 00.00      | 49.13  | 12.74              | 12.74             | 00'0                                 | 0.02     | 72.28        | 00.0        | 72.28                                  | 33.10  | 5.67                             | 8.28                   | 10.19              | 24.15  | 2.91    | 14.70  | 74.86     | 2.58    |
| 3                                           | 3,63       | 73.65                                 | 00.0       | 77.28  | 13.16              | 13.16             | 0.00                                 | 0.02     | 101.23       | 00.00       | 101.23                                 | \$2.08 | 8.92                             | 8.56                   | 10.53              | 28.01  | 2.91    | 23.12  | 106.12    | 4.89    |
| Aug                                         | 1217       | 44,11                                 | 00.0       | 46.29  | 13.16              | 13.16             | 00:00                                | 0.03     | 70.18        | 0.00        | 70.18                                  | 31.16  | 5.34                             | 8.56                   | 10.53              | 24 43  | 3.89    | 13.85  | 73.32     | 3.15    |
| Sep                                         | 1.90       | 38.61                                 | 0.00       | 40.51  | 12.74              | 12,74             | 00.00                                | 0.22     | 63.90        | 0.00        | 06:59                                  | 27.32  | 4.68                             | 8.28                   | 10.19              | 23.16  | 28.18   | 12.12  | 77.00     | 26.87   |
| Ö                                           | 4.58       | 93.00                                 | 00.00      | 97.58  | 13,16              | 13.16             | 00.00                                | 0.36     | 121.83       | 0.00        | 121.83                                 | 65.72  | 11.26                            | 8.56                   | 10.53              | 30.35  | 44.84   | 29.19  | 170.10    | 48.28   |
| δN                                          | 3.77       | 76.51                                 | 00:00      | 80.28  | 12.74              | 12,74             | 00.00                                | 0.66     | 104.05       | 00.00       | \$0 501                                | \$4.06 | 9.26                             | 8.28                   | 10.19              | 27.74  | 83.32   | 14,01  | 189.13    | 85.08   |
| ğ                                           | 5.10       | 103.45                                | 0.00       | 108.55 | 13.16              | 13.16             | 00.00                                | 0.26     | 132.70       | 00:00       | 132.70                                 | 73.10  | 12.52                            | 8.56                   | 10.53              | 31.62  | 33.31   | 32.47  | 170.50    | 37.80   |
| Jan                                         | 4.03       | 81.73                                 | 0.00       | 85.76  | 13.16              | 13.16             | 00.00                                | 0.09     | 109.74       | 00.00       | 109.34                                 | 57.76  | 9.89                             | 8.56                   | 10.53              | 28.99  | 11.70   | 25.65  | 124.09    | 14.35   |
| F.                                          | 0.88       | 17.78                                 | 00.0       | 18.66  | 11.89              | 11.89             | 00.00                                | 60'0     | 40.31        | 00:00       | 40.31                                  | 12.57  | 2.15                             | 7.73                   | 9.51               | 19.40  | 10.76   | 5.58   | 18.31     | 8.00    |
| Mar                                         | 1.76       | 35.62                                 | 0.00       | 37.38  | 13.16              | 13,16             | 0.00                                 | 90.0     | 61.31        | 00.00       | 18.19                                  | 25.17  | 4.31                             | 8.56                   | 10.53              | 23.41  | 7.02    | 11.18  | 86.78     | 5.46    |
| Apr                                         | 1.45       | 29.52                                 | 0.00       | 30.08  | 12.74              | 12.74             | 00.00                                | 0.05     | : I          | 00.00       | 54.11                                  | 20.87  | 3.57                             | 8.28                   | 10.19              | 22.05  | 2.98    | 9.27   | 55.16     | 1.05    |
| May                                         | 86.0       | 19.95                                 | 0.00       | 20.93  | 13.16              | 13.16             | 0.00                                 | 0.02     | 44.87        | 0.00        | 44.87                                  | 14.09  | 2.41                             | 8.56                   | 10.53              | 21.51  | 61.6    | 6.26   | 51.05     | 6.18    |
| Total                                       | 32.56      | 660,76                                | 00.0       | 693.32 | 155.0              | 155.0             | 0.00                                 | 1.91     | 1005.23      | 000         | 1005.2                                 | 467.0  | 80.0                             | 100.8                  | 124.0              | 304.8  | 241.00  | 207.4  | 1220.2    | 214.97  |
| Mars . Column no 10 = Column no (5+6+7+8+9) | 10 = Colum | The Part Cate of                      | 7+8+0)     | Colum  | 20 Na 12 2         | = Column p        | Column No. 12 = Column no. (10 + 11) | _        | 100 an amil  | = Column no | Column no 20 = Column no (13+17+18+19) |        | Column no 21 = Column no (20,12) | = Column n             | 10000              |        |         |        |           |         |

Table 4.10.13(e): Ponnanai Ar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

Unit: MCM Table 4.10.13(f): Ponnanai Ar Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                                    | <br> -                    |             |                                       |        | 5                  | Water Utilisation | sation                               |          |           |             |                                          |        |            |                                            | Water Availability | ability |         |        |           | 16.00      |
|----------------------------------------------------|---------------------------|-------------|---------------------------------------|--------|--------------------|-------------------|--------------------------------------|----------|-----------|-------------|------------------------------------------|--------|------------|--------------------------------------------|--------------------|---------|---------|--------|-----------|------------|
| A Comple                                           |                           |             |                                       | Wat    | Water requirements | ents              |                                      |          |           |             | Gross                                    |        |            | Regeneration from uses                     | from uses          |         | Surface | Ground | Gross     | Violatiniy |
| TAIOUT —                                           | Utilisatic                | on under it | Utilisation under irrigation projects | yects  | Dome-              | Indus-            | Hydro-                               | Environ- | Table     | Export      | total                                    | Import | Imga-      | Dome-                                      | Indus-             |         | waler.  | water  | water     | halance    |
|                                                    | Proposed Existing Ongoing | Existing k  | Ongoing                               | Total  | stic               | trial             | power                                | mental   | Total     |             | utilisation                              |        | tion       | Stic                                       | Lial               | 1501    | yields  | yields | available | Out de l'e |
| (1)                                                | (2)                       | (3)         | <b>⊕</b>                              | (5)    | (9)                | (1)               | (61)                                 | (6)      | (10)      | Œ           | (12)                                     | (13)   | (14)       | (15)                                       | (91)               | (17)    | (81)    | (61)   | (20)      | (11)       |
| Jun                                                | 2.31                      | 46.82       | 00.00                                 | 49.13  | 12.74              | 12.74             | 0.00                                 | 0.02     | 74.63     | 000         | 74.63                                    | 33.10  | 5.67       | 10.19                                      | 10.19              | 26.05   | 19.     | 14.70  | 75.79     | 1.15       |
| Jul                                                | 3.63                      | 73.65       | 00.00                                 | 77.28  | 13.16              | 13.16             | 00.00                                | 0.02     | 103.63    | 000         | 103.63                                   | \$2.08 | 8.92       | 10.53                                      | 10.53              | 36.67   | 16.     | 23.12  | 107.12    | 3.48       |
| Aug                                                | 2.17                      | 44.11       | 00:00                                 | 46.29  | 13,16              | 13.16             | 00.0                                 | 0.03     | 72.64     | 00.0        | 77.65                                    | 31.16  | 5.34       | 10.53                                      | 10.53              | 36.40   | 2.58    | 13.85  | 73.99     | 1.34       |
| Sep                                                | 1.90                      | 38.61       | 00.00                                 | 40.51  | 12.74              | 12.74             | 000                                  | 0.22     | 66.21     | 00.0        | 66.21                                    | 27.32  | 4.68       | 10.19                                      | 10.19              | 25.06   | 18.71   | 12.12  | 83.22     | 17.00      |
| Oct                                                | 4.58                      | 93.00       | 00.00                                 | 97.58  | 13.16              | 13.16             | 000                                  | 0.36     | 124.27    | 00:0        | 124.27                                   | 65.72  | 11.26      | 10 53                                      | 10.53              | 32,32   | 29.77   | 29.19  | 157.00    | 32.73      |
| Nov                                                | 3.77                      | 76.51       | 00.00                                 | 80.28  | 12.74              | 12.74             | 00.0                                 | 99.0     | 106.42    | 000         | 106,42                                   | \$4.06 | 9.26       | 10.19                                      | 10.19              | 3<br>83 | \$5,31  | 10.42  | 163.03    | 56.61      |
| ప్ర                                                | 5.10                      | 103.45      | 0.00                                  | 108.55 | 13.16              | 13.16             | 0.00                                 | 0.26     | 135.14    | 00.0        | 135.14                                   | 73.10  | 12.52      | 10.53                                      | 10.53              | 33.59   | 22,12   | 32.47  | 161.28    | 26.14      |
| Jan                                                | 4.03                      | 81.73       | 00.0                                  | 85.76  | 13.16              | 13.16             | 00:0                                 | 0.09     | 112.18    | 000         | 112.18                                   | 57.76  | 68.6       | 10.53                                      | 10.53              | 30.96   | 77.7    | 25.65  | 122.14    | 96.6       |
| Feb                                                | 880                       | 17.78       | 00.0                                  | 18.66  | 11.89              | 68-11             | 00.0                                 | 0.09     | 42.52     | 000         | 42.52                                    | 12.57  | 215        | 15.6                                       | 9.51               | 21.18   | 715     | 5.58   | 46,48     | 3.96       |
| Mar                                                | 1.76                      | 35.62       | 00.00                                 | 37.38  | 13.16              | 13.16             | 000                                  | 90.0     | 63.76     | 00:0        | 63.76                                    | 25.17  | 4.31       | 10.53                                      | 10.53              | 25.38   | 7,66    | 11 18  | 66.39     | 163        |
| Apr                                                | 1.45                      | 29.52       | 00.0                                  | 30.98  | 12.74              | 12.74             | 00:0                                 | 0.02     | 56.48     | 000         | 56.48                                    | 20.87  | 3.57       | 10.19                                      | 10.19              | 23.96   | 1.98    | 9.27   | 26.07     | .0.41      |
| May                                                | 86.0                      | 19.95       | 000                                   | 20.93  | 13.16              | 13.16             | 0.00                                 | 0.07     | 47.34     | 00.00       | 47.34                                    | 14.09  | 4.         | 10.53                                      | 10.53              | 23.48   | 019     | 636    | 49.93     | 2.60       |
| Total                                              | 32.56                     | 660.76      | 00.00                                 | 693.32 | 155.0              | 155.0             | 000                                  | 1.91     | 1005.23   | 00:0        | 1005.23                                  | 467.0  | 80.0       | 124.0                                      | 124 0              | 328 0   | 160.0   | 307.4  | 1162.4    | 157.17     |
| Note: Column no $10 = \text{Column no}(5+6+7+8+9)$ | no. 10 = Colun            | m no.(5+6   | 1+7+8+9).                             | Colun  | Tr No. 12 =        | Column            | Column No. 12 = Column no. (10 + 11) |          | umn no.20 | = Column no | Column no. 20 = Column no. (13+17+18+19) |        | uma no. 21 | Column no $21 = \text{Column no } (20-12)$ | 0 (20-12).         |         |         |        |           |            |

Table 4.10.13(g): Ponnanai Ar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

| Water requirements                          | Water requirements                       | Water requirements      | Water requirements                                                   | Utilisation | Utilisation   |                  |                                      |                    |            |           | Gross                               |        |                 | Water Avail.<br>Regeneration from uses | Water Availability<br>on from uses | olity | Surface | Unit   | Unit: MCM Monthly |
|---------------------------------------------|------------------------------------------|-------------------------|----------------------------------------------------------------------|-------------|---------------|------------------|--------------------------------------|--------------------|------------|-----------|-------------------------------------|--------|-----------------|----------------------------------------|------------------------------------|-------|---------|--------|-------------------|
|                                             | Utilisation under i<br>Proposed Existing | n under in<br>xisting O | Utilisation under irrigation projects  posed Existing Ongoing   Tota | -           | Dome-<br>stic | Inchus-<br>trial | Hydro-<br>power                      | Erryron-<br>mental | Total      | Export    | total<br>utilisation                | Import | Irriga-<br>tion | Dome-<br>stic                          | Indus-<br>trial                    | Total | water   | water  | balance           |
| (1)                                         | (2)                                      | 3                       | ( <del>†</del> )                                                     | (3)         | (9)           | (7)              | (8)                                  | (6)                | (10)       | (11)      | (13)                                | (13)   | (14)            | (15)                                   | (16)                               | (11)  | (81)    | (61)   | (30)              |
| wn                                          | 2.31                                     | 46.82                   | 0.00                                                                 | 49.13       | 10.36         | 12.74            | 00:0                                 | 0.02               | 72.28      | 0.00      | 72.28                               | 33.10  | 5.67            | 8.28                                   | 10.19                              | 24.14 | 0.77    | 58.01  | -14.27            |
| -                                           | 3.63                                     | 73.65                   | 0.00                                                                 | 77.28       | 10.70         | 13.16            | 000                                  | 0.03               | 101.23     | 00.00     | 101.23                              | 52.08  | 8.91            | 8.56                                   | 10.53                              | 28.01 | 0.77    | \$0.85 | -20.38            |
| \ug                                         | 2.17                                     | 7                       | 0.00                                                                 | 46.29       | 10.70         | 13.16            | 000                                  | 0.03               | 20.18      | 0.00      | 70.18                               | 31.16  | 5.34            | 8.56                                   | 10.53                              | 24.43 | 1.03    | 56.62  | .13.56            |
| Sep                                         | 06 T                                     | 38.61                   | 0.00                                                                 | 40.51       | 10.36         | 12,74            | 000                                  | 0.22               | 63.90      | 000       | 63.90                               | 27.32  | 4.67            | 8.28                                   | 10.19                              | 23.15 | 7.48    | 57.95  | .5.95             |
| )ct                                         | 4.58                                     | 93.00                   | 0.00                                                                 | 97.58       | 10.70         | 13.16            | 0.00                                 | 0.36               | 121.83     | 00.00     | 121.83                              | 65.72  | 11.26           | 8.56                                   | 10.53                              | 30.35 | 16.11   | 107.98 | .13.85            |
| Nov                                         | 3.77                                     | 76.51                   | 0.00                                                                 | 80.28       | 10.36         | 12.74            | 0,00                                 | 0.66               | 104.05     | 0.00      |                                     | 54.06  | 9.26            | 8.28                                   | 10.19                              | 27.74 | 22.13   | 103.93 | 0.12              |
| ક્                                          | 5.10                                     | 103.45                  | 000                                                                  | 108.55      | 10.70         | 13.16            | 0.00                                 | 0.26               | 132,70     | 0.00      | 132,70                              | 73.10  | 12.52           | 8.56                                   | 10.53                              | 31.61 | 8.85    | 113.57 | +1.61.            |
| an                                          | 4.03                                     | 81.73                   | 000                                                                  | 85.76       | 10.70         | 13.16            | 0.00                                 | 60.0               | 109,74     | 00.0      | 109.74                              | 57.76  | 68.6            | 8.56                                   | 10.53                              | 28.98 | 3.11    | \$9.85 | 68.61.            |
| eb                                          | 0.58                                     | 17.78                   | 0.00                                                                 | 18.66       | 6.67          | 11.89            | 0.00                                 | 60'0               | 40.31      | 00.00     | 40.31                               | 12.57  | 2.15            | 7.73                                   | 9.51                               | 19.40 | 2.86    | X 83   | .5.48             |
| Mar                                         | 1.76                                     | 35.62                   | 0.00                                                                 | 37.38       | 10.70         | 13.16            | 00:0                                 | 0.06               | 61.31      | 0.00      | 61.31                               | 25.17  | 4.31            | 8.56                                   | 10.53                              | 23.40 | 1.86    | 30.t   | -10.87            |
| Apr                                         | 1.45                                     | 29.52                   | 0.00                                                                 | 30.98       | 10.36         | 12.74            | 0.00                                 | 0.02               | エズ         | 00'0      | ¥.1                                 | 20.87  | 3.57            | 8.28                                   | 10.19                              | 22.05 | 0.79    | 43.71  | -10.40            |
| May                                         | 0.98                                     | 19.95                   | 0.00                                                                 | 20.93       | 10.70         | 13.16            | 00'0                                 | 0.07               | 44.87      | 00.0      | 44.87                               | 14.09  | 2.41            | 8.56                                   | 10.53                              | 21.51 | 17.     | 38.04  | 6.83              |
| Fotal                                       | 32.56                                    | 32.56 660.76            | 0.00                                                                 | 693.32      | 126.0         | 155.0            | 0.00                                 | 1,91               | 976.51     | 0.00      | 976.51                              | 467.0  | 80.0            | 100.8                                  | 124.0                              | 304.8 | 0.3     | 835.8  | -140.74           |
| Note; Column no. 10 = Column no.(5+6+7+8+9) | . 10 = Colum                             | n no.(3+6+              | -7+8+9).                                                             | Colum       | n No. 12 =    | . Column n       | Column No. 12 = Column no. (10 + 11) |                    | mn no.19 a | Column no | Column no.19 = Column no.(13+17+18) |        | 2 no. 20 = Co   | Column no. 20 = Column no. (19-12)     | -12).                              |       |         |        |                   |

Table 4.10.13(h): Ponnanai Ar Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                               |              |                                       |             |        | 15                 | Water Utilisation | sation                               |          |           |           |                                        |        |                                   |                        | Water Anailability | hilito        |         |        |           |                    |
|-----------------------------------------------|--------------|---------------------------------------|-------------|--------|--------------------|-------------------|--------------------------------------|----------|-----------|-----------|----------------------------------------|--------|-----------------------------------|------------------------|--------------------|---------------|---------|--------|-----------|--------------------|
|                                               |              |                                       |             |        |                    |                   |                                      |          | -         |           |                                        |        |                                   |                        | Maici Pivalli      | A TILLY       |         |        |           | 1 40mm             |
| Acces 4                                       |              |                                       |             | Wate   | Water requirements | cuts              |                                      |          |           |           | Gross                                  |        | œ                                 | Regeneration from uses | from uses          |               | Surface | Ground | Gross     | Monthly            |
| Inion:                                        | Utilisatic   | Itilisation under irrigation projects | gation proj |        | Dome               | Indus-            | Hydro                                | Environ- | ŀ         | Export    | total                                  | Import | Irriga-                           | Dome-                  | Indus-             |               | Water   | water  | water     | water .            |
|                                               | Proposed     | Existing Ongoing                      | $\vdash$    | Total  | stic               | trial             | power                                | mental   | i otai    |           | wilisation                             |        | tion                              | stic                   | trial              | lota          | yields  |        | available | Dalance<br>Dalance |
| Ξ                                             | (3)          | 3                                     | <b>(4)</b>  | (S)    | 9                  | (3)               | (61)                                 | (6)      | (10)      | (11)      | (12)                                   | (13)   | (14)                              | (35)                   | (91)               | (17)          | (81)    | (e)    | (30)      | (3)                |
| Jun                                           | 133          | 36.82                                 | 0.00        | 49.13  | 12.74              | 12.74             | 0.00                                 | 0.03     | 74.63     | 0.00      |                                        | 33.10  | 5.67                              | 10.19                  | 10.19              | 26.05         | 0.77    | 14.70  | 74.62     | -0.02              |
| Įa.                                           | 3.63         | 73.65                                 | 0.0         | 77.28  | 13.16              | 13.16             | 0.00                                 | 0.03     | 103.63    | 00:0      | 103.63                                 | 52.08  | 8.92                              | 10.53                  | 10.53              | 29.98         | 0.77    | 23.12  | 105.95    | 2.31               |
| Ang                                           | 2.17         | <del>1</del> <del>1</del>             | 0.00        | 46.29  | 13.16              | 13.16             | 000                                  | 0.03     | 72.64     | 000       | 72.64                                  | 31.16  | 5.34                              | 10.53                  | 10.53              | 26.40         | 1.03    | 13.85  | 1.4       | -0.21              |
| Sep                                           | 8            | 38.61                                 | 0.00        | 40.51  | 12.74              | 12.74             | 0.00                                 | 0.22     | 66.21     | 00.0      | 66.21                                  | 27.32  | 4.68                              | 10.19                  | 10.19              | 25.06         | 2.48    | 12.12  | 71.99     | 5.77               |
| Oct                                           | 85.7         | 93.00                                 | 0.00        | 97.58  | 13.16              | 13.16             | 0.00                                 | 0.36     | 124.27    | 00:0      | 124.27                                 | 65.72  | 11.26                             | 10.53                  | 10.53              | 32.32         | 16.11   | 29.19  | 139.14    | 14.87              |
| Ngv                                           | 3.77         | 76.51                                 | 0.00        | 80.28  | 12.74              | 12.74             | 0.00                                 | 0.66     | 106.42    | 0.00      | 106.42                                 | 54.06  | 9.26                              | 10.19                  | 10.19              | <b>13</b> (2) | 22.13   | 24.01  | 129.85    | 23.43              |
| Šć                                            | \$.10        | 103.45                                | 0.00        | 108.55 | 13.16              | 13.16             | 0.00                                 | 0.26     | 135.14    | 0.00      | 135.14                                 | 73.10  | 12.52                             | 10.53                  | 10.53              | 33.59         | 8.85    | 32.47  | 148.01    | 12.87              |
| Jan                                           | 4.03         | 81.73                                 | 0.00        | 85.76  | 13.16              | 13.16             | 800                                  | 0.00     | 112.18    | 000       | 112.18                                 | 57.76  | 68.6                              | 10.53                  | 10.53              | 30.96         | 3.1.    | 25.65  | 117.48    | 5.30               |
| Feb                                           | 88.0         | 17.78                                 | 000         | 18.66  | 11.89              | 11.89             | 000                                  | 0.0      |           | 0.00      | 42.52                                  | 12.57  | 2.15                              | 9.51                   | 9.51               | 21.18         | 2.86    | 5.58   | 42.19     | 033                |
| Mar                                           | 1.76         | 35.62                                 | 0.00        | 37.38  | 13,16              | 13.16             | 0.00                                 | 90.0     | 63.76     | 000       | 63.76                                  | 25.17  | 4.31                              | 10.53                  | 10.53              | 25.38         | 1.86    | 1.18   | 63.59     | -0.17              |
| Apr                                           | 1.45         | 29.52                                 | 000         | 30.5%  | 12.74              | 12.74             | 0.00                                 | 0.05     |           | 000       | <b>26.</b> 48                          | 20.87  | 3.57                              | 10.19                  | 10.19              | 23.96         | 0.79    | 927    | £.88      | 9.                 |
| May                                           | 0.98         | 19.95                                 | 000         | 20.93  | 13.16              | 13.16             | 0.00                                 | 0.07     | 47.34     | 000       | 47.34                                  | 14.09  | 2.41                              | 10.53                  | 10.53              | 23.48         | 2.44    | 6.26   | 46.27     | 90.L               |
| Total                                         | 32.56        | 32.56 660.76                          | 0.00        | 693.32 | 155.0              | 155.0             | 0.00                                 | 1.91     | 1005.2    | 0.00      | 1005.2                                 | 467.0  | 80.0                              | 124.0                  | 124.0              | 328.0         | 25      | 207.4  | 1066.4    | 61.17              |
| Note : Column no. 10 = Column no. (5+6+7+8+9) | 1.10 = Colun | m no. (5+6+                           | (6+8+)      | Colum  | n No. 12 *         | · Column n        | Column No. 12 = Column no. (10 + 11) | <b>~</b> | umn no.20 | Column no | Column no.20 = Column no.(13+17+18+19) |        | Column no. 21 = Column no.(20-12) | = Column no            | 0.(20-12).         |               |         |        |           |                    |

Unit: MCM Table 4.10.14(a): Upper Coleroon Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                              | _                         |            |                                       |         |                                     | Water Utilisation | sation    |          |             |                                     |             |        |              | **                                 | Water Availability | ility        |         |           | 10-14    |
|----------------------------------------------|---------------------------|------------|---------------------------------------|---------|-------------------------------------|-------------------|-----------|----------|-------------|-------------------------------------|-------------|--------|--------------|------------------------------------|--------------------|--------------|---------|-----------|----------|
| Mead                                         |                           |            |                                       | Ä       | Water requirements                  | nents             |           |          |             |                                     | Gross       |        |              | Regeneration from uses             | from uses          |              | Surface | Gross     | Minning) |
| dinory                                       | Utilisati                 | on under 1 | Itilisation under irrigation projects | ojects  | Dome-                               | Indus-            | Hydro-    | Environ- | 1           | Export                              | total       | Import | Irriga.      | Dome-                              | Indus-             | Į.           | Waler   | water     | balance  |
|                                              | Proposed Existing Ongoing | Existing   | Ongoing                               | Total   | stic                                | trial             | DOWCE     | mental   | 1870        |                                     | utilisation |        | lion         | डार                                | trial              | 1            | yields  | available |          |
| Ξ                                            | 3                         | 3          | Ŧ                                     | 3       | 9                                   | 6                 | (8)       | (6)      | (01)        | (11)                                | (12)        | (3)    | (14)         | (15)                               | (91)               | (17)         | (18)    | (61)      | (20)     |
| Jun                                          | 3.71                      | 11.03      | 000                                   | 14.75   | 9.6                                 | 11.01             | 000       | 0.07     | 78.87       | 0.00                                | 74.87       | 7.81   | 0.93         | 7.23                               | 8.81               | 16.91        | 7.29    | 32.07     | -2.80    |
| iui                                          | 62.11                     | 184.55     | 00.0                                  | 246.66  | 9.34                                | 11.38             | 000       | 0.36     | 267.75      | 0.00                                | 267.75      | 130.67 | 15.49        | 7.43                               | 9.10               | 32.07        | 35.94   | 198.68    | -69.07   |
| Λuα                                          | 66.47                     | 197.49     | 00.0                                  | 263.96  | 9.34                                | 11.38             | 000       | 0.51     | 285.19      | 0.00                                | 285.19      | 139.83 | 16.58        | 7.47                               | 9.10               | 33.16        | 51.05   | 224.04    | -61.16   |
| Sep                                          | 64.98                     | 193.07     | 00'0                                  | 258.05  | 200                                 | 10.11             | 000       | 0.93     | 279.03      | 00.0                                | 279.03      | 136.70 | 16.21        | 7,23                               | 8.81               | 32.28        | 92.59   | 261.54    | .17.49   |
| 8                                            | 19.47                     | 57.87      | 000                                   | 77.34   | 9.34                                | 11.38             | 000       | 0.82     | 88.86       | 0.00                                | 98.69       | 40.97  | 4.86         | 7.47                               | 9.10               | <del>द</del> | 87.18   | 144.59    | 45.70    |
| Š                                            | 17.13                     | 16:05      | 00.0                                  | 68.05   | 9.04                                | 10:11             | 000       | 1.66     | 89.76       | 00:0                                | 89.76       | 36.05  | 4.27         | 7.23                               | 8.83               | 20.32        | 165.9   | 222.26    | 132.50   |
| Š                                            | 13.49                     | 40.09      | 00.0                                  | 53.58   | 9.34                                | 11.38             | 000       | 0.94     | 75.24       | 0.00                                | 75.24       | 28.38  | 3.37         | 7.47                               | 9.10               | 19.94        | 93.55   | 141.88    | 66.63    |
| Jan                                          | 4.68                      | 13.90      | 00.0                                  | 18.57   | 9.34                                | 11.38             | 000       | 0.22     | 39.52       | 0.00                                | 39.52       | 9.84   | 1.17         | 7.47                               | 9.10               | 17.75        | 21.63   | 49.21     | 9.70     |
| Fcb                                          | 8.16                      | 24.25      | 00.0                                  | 32.41   | 8.44                                | 10.28             | 000       | 0.13     | 51.26       | 0.00                                | 51.26       | 17.17  | 20.5         | 6.75                               | 8.22               | 17.01        | 13.25   | 47.43     | .3.83    |
| Mar                                          | 12.33                     | 1          | 00:0                                  | 48.96   | 9.34                                | 11.38             | 000       | 0.11     | 08.69       | 0.00                                | 69.80       | 25.94  | 3.08         | 7.47                               | 9.10               | 19.65        | 10.71   | 56.30     | -13,49   |
| Apr                                          | 3.44                      | 10.22      | 00:0                                  | 13.66   | 9.0                                 | 11.01             | 000       | 0.06     | 33.77       | 0.00                                | 33.77       | 7.24   | 0.86         | 7,23                               | 00                 | 16,90        | 5.78    | 29.92     | -3.86    |
| May                                          | 0.67                      | 1.99       | 00.0                                  | 2.67    | 9.34                                | 11.38             | 00.00     | 0.10     | 23.49       | 00.00                               | 23.49       | 1.41   | 0.17         | 7.47                               | 9.10               | 16.75        | 10.13   | 28.29     | 4.80     |
| Total                                        | 276.65                    | 822.0      | 0.00                                  | 1098.65 | 110.0                               | 134.0             | 00.0      | 16.5     | 1348.6      | 00.0                                | 1348.6      | 582.0  | 0.69         | 88.0                               | 107.2              | 164.2        | 289.0   | 1435.2    | 86.64    |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | no. 10 = Colur            | nn no.(5+  | 6+4+6+6)                              | Colu    | Column No. 12 - Column no. (10 + 11 | Column n          | 11+01).o. | _        | umn no.19 = | Column no.19 = Column no.(13+17+18) | (13+17+18)  |        | 1 no.20 ≠ Ca | Column no. 20 * Column no. (19-12) | -12).              |              |         |           |          |

Table 4.10.14(b): Upper Coleroon Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                              | _          |                           |                                     |              |                    | Who are Prilimenting                | 1070         |          |           |             |                                          |        |                                    |                        | Water Assailability | -Kilida |         |        |           |         |
|----------------------------------------------|------------|---------------------------|-------------------------------------|--------------|--------------------|-------------------------------------|--------------|----------|-----------|-------------|------------------------------------------|--------|------------------------------------|------------------------|---------------------|---------|---------|--------|-----------|---------|
|                                              |            |                           |                                     |              |                    | Wales Cult                          | SAUDI        |          |           | j           |                                          |        |                                    |                        | TOAC PAGE           |         |         |        |           | Monthly |
|                                              |            |                           |                                     | W            | Water requirements | Themis                              |              |          |           |             | Gross                                    |        |                                    | Regeneration from uses | n from uses         |         | Surface | Ground | Gross     | worker  |
| n nonin                                      | Utilisati  | on under in               | Utilisation under imgation projects | ojects       | Domc-              | Indus-                              | Hydro-       | Environ- |           | Export      | total                                    | Import | Irriga-                            | Dome-                  | Indus-              |         | water   | water  | Water     | palance |
|                                              | Proposed   | Proposed Existing Ongoing | Ongoing                             | Total        | stic               | Lia                                 | power        | mental   | I oral    |             | utilisation                              |        | tion                               | stic                   | trial               | 1000    | yiclds  | yicks  | available |         |
| Ξ                                            | (2)        | <u></u>                   | <b>(</b> €)                         | (S)          | 9                  | 8                                   | (61)         | 6)       | (01)      | Ê           | (13)                                     | (EI)   | (14)                               | (15)                   | (16)                | (17)    | (18)    | (61)   | (30)      | (21)    |
| Jun                                          | 3.71       | 11.03                     | 000                                 | 14.75        | 10:11              | 11.03                               | 000          | 0.07     | 34.87     | 00.00       | 34.87                                    | 7.81   | 0.93                               | 8.81                   | 8.81                | 18.55   | 7.29    | 3.39   | 37.04     | 2.17    |
| 75                                           | 62.11      | 184.55                    | 00.00                               | 246.66       | 11.38              | 11.38                               | 000          | 0.36     | 267.75    | 0.00        | 267.75                                   | 130.67 | 15.49                              | 01.6                   | 9.10                | 33.70   | 35.94   | 56.71  | 257.02    | -10.73  |
| Aug                                          | 66.47      | 197.49                    | 00.0                                | 263.96       | 11.38              | 11.38                               | 000          | 0.51     | 285.191   | 00:00       | 285.191                                  | 139.83 | 16.58                              | 9.10                   | 9.10                | 24.79   | \$1.05  | 69.09  | 286.36    | 1.16    |
| S                                            | 64.98      | 193.07                    | 000                                 | 258.05       | 1.0                | 10.11                               | 000          | 0.93     | 279.03    | 0.00        | 279.03                                   | 136,70 | 16.21                              | 8.8                    | 8.81                | 33.83   | 92.59   | 59.33  | 322.45    | 43.41   |
| ğ                                            | 19.47      | 57.87                     | 000                                 | 77.34        | 11.38              | 11,38                               | 000          | 0.82     | 88.86     | 0000        | 98.86                                    | 40.97  | 4.86                               | 9.10                   | 9.10                | 23.07   | 82.18   | 17.78  | 164.00    | 65.12   |
| Nov                                          | 17.13      | 50.91                     | 0.00                                | 68.05        | 10:11              | 11.01                               | 000          | 1.66     | 89.76     | 00.00       | 89.76                                    | 36.05  | 4.27                               | 8.81                   | 8.81                | 21.90   | 1659    | 15.65  | 239.49    | 149.73  |
| ğ                                            | 13.49      | 40.09                     | 000                                 | 53.58        | 11.38              | 11,38                               | 000          | 0.94     | 75.24     | 000         | 75.24                                    | 28.38  | 3.37                               | 9,10                   | 9.10                | 21.57   | 93.55   | 12.32  | 155.83    | 80.58   |
| 5                                            | 4.68       | 13.90                     | 00.0                                | 18.57        | 11.38              | 11.38                               | 000          | 0.22     | 39.52     | 00:00       | 39.52                                    | 9.84   | 1.17                               | 9.10                   | 9.10                | 19.38   | 21.63   | 4.27   | \$5.11    | 15.60   |
| Feb                                          | 8.16       | 24.25                     | 000                                 | 32.41        | 10.28              | 10.28                               | 000          | 0.13     | 51.26     | 0.00        | 51.26                                    | 17.17  | 205                                | 8.22                   | 8.22                | 18.48   | 13.25   | 7,45   | \$6.36    | 5.09    |
| Mar                                          | 12.33      | 36.63                     | 000                                 | 48.96        | 11.38              | 11.38                               | 000          | 0.11     | 08.69     | 0.00        | 03.69                                    | 25.94  | 3.08                               | 9.10                   | 9.10                | 21.28   | 10,71   | 11.26  | 66.19     | 19:0    |
| Apr                                          | #<br>#     | 10.22                     | 00.0                                | 13.66        | 11.01              | 11.01                               | 000          | 90.0     | 33.77     | 0.00        | 33.77                                    | 7.24   | 98.0                               | 18.8                   | 8.81                | 18.48   | 5.78    | 3.14   | 7.        | 0.86    |
| May                                          | 0.67       | 66                        | 000                                 | 2.67         | 11.38              | 11.38                               | 000          | 0.10     | 23.49     | 0.00        | 23.49                                    | 14.    | 0.17                               | 9.10                   | 9.10                | 18.38   | 10.13   | 0.61   | 30.53     | 2.2     |
| Total                                        | 276.65     | 822.0                     | 000                                 | 0.00 1098.65 | 134.0              | 134.0                               | 000          | 5.91     | 1372.6    | 00.00       | 1372.6                                   | 582.0  | 0.69                               | 107.2                  | 107.2               | 283.4   | 589.0   | 252.6  | 1707.0    | 334.4   |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10 = Colur | nn no.(5+6                | (6+8+4+                             | Colum        | mn No. 12          | Column No. 12 = Column no. (10 + 11 | to. (30 + 11 | _        | mn no. 20 | - Column no | Column no. 20 = Column no. (13+17+18+19) |        | Column no. 21 = Column no. (20-12) | = Column               | 10.(20-12).         |         |         | į      |           |         |

Unit: MCM Table 4.10.14(c): Upper Coleroon Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

|                                              |                           |           |                                     |         |                    |                   |                                      |          |             |             |                                        |        |              |                                   | A STATE OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PARTY OF THE PAR |        |         |           |          |
|----------------------------------------------|---------------------------|-----------|-------------------------------------|---------|--------------------|-------------------|--------------------------------------|----------|-------------|-------------|----------------------------------------|--------|--------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|-----------|----------|
|                                              |                           |           |                                     |         | 75                 | Water Utilisation | alton                                |          |             |             |                                        |        |              | 3                                 | Water Availability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | allity |         |           | 1 C      |
|                                              |                           |           |                                     | Wat     | Water requirements | tents             |                                      |          |             |             | Gross                                  |        |              | Regeneration from uses            | ा मित्रमा पाइट्ड                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |        | Surface | Gross     | Monitory |
| เนอนา                                        | Utilisation               | under im  | Utilisation under impation projects |         | Dorne-             | Indus-            | Hydro                                | Environ- | Total       | Export      | total                                  | Import | Imga.        | Dome-                             | Inches-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Total  | water   | water     | Malance  |
|                                              | Proposed Existing Ongoing | visting O | ngoing                              | Total   | stic               | rial              | power                                | mental   | 1 Old 1     |             | nonesilita                             |        | tion         | stic                              | trial                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LONG   | yields  | available |          |
| ε                                            | (2)                       | ε         | €                                   | 3       | (9)                | (7)               | (8)                                  | (6)      | (10)        | (11)        | (12)                                   | (13)   | (+I)         | (15)                              | (91)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (17)   | (18)    | (61)      | (20)     |
| Jun                                          | 3.71                      | 11.03     | 000                                 | 14.75   | 904                | 11.01             | 0.00                                 | 0.07     | 34.87       | 00.00       | 34.87                                  | 7.81   | 0.93         | 7.23                              | 8.81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 16.97  | 9.15    | 33.93     | よ。<br>な。 |
| 70(                                          | 62.11                     | 184.55    | 00.0                                | 246.66  | 9.34               | 11.38             | 0.00                                 | 0.36     | 267.75      | 00'0        | 267.75                                 | 130.67 | 15.49        | 7.47                              | 01.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 32.07  | 45.09   | 207.83    | .59.92   |
| Aug                                          | 66.47                     | 197.49    | 000                                 | 263.96  | 934                | 11.38             | 0.00                                 | 0.51     | 285.19      | 00.0        | 285.19                                 | 139.83 | 16.58        | 7.47                              | 9.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 33.16  | 64.05   | 237.04    | -48.15   |
| eş                                           | 64.98                     | 193.07    | 80                                  | 258.05  | 9.04               | 11.01             | 0.00                                 | 0.93     | 279.03      | 00.0        | 279.03                                 | 136.70 | 16.21        | 7.23                              | 8.81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 32.25  | 116.17  | 285.12    | 60.9     |
| Ö                                            | 19.47                     | 57.87.    | 000                                 | 77.34   | 9.34               | 11.38             | 0.00                                 | 0.82     | 98.88       | 00.0        | 98.88                                  | 40.97  | 4.86         | 7.47                              | 9.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 21.44  | 103.11  | 165.51    | 66.63    |
| No                                           | 17.13                     | 50.91     | 000                                 | 68.05   | 9.03               | 10.11             | 00.0                                 | 1.66     | 89.76       | 00:0        | 89.76                                  | 36.05  | 4.27         | 7.23                              | 8.33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 20.32  | 208.15  | 264.51    | 174.75   |
| 86                                           | 13.49                     | 60.04     | 000                                 | 53.58   | 9.34               | 11.38             | 00'0                                 | 0.94     | 75.24       | 00.0        | 75.24                                  | 28.38  | 3.37         | 7.47                              | 01.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19.94  | 117.37  | 165.70    | 97.06    |
| Jan                                          | 4.68                      | 13.90     | 000                                 | 18.57   | 9.34               | 11.38             | 0.00                                 | 0.22     | 39.52       | 00.0        | 39.52                                  | 9.84   | 1.17         | 7.47                              | 9.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 17.75  | 27.14   | 54.72     | 15.21    |
| Feb                                          | 8.16                      | 24.25     | 0.00                                | 32.41   | 7.00               | 10.28             | 0.00                                 | 0.13     | 51.26       | 00.00       | 51,26                                  | 17.17  | 2.04         | 6.75                              | 8.33                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 17.01  | 16.62   | 20.80     | -0.46    |
| Mar                                          | 12.33                     | 36.63     | 0.00                                | 96.84   | 9.34               | 11.38             | 00.0                                 | 0.11     | 69.80       | 00.0        | 08.69                                  | 25.94  | 3.08         | 7.47                              | 9,10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 19.65  | 13.44   | 59.03     | -10.77   |
| Apr                                          | 3.4                       | 10.22     | 0.00                                | 13.66   | 9.04               | 11.01             | 0.00                                 | 90:0     | 33.77       | 00.0        | 33.77                                  | 7.24   | 0,86         | 7.23                              | 18.81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 16,90  | 7.25    | 31.39     | -2.38    |
| May                                          | 190                       | 66        | 0.00                                | 2.67    | 9.34               | 11.38             | 0.00                                 | 0.10     | 23.49       | 00:0        | 23.49                                  | 141    | 0.17         | 7.47                              | 9.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 16.75  | 12.71   | 30.87     | 7.38     |
| Total                                        | 276.65                    | 822.0     | 0.00                                | 1098.65 | 110.0              | 134.0             | 0.00                                 | 5.91     | 1348.6      | 00'0        | 1348.56                                | \$82.0 | 0.69         | 88.0                              | 107.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 264.2  | 739.00  | 1585.2    | 236.64   |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10 = Column               | 10.(5+6+  | (6+8+1-                             | Colum   | n No. 12 =         | : Column n        | Column No. 12 = Column no. (10 + 11) |          | umn no.19 * | - Column no | Column no. 19 = Column no. (13+17+18). |        | n no.20 ≈ Cc | Column no.20 ≈ Column no. (19-12) | .12).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |        |         |           |          |

Table 4.10.14(d): Upper Coleroon Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                               |              |                  |                                      |         |                    |                   |                                      |          |             |          |                                          |        |             |                                   |                    |        |         |        | Unit: MCM | MCM     |
|-----------------------------------------------|--------------|------------------|--------------------------------------|---------|--------------------|-------------------|--------------------------------------|----------|-------------|----------|------------------------------------------|--------|-------------|-----------------------------------|--------------------|--------|---------|--------|-----------|---------|
|                                               |              |                  |                                      |         |                    | Water Utilisation | sation                               |          |             |          |                                          |        |             |                                   | Water Availability | Sility |         |        |           |         |
| 3                                             |              |                  |                                      | Wal     | Waler requirements | nents             |                                      |          |             |          | Gross                                    |        |             | Regeneration from uses            | from uses          |        | Surface | Ground | Gross     | Monumy  |
| Month                                         | Utilisatic   | m under in       | Utilisation under impartion projects | yects   | Dome-              | Indus-            | Hydro-                               | Environ- | Total       | Export   | total                                    | Import | Irriga-     | Dome-                             | Indus-             | Total  | waler   |        | Waler     | halance |
|                                               | Proposed 1   | Existing Ongoing | guioau                               | Total   | stic               | E.S               | power                                | mental   | 1000        |          | utilisation                              |        | tion        | Stic                              | Lr) a              | 101    | yields  | yields | available | 3       |
| €                                             | (2)          | <u>ල</u>         | €                                    | (5)     | (9)                | (1)               | (61)                                 | (6)      | (01)        | (11)     | (12)                                     | (13)   | (11)        | (15)                              | (16)               | (17)   | (81)    | (61)   | (92)      | (21)    |
| ten                                           | 3.71         | 11.03            | 000                                  | 14.75   | 11.01              | 10:11             | 000                                  | 0.07     | 34.87       | 00.0     | 34.87                                    | 7.81   | 0,93        | 18.81                             | 18.81              | 18.55  | 9.15    | 3.39   | 38.90     | 4.03    |
|                                               | 62.11        | 184.55           | 000                                  | 246.66  | 11.38              | 11.38             | 00:0                                 | 0.36     | 267.75      | 0.00     | 267.75                                   | 130.67 | 15.49       | 9.10                              | 9.10               | 33.70  | 45.09   | \$6.71 | 266.17    | -1.57   |
| Aug                                           | 66.47        | 197,49           | 00.00                                | 263.96  | 11.38              | 11.38             | 0000                                 | 0.51     | 285.19      | 0.00     | 285.19                                   | 139.83 | 16.58       | 9.10                              | 9.10               | 34.79  | 64.05   | 60.69  | 299.36    | 14.16   |
| Sep                                           | 86.19        | 193.07           | 000                                  | 258.05  | 11.01              | 11.01             | 0.00                                 | 0.93     | 279.03      | 0.00     | 279.03                                   | 136.70 | 16.21       | 18.8                              | 8.81               | 33.83  | 116.17  | 59.33  | 346.03    | 66.99   |
| Oet                                           | 19.47        | 57.87            | 000                                  | 7.34    | 11.38              | 11.38             | 000                                  | 0.82     | 98.88       | 0.00     | 98.88                                    | 40.97  | 4.86        | 61.6                              | 01.6               | 23.07  | 103,11  | 17.78  | 184.93    | \$6.04  |
| Nov.                                          | 17.13        | 16:05            | 000                                  | 68.05   | 11.01              | 10.11             | 000                                  | 99.1     | 89.76       | 00.0     | 89.76                                    | 36.05  | 4,27        | 8.81                              | 18.8               | 21.90  | 208.15  | 15.65  | 281.74    | 191.98  |
| ဦး                                            | 13.49        | 60.0+            | 0.00                                 | 53.58   | 11.38              | 11.38             | 0.00                                 | 0.94     | 75.24       | 0.00     | 75.24                                    | 28.38  | 3.37        | 9.10                              | 9.10               | 21.57  | 117.37  | 12.32  | 179.65    | 104.41  |
| uef                                           | 4,68         | 13.90            | 00'0                                 | 18.57   | 11.38              | 11.38             | 0.00                                 | 0.22     | 39.52       | 0.00     | 39.52                                    | 9.84   | 1.17        | 9.10                              | 9.10               | 19.38  | 27.14   | 4.27   | 60.62     | 21.11   |
| Feb                                           | 8.16         | 24.25            | 00:0                                 | 32.41   | 10.28              | 10.28             | 00.0                                 | 0.13     | 51.26       | 000      | 51.26                                    | 17.17  | 2.04        | 8.22                              | 8.22               | 18.48  | 16.62   | 7.45   | 59.73     | 8.47    |
| Mar                                           | 12.33        | 36.63            | 0.00                                 | 48.96   | 11.38              | 11.38             | 00.0                                 | 0.11     | 69.80       | 00.0     | 69.80                                    | 25.94  | 3.08        | 9.10                              | 9.10               | 21.28  | 13,44   | 11.26  | 71.92     | 2.12    |
| Apr                                           | 7            | 10.22            | 000                                  | 13.66   | 11.01              | 10.11             | 0.00                                 | 90.0     | 33.77       | 0.00     | 33,77                                    | 7.24   | 0.86        | 8.81                              | 90.00              | 18.48  | 7.25    | 3.14   | 36.11     | 2.33    |
| Velv                                          | 19'0         | 1.99             | 00:0                                 | 2.67    | 11.38              | 11.38             | 0.00                                 | 0.10     | 23.49       | 000      | 23,49                                    | 1.41   | 0.17        | 9.10                              | 9,10               | 18.38  | 12.71   | 0.61   | 33.11     | 9.62    |
| Total                                         | 276.65       | 822.0            | 00:0                                 | 1098.65 | 134.0              | 134,0             | 0.00                                 | 16.5     | 1372.6      | 0.00     | 1372.56                                  | 582.0  | 0.09        | 107.2                             | 107.2              | 283.4  | 739.00  | 252.6  | 1857.0    | 484.41  |
| Note: Column no. 10 . Column no. (5+6+7+8+9). | 3.10 = Colum | n no.(5+6        | +1+8+6)                              | Colur   | Tru No. 12         | = Column          | Column No. 12 = Column no. (10 + 11) |          | umn no.20 = | Column R | Column no. 20 = Column no. (13+17+18+19) |        | lumn no. 21 | Column no. 21 = Column no.(20-12) | .(20-12).          |        |         |        |           |         |

Table 4.10.14(e): Upper Coleroon Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                                               |               |                  |                                       |         |                    |                   |                                      |          |            |                                       |             |        |              |                                  |                    |       |         |           | CILL : IVA CIVE |
|-----------------------------------------------|---------------|------------------|---------------------------------------|---------|--------------------|-------------------|--------------------------------------|----------|------------|---------------------------------------|-------------|--------|--------------|----------------------------------|--------------------|-------|---------|-----------|-----------------|
|                                               |               |                  |                                       |         |                    | Water Utilisation | sation                               |          |            |                                       |             |        |              | ŝ                                | Water Availability | lity  |         |           | Manth           |
| 197                                           |               |                  |                                       | W       | Water requirements | nents             |                                      |          |            |                                       | Gross       |        |              | Regeneration from uses           | from uses          |       | Surface | Gross     | water           |
| Wound:                                        | Utilisat      | on under i       | Utilisation under irrigation projects | ojects  | Dome-              | Indus.            | Hydro-                               | Environ- | Total      | Export                                | total       | Import | Lmga-        | Dome-                            | Indus-             | To a  | water   | water     | balance         |
| _                                             | Proposed      | Existing Ongoing | Ongoing                               | Fotal   | stic               | trial             | power                                | mental   | 1801       |                                       | utilisation |        | tion         | stic                             | trial              | 1001  | yields  | available |                 |
| ĉ                                             | 8             | Θ                | €                                     | (5)     | 9                  | (2)               | (8)                                  | (6)      | (01)       | (11)                                  | (12)        | (13)   | (14)         | (15)                             | (91)               | (17)  | (18)    | (61)      | (39)            |
| Jun                                           | 3.71          | 11.03            | 00.0                                  | 14.75   | 50.6               | 11.011            | 000                                  | 0.07     | 74.87      | 00.0                                  | 34.87       | 7.81   | 0.93         | 7.23                             | \$ 83              | 16.97 | 5.86    | 30.64     | <b>→4</b> .23   |
| 74                                            | 62 11         | 184.55           | 000                                   | 246.66  | 9.34               | 11.38             | 0.00                                 | 0.36     | 267.75     | 000                                   | 267.75      | 130.67 | 15.49        | 7.47                             | 9.10               | 32 07 | 28.87   | 191.61    | -76.14          |
| Aug                                           | 66.47         | 197.49           | 00.0                                  | 263.96  | 9.34               | 11.38             | 000                                  | 15.0     | 285.19     | 00.0                                  | 285.19      | 139.83 | 16 58        | 7.47                             | 9.10               | 33.16 | 10.14   | 214.00    | .71.20          |
| Sco                                           | 64.98         | 193.07           | 000                                   | 1       | 36                 | 11 01             | 00:0                                 | 0.93     | 279,03     | 00:0                                  | 279.03      |        | 16.21        | 7.23                             | 18.8               | 32.25 | 74.39   | 243.34    | -35 69          |
| Š                                             | 1947          | 57.87            | 000                                   | 77.34   | 9.34               | 11.38             | 000                                  | 0.82     | 98.88      | 0.00                                  | 98.88       | 40.97  | 4.86         | 7,47                             | 9.10               | 4.12  | 66.02   | 128.43    | 29.54           |
| Nov                                           | 1713          | 16.05            | 00.0                                  | 68.05   | 10.6               | 10.11             | 000                                  | 1.66     | 92 68      | 000                                   | 89.76       | 36 05  | 4.27         | 7.23                             | 8.81               | 30.32 | 133.3   | 189.66    | 99.90           |
| ĕ                                             | 13.49         |                  | 00'0                                  | 53.58   | 9.34               | 11.38             | 000                                  | 0,94     | 75.24      | 00.00                                 | 75.24       | 28.38  | 337          | 747                              | 9.10               | 16.61 | 75.16   | 123 49    | 43 24           |
| Jan                                           | 4.68          | 13.90            | 0.00                                  | 18.57   | 9.34               | 11 38             | 000                                  | 0.22     | 39.52      | 00.00                                 | 39.52       | 18.6   | 1.17         | 7.47                             | 9.10               | 17.75 | 17.38   | 41.86     | 5.45            |
| Feb                                           | 8.16          | 24.25            | 000                                   | 32.41   | 8.44               | 10.28             | 00.0                                 | 0.13     | 51.26      | 00:0                                  | 51.26       | 17.17  | 2.04         | 6.75                             | 8.12               | 17.01 | 10 64   | 44.82     | -6.44           |
| Mar                                           | 12.33         | 36.63            | 000                                   | 48.96   | 9.34               | 11.38             | 0.00                                 | 0.13     | 69.80      | 00:0                                  | 69.80       | 25.94  | 3.08         | 7.47                             | 9.10               | 19.65 | 8.60    | \$4.19    | .15.60          |
| Z Z                                           | 3.44          | 10.22            | 000                                   | 13.66   | 300                | 11.011            | 00:0                                 | 90'0     | 33.77      | 00:0                                  | 33.77       | 7.24   | 98'0         | 7.23                             | 8.81               | 16.90 | 4.64    | 28.78     | -5.00           |
| May                                           | 100           | 1.99             | 00.0                                  | 7.67    | 9.34               | 11.38             | 000                                  | 0.10     | 23.49      | 00:0                                  | 23.49       | [4]    | 0.17         | 747                              | 01.6               | 16.75 | 8.14    | 26.30     | 2.81            |
| Total                                         | 276.65        | 822.0            | 00.0                                  | 1098.65 | 110.0              | 134.0             | 0.00                                 | 5.91     | 1348.6     | 000                                   | 1348 6      | 582.0  | 0.69         | 0.88                             | 107.2              | 364 2 | 474 01  | 1320.2    | -28.36          |
| Note: Column no. $10 = Column no.(5+6+7+8+9)$ | o. 10 = Colu. | TUD DO. (5+t     | 5+7+8+9).                             | Colu    | mn No. 12          | Column n          | Column No. 12 * Column no. (10 + 11) |          | umn no. 19 | Column no. 19 = Column no. (13+17+18) | (13+17+18   |        | n no.20 = Cc | Column no.20 = Column no.(19-12) | -12).              |       |         |           |                 |
|                                               |               |                  |                                       |         |                    |                   |                                      |          |            |                                       |             | ı      |              |                                  |                    |       |         |           |                 |

Table 4.10.14(f): Upper Coleroon Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                              |               |                                     |              |        |                    |                   |                                      |          |            |            |                                          |        |            |                                    |                    |        |           |        | Unit: MCM | MCM        |
|----------------------------------------------|---------------|-------------------------------------|--------------|--------|--------------------|-------------------|--------------------------------------|----------|------------|------------|------------------------------------------|--------|------------|------------------------------------|--------------------|--------|-----------|--------|-----------|------------|
|                                              |               |                                     |              |        | 14                 | Water Utilisation | ation                                |          |            |            |                                          |        |            |                                    | Water Availability | bility |           |        |           | , Complete |
| 7.                                           |               |                                     |              | Wate   | Water requirements | ents              |                                      |          |            |            | Gross                                    |        |            | Regeneration from uses             | from uses          |        | Surface ( | Ground | Gross     | Motterily  |
| n Maonin                                     | Utilisatio    | Utilisation under imgation projects | ttion proje  | -      | Dome-              | [ndus-            | Hydro-                               | Environ- | 1,11       | Export     | lotal                                    | Import | Imiga-     | Dome-                              | -snpuj             |        | water     | _      | water     | halance    |
|                                              | Proposed I    | Proposed Existing Ongoing           | -            | Total  | stic               | is in             | power                                | mental   | iolai      |            | utilisation                              |        | rion       | stic<br>stic                       | trial              | 100    | yields    | yields | available |            |
| Ξ                                            | <u> </u>      | (E)                                 | €            | (S)    | (9)                | E                 | (61)                                 | (6)      | (01)       | (11)       | (12)                                     | (13)   | (14)       | ((15)                              | (16)               | (17)   | (18)      | (19)   | 8         | (21)       |
| un/                                          | 3.71          | 11.03                               | 0.00         | 14.75  | 10.1               | 11.01             | 0.00                                 | 0.07     | 36.84      | 0.00       | 34.87                                    | 781    | 0.93       | 18.8                               | 8.81               | 18.55  | 5.86      | 3.39   | 35.61     | 0.74       |
| 12                                           | 62.11         | 184.55                              | 00.0         | 246.66 | 11.38              | 11.38             | 000                                  | 0.36     | 269.78     | 00.00      | 267.75                                   | 130.67 | 15.49      | 9.10                               | 9.10               | 13.70  | 28.87     | \$6.71 | 249.95    | -17.80     |
| Aug                                          | 66.47         | 197.49                              | 00.0         | 263.96 | 11.38              | 11.38             | 000                                  | 0.51     | 287.23     | 00.00      | 285.19                                   | 139.83 | 16.58      | 9.30                               | 9.10               | H 79   | 41.01     | 69.09  | 276.32    | -8.88      |
| Sep                                          | 61.98         | 193.07                              | 00.0         | 258 05 | 11.01              | 10.11             | 0.00                                 | 0.93     | 281.00     | 0.00       |                                          | 136.70 | 16.21      | 8.81                               | 18.8               | 33.83  | 74.39     | 59.33  | 304.25    | 25.21      |
| o<br>O                                       | 19,47         | 57.87                               | 00.00        | 77.34  | 11.38              | 11.38             | 0.00                                 | 0.82     | ı          | 000        |                                          | 40.97  | 4.86       | 9.10                               | 9.10               | 73.07  | 66.02     | 17.78  | 147.841   | 48.96      |
| Nov                                          | 17.13         | 16.05                               | 0.00         | 68.05  | 11.01              | 10.11             | 0.00                                 | 1.66     | 91.73      | 000        |                                          |        | 4.27       | 18.8                               | 8.81               | 21.90  | 133.3     | 15.65  | 206.89    | 117.13     |
| ļ                                            | 13.49         | 40.09                               | 00.0         | 53.58  | 11.38              | 11.38             | 000                                  | 100      | 77.28      | 00.0       | 75.24                                    | 28.38  | 3.37       | 01.6                               | 9.10               | 21.57  | 75.16     | 12.32  | 137.41    | 62.19      |
| Jan                                          | 468           | 13.90                               | 800          | 18.57  | 11.38              | 11.38             | 000                                  | 0.22     | 41.55      | 000        | 39,52                                    | 18.6   | 1.17       | 9.10                               | 9.10               | 19.38  | 17.38     | 4.27   | 50.86     | 11.35      |
| Feb                                          | 8.16          | 24.25                               | 00.0         | 32.41  | 10.28              | 10.28             | 0.00                                 | 0.13     |            | 00.0       |                                          | 17.17  | 707        | 8.22                               | 8.22               | 18.48  | 10.64     | 7.45   | 53.75     | 2.48       |
| Mar                                          | 12.33         | 36 63                               | 00.0         | 48.96  | 11.38              | 11.38             | 000                                  | 0.11     | 71.83      | 00.00      | 18.69                                    | 25.94  | 3.08       | 9.10                               | 9.10               | 21.28  | 8.60      | 11.26  | 67.08     | -2.7       |
| Λpr                                          | 3.64          | 10.22                               | 0.00         | 13.66  | 11.01              | 11.01             | 000                                  | 90.0     | 35.75      | 000        | 33 77                                    | 7.24   | 0.86       | 8.81                               | 18.8               | 18.48  | 79.7      | 3.14   | 33.50     | -0.28      |
| May.                                         | 0.67          | 1.99                                | 0.00         | 2.67   | 11.38              | 11.38             | 0.00                                 | 0.10     | 25.53      | 000        | 23.49                                    | 14.1   | 0.17       | 9.10                               | 9.10               | 18.38  | 8.14      | 0.61   | 28.54     | 5.05       |
| Total                                        | 276.65        | 822.0                               | 0.00 1098.65 | 098.65 | 134.0              | 134.0             | 000                                  | \$6.5    | 1372.6     | 0000       | 1372.6                                   | 583.0  | 0.69       | 107.2                              | 107.2              | 283.4  | 474 0     | 152.6  | 1592.0    | 219.4      |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Colum | n no.(5+6+7                         | +8+6)        | Colum  | 1 No. 12 =         | Column n          | Column No. 12 = Column no. (10 + 11) | Col      | umn no. 20 | = Column n | Column no. 20 = Column no. (13+17+18+19) |        | umn no. 21 | Column no. 21 = Column no. (20-12) | 0.(20-12).         |        |           |        |           |            |

Table 4.10.14(g): Upper Coleroon Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water Unit: MCM

| 117.34             | A TOTAL DAY            | balance                               |                  | (30) | -7.74   | -93.44     | .95.77       | -80.26       | -10.02      | 20.03          | 3.21        | 4.96       | -12.81     | -20.75      | -7.78      | -2.07     | -312.4       |                                              |
|--------------------|------------------------|---------------------------------------|------------------|------|---------|------------|--------------|--------------|-------------|----------------|-------------|------------|------------|-------------|------------|-----------|--------------|----------------------------------------------|
|                    | Gross                  | Water                                 | available        | (61) | 27.13   | 174.31     | 189.43       | 17.861       | 88.87       | 109.79         | 78.46       | 34.55      | 38.45      | 49.04       | 26.00      | 21,421    | 1036.2       |                                              |
|                    | Surface                | Water                                 | yields           | (81) | 2.35    | 11.57      | 16.44        | 29.82        | 26.46       | 53.43          | 30.13       | 6.97       | 4.27       | 3,45        | 1.86       | 3.26      | 190.0        |                                              |
| ility              |                        | Total                                 |                  | (11) | 16.97   | 32.07      | 33.16        | 32.25        | 21.44       | 20.32          | 19.94       | 17.75      | 17.01      | 19.65       | 16.90      | 16.75     | 264.2        |                                              |
| Water Availability | from uses              | [ndus-                                | E.J.             | (16) | 8.81    | 01.6       | 01.6         | 18.8         | 01.6        | 8.81           | 9.10        | 9.10       | 8.23       | 9.10        | 8.81       | 9.10      | 107.2        | .12).                                        |
| M                  | Regeneration from uses | Dome-                                 | stic             | (15) | 7.23    | 7.47       | 7.47         | 7.23         | 7.47        | 7.23           | 7.47        | 747        | 6.75       | 7.47        | 7.23       | 7.47      | \$8.0        | Column no.20 = Column no.(19-12)             |
|                    |                        | Irriga-                               | tion             | (14) | 0.93    | 15.49      | 16.58        | 16.21        | 4.86        | 4.27           | 3.37        | 1.17       | 36         | 3.08        | 0.86       | 0.17      | 0.69         | 1 no.20 = Co                                 |
|                    |                        | Import                                |                  | (13) | 7.81    | 130.67     | 139.83       | 136.70       | 40.97       | 36.05          | 28.38       | 9.84       | 17.17      | 25.94       | 7.24       | 1.41      | 582.0        | Column                                       |
|                    | Gross                  | total                                 | utilisation      | (12) | 34.87   | 267.75     | 285.19       | 279.03       | 98.88       | 89.76          | 75.24       | 39.52      | 51.26      | 08.69       | 33.77      | 23.49     | 1348.6       | (13+17+18)                                   |
|                    |                        | Export                                |                  | (11) | 0.00    | 00.00      | 0.00         | 000          | 00.0        | 0.00           | 00.0        | 0.00       | 00:0       | 00.0        | 000        | 00.0      | 0.00         | Column no.19 = Column no.(13+17+18)          |
|                    |                        | Tutal                                 | epho 1           | (01) | 34.87   | 267.75     | 285.19       | 279.03       | 88.86       | 89.76          | 75.24       | 39.52      | 51.26      | 69.80       | 33,77      | 23.49     | 1348.6       | umn no.19 =                                  |
|                    |                        | Environ-                              | mental           | 6)   | 0.07    | 0.36       | 0.51         | 0.93         | 0.82        | 1.66           | 0.94        | 0.22       | 0.13       | 0.11        | 90.0       | 0.10      | 16.5         |                                              |
| sation             |                        | Hydro                                 | power            | (8)  | 00.00   | 0.00       | 0.00         | 00.0         | 0.00        | 00.00          | 00.00       | 000        | 00.0       | 00.0        | 000        | 00.0      | 00.0         | Column No. 12 = Column no. (10 + 11)         |
| Water Utilisation  | ments                  | -sapur                                | tria             | (1)  | 11.01   | 11.38      | 11.38        | 11.01        | 11.38       | 11.01          | 11.38       | 11.38      | 10.28      | 11.38       | 11.01      | 11.38     | 134.0        | = Column                                     |
|                    | Water requirements     | Dome.                                 | Stic             | (9)  | 10.6    | 9.34       | 9.34         | 9.6          | 9.34        | 9.04           | 9.34        | 9.34       | ***        | 9.34        | 9.04       | 9.34      | 110.0        | лпп No. 12                                   |
|                    | M                      | projects                              | Total            | (5)  | 0 14.75 | 0 246.66   | 0 263.96     | 0 258.05     | 0 77.34     | 0 68.05        | 53.58       | 18.57      | 32.41      | 0 48.96     | 13.66      | 0 2.67    | 0 1098.65    |                                              |
|                    |                        | rirrigation                           | Existing Ongoing | €    | 3 0.00  | 5 0.00     | 00.0         | 7 0.00       | 7 0.00      | 000            | 00.00       | 0.00       | 00.0       | 3 0.00      | 0.00       | 00'0      | 00.0         | 46+7+8+9                                     |
|                    |                        | Utilisation under irrigation projects | ed Existing      | (3)  | 17.1    | 111 184.55 | 66.47 197.49 | 64.98 193.07 | 19.47 57.87 | 17.13 50.91    | 13.49 40.09 | 4.68 13.90 | 8 16 34.25 | 12.33 36.63 | 3.44 10.22 | 0.67 1.99 | 276.65 822.0 | olumn no.(                                   |
| -                  |                        | 5                                     | Proposed         | 3    | [       | 62.1       | 18           | 3            | 5           | -              | E.          | 1          |            | 121         | \          |           | 376          | 1 no. 10 - C.                                |
|                    | :                      | Month                                 |                  | ε    | Jun     | [ <b>2</b> | Aue          | Sep          | o<br>o      | N <sub>Q</sub> | i<br>G      | Jan        | Feb        | Mar         | Apr        | May       | Total        | Note: Column no. 10 = Column no. (5+6+7+8+9) |

Unit: MCM Table 4.10.14(h): Upper Coleroon Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                             |                           |             |                                       |              | ***                | 1.00                                 |           |          |           |             |                                        |        |                                    |                        | Western Sec. of a holder | . L. (1) |         |        |           |          |
|---------------------------------------------|---------------------------|-------------|---------------------------------------|--------------|--------------------|--------------------------------------|-----------|----------|-----------|-------------|----------------------------------------|--------|------------------------------------|------------------------|--------------------------|----------|---------|--------|-----------|----------|
| _                                           |                           |             |                                       |              | *                  | water Utilisation                    | Sation    |          |           |             |                                        |        |                                    |                        | Water Avail              | & DITTE  |         |        | ]         | ) Courte |
| 3                                           |                           |             |                                       | Wate         | Water requirements | ients                                |           |          |           |             | Gross                                  |        | -                                  | Regeneration from uses | r from uses              |          | Surface | Ground | Gross     | Asomus . |
| Month                                       | Utilisatio                | in under fr | Utilisation under irrigation projects |              | Dome               | Indus-                               | Hydro     | Environ- | Teres     | Export      | total                                  | Import | Lriga.                             | Dome-                  | Indus-                   | -68      | Water   | water  | Water     | halance  |
|                                             | Proposed Existing Ongoing | Sxisting O  | Buiogu                                | Total        | stic               | trial                                | power     | mental   | Telor     |             | utilisation                            |        | tion                               | stic                   | trial                    | TO SE    | yields  | yelds  | available |          |
| ε                                           | 3                         | <u> </u> €  | £                                     | (ડ)          | (9)                | (7)                                  | (61)      | (6)      | (10)      | (11)        | (12)                                   | (13)   | (14)                               | (13)                   | (16)                     | (17)     | (81)    | (19)   | (20)      | (21)     |
| lun                                         | 3.71                      | 11.03       | 00'0                                  | 14.75        | 11.01              | 10.11                                | 00.0      | 0.07     | 36.84     | 00.0        | 36.84                                  | 7.81   | 0.93                               | 8.81                   | 8.81                     | 18.55    | 2.35    | 3.39   | 32.10     | -4.74    |
| Jul                                         | 62.11                     | 184.55      | 0.00                                  | 246.66       | 11.38              | 11.38                                | 00.0      | 0.36     | 269.78    | 00.00       | 269.78                                 | 130.67 | 15.49                              | 9.10                   | 01.6                     | 33.70    | 11.57   | 56.71  | 232.65    | -37.13   |
| Aug                                         | 68.43                     | 197.49      | 00.0                                  | 263.96       | 11.38              | 11.38                                | 00.00     | 0.51     | 287.23    | 0.00        | 287.23                                 | 139.83 | 16.58                              | 9.10                   | 01.6                     | 34.79    | 16.44   | 69.69  | 251.75    | -35.48   |
| es <sub>N</sub>                             | 86.198                    | 193.07      | 00.0                                  | 258.05       | 10.11              | 10.11                                | 00.0      | 0.93     | 281.00    | 0.00        | 281,001                                | 136.70 | 16.21                              | 8.81                   | 8.81                     | 33.83    | 29.82   | \$9.33 | 259.68    | -21.33   |
| S                                           | 19.47                     | 57.87       | 0.00                                  | 77.34        | 11.38              | 11.38                                | 0.00      | 0.82     | 100.92    | 00.00       | 100.92                                 | 40.97  | 4.86                               | 9.10                   | 6.10                     | 23.07    | 26.46   | 17.78  | 108.28    | 7.36     |
| Nov                                         | 17.13                     | 16.08       | 0.00                                  | 68.05        | 11.01              | 10 11                                | 00.0      | 99.1     | 91.73     | 00.0        | 91.73                                  | 36.05  | 4.27                               | 8.81                   | 8.81                     | 21.90    | 53.43   | 15.65  | 127.02    | 35.28    |
| ž                                           | 13.49                     | 40.09       | 000                                   | 53.58        | 11.38              | 11.38                                | 00.0      | 0.94     | 77.28     | 00.0        | 77.28                                  | 28.38  | 3.37                               | 01.0                   | 01.6                     | 21.57    | 30.13   | 12.32  | 92.41     | 15.13    |
| Jan                                         | 4.68                      | 13.90       | 0.00                                  | 18.57        | 11.38              | 11.38                                | 0.00      | 0.22     | 41.55     | 00'0        | 41.55                                  | 9.84   | 1.17                               | 9.10                   | 9.10                     | 19.38    | 6.97    | 4.27   | 40.45     | -1.10    |
| Feb                                         | 8.16                      | 24.25       | 00.0                                  | 32.41        | 10.28              | 10.28                                | 000       | 0.13     | 53.10     | 0.00        | \$3.10                                 | 17.17  | 2.04                               | 8.22                   | 8.72                     | 87-81    | 4.27    | 7.45   | 47.38     | -5.73    |
| Ya                                          | 12.33                     | 36.63       | 0.00                                  | 48.96        | 11.38              | 11.38                                | 00.0      | 0.11     | 71.83     | 00.0        | 71.83                                  | 25.94  | 3.08                               | 9.10                   | 9.10                     | 21.28    | 3.45    | 11.26  | 61.93     | -9.90    |
| Apr                                         | ¥                         | 10.22       | 0.00                                  | 13.66        | 11.01              | 11.01                                | 00.0      | 90:0     | 35.75     | 00.0        | 35.75                                  | 7.24   | 98.0                               | 8.81                   | 8.81                     | 18.48    | 1.86    | 3.14   | 30.72     | •5.03    |
| May                                         | 0.67                      | 66          | 0.00                                  | 2.67         | 11.38              | 11.38                                | 00:00     | 0.10     | 25.53     | 0.00        | 25.53                                  | 1.41   | 0.17                               | 9.10                   | 9.10                     | 18.38    | 3.26    | 0.61   | 23.66     | -1.87    |
| Total                                       | 276.65                    | 822.0       | 0.00                                  | 0.00 1098.65 | 134.0              | 134.0                                | 0.00      | 16.5     | 1373      | 0.00        | 1373                                   | 582.0  | 0.69                               | 107.2                  | 107.2                    | 283.4    | 190.0   | 252.6  | 1308.0    | 64.56    |
| Note: Column no.10 = Column no.(5+6+7+8+9). | 10 = Colum                | m no (5+6   | 17+8+9).                              | Colum        | n No. 12 =         | Column No. 12 = Column no. (10 + 11) | 0. (10+11 |          | amn no.20 | = Column no | olumn no.20 = Column no. (13+17+18+19) |        | Column no. 21 = Column no. (20-12) | = Coկսադ բ             | 10.(20-12).              |          |         |        |           |          |

Table 4.10.15(a): Lower Coleroon Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water

|                                               |               |                                     |             |        | -                  | Water Utilisation | sation                              |          |             |           |                                       |        |            | =                                | Water Availability | ility      |         |           |         |
|-----------------------------------------------|---------------|-------------------------------------|-------------|--------|--------------------|-------------------|-------------------------------------|----------|-------------|-----------|---------------------------------------|--------|------------|----------------------------------|--------------------|------------|---------|-----------|---------|
| Manth                                         |               |                                     |             | We     | Water requirements | nents             |                                     |          |             |           | Gross                                 |        |            | Regeneration from uses           | Trom uses          |            | Surfece | Gross     | Monthly |
|                                               | Utilisatio    | Utilisation under imgation projects | igation pro | ojects | Dome-              | Indus-            | Hydro-                              | Environ- | E           | Export    | total                                 | Import | Imiga-     | Dome-                            | Indus-             | ,          | water   | water     | water   |
| i                                             | Proposed      | Proposed Existing Ongoing           | ngoing      | Total  | stic               | trial             | power                               | mental   | 1 otal      |           | utilisation                           |        | Lon        | stic                             | trial              | <b>₹</b> 0 | yiclds  | available | Dalance |
| Ξ                                             | (2)           | ව                                   | (F)         | (2)    | (9)                | (2)               | (8)                                 | (6)      | (10)        | (1)       | (12)                                  | (13)   | (14)       | (15)                             | (91)               | (E)        | (31)    | (61)      | (50)    |
| Jun                                           | 0.00          | 15.25                               | 00:0        | 15.25  | 5.75               | 28.9              | 00.0                                | 90.0     | 27.88       | 00.0      | 27.88                                 | 14.46  | 121        | 4.60                             | 5.46               | 11.27      | 5.80    | 31.53     | 3.64    |
| Jor<br>Jor                                    | 0.00          | 255.05                              | 0.00        | 255.05 | 5.95               | 7.05              | 00.0                                | 0.15     | 268.20      | 00.00     | 268.30                                | 241.80 | 20 21      | 4.76                             | 5.64               | 30.60      | 15.20   | 287.60    | 16.41   |
| Aug                                           | 0.00          | 272.93                              | 0.00        | 272.93 | 5.95               | 7.05              | 00:0                                | 0.34     | 286.27      | 00.0      | 286.27                                | 258.76 | 21.62      | 4.76                             | 20.2               | 32.02      | 33.93   | 324.71    | 38,44   |
| Sep                                           | 0.00          | 266.82                              | 00.0        | 266.82 | 5.73               | 6.82              | 000                                 | 0.42     | 279.81      | 00.0      | 279.81                                | 252.96 | 21.14      | 4.60                             | 5.46               | 31.20      | 41.66   | 325.82    | 46.01   |
| ્દ                                            | 0.00          | 16.67                               | 0.00        | 79.97  | 5.95               | 7.05              | 00:0                                | 0.34     | 93,30       | 000       | 93.30                                 | 75.82  | 6.34       | 4.76                             | 5.64               | 16.73      | 33.89   | 126.44    | 33.13   |
| Nov                                           | 0.00          | 70.36                               | 0.00        | 70.36  | 5.75               | 6.82              | 0.00                                | 0.29     | 83.22       | 00'0      | 83.22                                 | 66.71  | 5.57       | 4.60                             | 5.46               | 15.63      | 28.88   | 111.22    | 28.00   |
| <u>8</u>                                      | 00:0          | 55.40                               | 0.00        | 55.40  | 5.95               | 7.05              | 00.0                                | 0.33     | 68.72       | 000       | 68.72                                 | 52.52  | 4.39       | 4.76                             | 5.64               | 4.78       | 32.64   | 99.95     | 31.23   |
| Jan                                           | 0.00          | 19.20                               | 0.00        | 19.20  | 5.95               | 7.05              | 000                                 | 0.12     | 32.31       | 0.00      | 32.31                                 | 18.21  | 1.52       | 4.76                             | 5.64               | 11.92      | 199711  | 41.78     | 9.47    |
| Fcb                                           | 00.0          | 33.51                               | 0.00        | 33.51  | 5.37               | 6.37              | 000                                 | 0.05     | 45.30       | 000       | 45.30                                 | 31.77  | 2.66       | 4.30                             | 5.09               | 12.04      | 5.34    | 49.16     | 3.85    |
| Mar                                           | 00.0          | 50.63                               | 0.00        | 50.63  | 5.95               | 7.05              | 000                                 | 0.05     | 63.68       | 000       | 63.68                                 | 48.00  | 4.01       | 4.76                             | 5.64               | 14.41      | 5.42    | 67.82     | 4.15    |
| Арт                                           | 000           | 14 12                               | 0.00        | 14.12. | 5.75               | 6.82              | 0.00                                | 0.07     | 26.77       | 00'0      | 26.77                                 | 13.39  | 1.12       | 4.60                             | 5.46               | 11.18      | 6.72    | 31.29     | 4.52    |
| May                                           | 000           | 2,76                                | 0.00        | 2.76   | 5.95               | 7.05              | 0.00                                | 0.05     | 15.80       | 00:0      | 15 80                                 | 2.61   | 0.22       | 4.76                             | 5.64               | 19.01      | 5.38    | 19:81     | 2.80    |
| Total                                         | 000           | 1136.0                              | 0.00        | 1136.0 | 20.00              | 83.00             | 000                                 | 2.24     | 1291.2      | 000       | 1291.2                                | 1077.0 | 0.08       | 56.0                             | 66.4               | 212.4      | 224.0   | 1513.4    | 222.16  |
| Note : Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Colum | m no.(5+6+                          | .7+8+9)     | Colun  | nn No. 12 -        | = Column n        | Column No. 12 = Column no. (10 + 11 |          | # 61 ou nun | Column no | Column no. 19 = Column no. (13+17+18) | ١.     | no 20 = Co | Column no 20 * Column no (19-12) | 2.12).             |            |         |           |         |

Table 4.10.15(b): Lower Coleroon Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

| {                                            |                |                                       |            |        |                                      |                   |         |          |           |             | ,                                      |        |            |                                    |                    |        |         |        | Unit: MCM  | MCM      |
|----------------------------------------------|----------------|---------------------------------------|------------|--------|--------------------------------------|-------------------|---------|----------|-----------|-------------|----------------------------------------|--------|------------|------------------------------------|--------------------|--------|---------|--------|------------|----------|
|                                              | :              |                                       |            |        |                                      | Water Utilisation | isation |          |           |             |                                        |        |            |                                    | Water Availability | bility |         |        |            | ;        |
| Nonth                                        |                |                                       |            | Wa     | Water requirements                   | nents             |         |          |           |             | Gross                                  |        |            | Regeneration from uses             | from uses          |        | Surface | Ground | Gross      | Nionthly |
|                                              | Utilisatio     | Utilisation under irrigation projects | Sation pre | ojects | Dome-                                | Indus-            | Hydro   | Environ- | F         | Export      | total                                  | Import | Imiga-     | Dome-                              | Indus-             |        | water   | water  | Water      | Walter   |
|                                              | Proposed       | Existing Ongoing                      | 2 going    | Total  | stic                                 | mal               | power   | mental   | I OCBI    |             | utilisation                            |        | tion       | stic                               | triat              | 101    | yields  | yields | available  | 2017     |
| Ξ                                            | (3)            | <b>1</b>                              | €          | (5)    | (9)                                  | (J)               | (61)    | (6)      | (10)      | (11)        | (12)                                   | (13)   | (14)       | (15)                               | (91)               | (13)   | (81)    | (61)   | (50)       | (21)     |
| ող                                           | 0.00           | 15.25                                 | 00.00      | 15.25  | 6.82                                 | 6.82              | 00.0    | 90.0     | 28.95     | 00'0        | 28.95                                  | 14.46  | 1,21       | 5.46                               | 5,46               | 12.12  | 5.80    | 1.62   | 8.<br>1.00 | 5.05     |
| J <sub>11</sub> ]                            | 0.00           | 255.05                                | 0.00       | 255.05 | 7.05                                 | 7.05              | 00.0    | 51.0     | 269.30    | 00'0        | 369.30                                 | 241.80 | 20.21      | 5.64                               | 5.64               | 31.49  | 15.20   | 27.08  | 315.56     | 46.26    |
| Aug                                          | 0.00           | 272.93                                | 0.00       | 272.93 | 7.05                                 | 7.05              | 00.0    | 0.34     | 287.37    | 00'0        | 287.37                                 | 258.76 | 21.62      | 5.64                               | 5.64               | 32.80  | 33.93   | 28.97  | 354.56     | 61.79    |
| Şeb                                          | 0.00           | 286.82                                | 0.00       | 266.82 | 6.82                                 | 6.82              | 00.00   | 0.42     | 280.88    | 00.0        | 280.88                                 | 252.96 | 21.14      | 5.46                               | 5.46               | 32.05  | 41.66   | 28.33  | 355.00     | 74 12    |
| ষ্ট                                          | 0.00           | 79.97                                 | 0.00       | 79.97  | 7.05                                 | 7.05              | 00.0    | 0 34     | マス        | 00'0        | 15.46                                  | 75.82  | 6.34       | 5.64                               | 25.2               | 19'21  | 33.89   | 8.49   | 135.81     | 97.77    |
| Nov                                          | 00.00          | 70.36                                 | 000        | 70.36  | 6.82                                 | 6.82              | 00.00   | 0.29     | 84.29     | 00'0        | 84.29                                  | 17.99  | 5.57       | 5.46                               | 5.46               | 16.49  | 28 88   | 7.47   | 119.54     | 35.25    |
| ಕ್ಷ                                          | 0.00           | 55.40                                 | 0.00       | 55.40  | 7.05                                 | 7.05              | 0.00    | 0.33     | 69.83     | 00.00       | 69.83                                  | 52.52  | 4.39       | 5.64                               | 5.64               | 15.67  | 32.64   | 5.88   | 106 72     | 36.89    |
| Jan                                          | 0.00           | 19.20                                 | 000        | 19.20  | 7.05                                 | 7.05              | 00.00   | 0.12     | 33.42     | 00.0        | 33.42                                  | 18.21  | 1.52       | 5.62                               | 5.64               | 12.80  | 11.66   | 2.05   | 17,        | 11.29    |
| Feb                                          | 0.00           | 33.51                                 | 0.00       | 33.51  | 6.37                                 | 6.37              | 000     | 0.05     | 46.30     | 00.0        | 46.30                                  | 31.77  | 2.66       | 5.09                               | 5.09               | 12.84  | 234     | 3.56   | 13.51      | 7.21     |
| Mar                                          | 800            | 50.63                                 | 0.00       | 50.63  | 7.05                                 | 7.05              | 00.00   | 0.05     | 64.78     | 0.00        | 64,78                                  | 48.00  | 4.01       | 5.64                               | 5.64               | 15.29  | 5.42    | 5.37   | 74 08      | 9.30     |
| Apr                                          | 0.00           | 14.12                                 | 0.00       | 14.12  | 6.82                                 | 6.82              | 00.00   | 0.07     | 27.83     | 00.0        | 27.83                                  | 13.39  | 1.13       | 5.46                               | 5.46               | 12.03  | 6.72    | 1.50   | 33.64      | 18'5     |
| May                                          | 0.00           | 2.76                                  | 0.00       | 2.76   | 7.05                                 | 7.05              | 0.00    | 0.05     | 16.91     | 00.0        | 16 91                                  | 2.61   | 0.23       | 5.64                               | 5.64               | 11.50  | 5.38    | 0.29   | 19.78      | 2.87     |
| Total                                        | 0.00           | 1136.0                                | 0.00       | 1136.0 | 83.00                                | 83.00             | 00.0    | 2.24     | 1304.2    | 0.00        | 1304.2                                 | 1077.0 | 0.06       | 66.40                              | 66.4               | 222.8  | 224.0   | 120.6  | 1644       | 340.16   |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | no. 10 = Colum | n no.(5+6+                            | 7+8+9).    | Colu   | Column No. 12 = Column no. (10 + 11) | - Column r        | 10 + 11 |          | umn no.20 | ▼ Column no | Column no.20 * Column no.(13+17+18+19) | Г      | umn no. 21 | Column no. 21 = Column no. (20-12) | 0.(20-12).         |        |         |        |            |          |

Table 4.10.15(c): Lower Coleroon Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| Unit: MCM |                    | Monthly                | Water                              | oatance                   | (20) | 7.67     | 29.96    | 96.19    | 74.92    | \$6.65   | 48.04   | \$3.88  | 17.56   | 7.56    | 16.7    | 9.19    | 45.9   | 377.59   |                                             |
|-----------|--------------------|------------------------|------------------------------------|---------------------------|------|----------|----------|----------|----------|----------|---------|---------|---------|---------|---------|---------|--------|----------|---------------------------------------------|
| Unit      | -                  | Gross                  | water                              | available                 | (61) | 35.59    | 298.26   | 348.49   | 355.02.  | 150.19   | 131.46  | 122.83  | 49.96   | 52.90   | 71.62   | 36.00   | 22.38  | 1670.4   |                                             |
|           |                    | Surface                | water                              | yields                    | (81) | 6.87     | 25.85    | 17.72    | 70.86    | 57.64    | 51.6    | 55.52   | 19.83   | 80.6    | 9.22    | 11.43   | 9.15   | 381,00   |                                             |
|           | ility              | _                      | E                                  | <u>a</u>                  | (1)  | 11.27    | 30.60    | 32,02    | 31.20    | 16.73    | 15.63   | 14.78   | 11.92   | 12.01   | 14.41   | 11.18   | 19.01  | 212.4    |                                             |
|           | Water Availability | from uses              | Indus-                             | trial                     | (91) | 5.46     | 5.64     | 5.64     | 5.46     | 5.64     | 5.46    | 5.64    | 5.64    | 5.09    | 5.64    | 5.46    | 5.64   | 66.4     | .12).                                       |
|           | Al                 | Regeneration from uses | Dome-                              | stic                      | (15) | 4.60     | 4.76     | 4.76     | 4.60     | 4.76     | 4.60    | 4.76    | 4.76    | 4.30    | 4.76    | 4.60    | 4.76   | 56.0     | Column na.20 = Column no. (19-12)           |
|           |                    | 2                      | Imiga-                             | tion                      | (14) | 1.21     | 20.21    | 21.62    | 21.14    | 6.34     | 5.57    | 4.39    | 1.52    | 3.66    | 101     | 1,12    | 0.22   | 0.06     | no.30 = Col                                 |
|           |                    |                        | Import                             |                           | (13) | 14.46    | 241.80   | 258.76   | 252.96   | 75.82    | 12.99   | 52.52   | 18.21   | 31.77   | 48.00   | 13.39   | 2.61   | 1077.0   | Column                                      |
| i         |                    | Gross                  | total                              | utilisation               | (12) | 27.92    | 268.30   | 286.50   | 280.10   | 93.54    | 83.43   | 68.95   | 32.40   | 45.34   | 63.71   | 26.81   | 15.84  | 1292.8   | 13+17+18).                                  |
|           |                    |                        | Ехроп                              |                           | (11) | 0.00     | 00:00    | 0.00     | 00.0     | 00.00    | 00.00   | 00'0    | 00.00   | 000     | 00.00   | 00:00   | 0.00   | 0.00     | Column no.19 = Column no.(13+17+18).        |
|           |                    |                        | Loto                               | T CAST                    | (01) | 27.92    | 268.30   | 286.50   | 280,10   | 93.54    | 83,43   | 68.95   | 32.40   | 45.34   | 63.71   | 26.81   | 15.84  | 1292.8   | = 61.0и иш                                  |
|           |                    |                        | Environ-                           | mental                    | (6)  | 0.10     | 0.26     | 0.58     | 0.71     | 0.58     | 0.49    | 0.56    | 0.20    | 0.09    | 0.00    | 0.11    | 0.09   | 3.81     | Colu                                        |
|           | sation             |                        | Hydro                              | power                     | (8)  | 000      | 00.00    | 0.00     | 00.0     | 00.00    | 0.00    | 00.00   | 00.00   | 0.0     | 0.00    | 00'0    | 000    | 0.00     | no. (10 + 11                                |
|           | Water Utilisation  | ments                  | -snpt/I                            | trial                     | (£)  | 6.82     | 7.05     | 7.05     | 6.82     | 7.05     | 6.82    | 7.05    | 7.05    | 6.37    | 7.05    | 6.82    | 7.05   | 83.00    | Column No. 12 = Column no. (10 + 11         |
|           |                    | Water requirements     | Dome                               | stic                      | (9)  | 5.75     | 5.95     | 5.95     | 5.75     | 5.95     | 5.75    | 5.95    | 5.95    | 5.37    | 5.95    | 5.75    | 5.95   | 70.00    | lumn No. 12                                 |
|           |                    | 1                      | projects                           | Total                     | (5)  | 00 15.25 | 0 255.05 | 0 272.93 | 266.82   | 79.97    | 0 70.36 | 0 55.40 | 0 19.20 | 0 33.51 | 0 50.63 | 0 14.12 | 2.76   | 0 1136.0 |                                             |
|           |                    |                        | Julisation under imgation projects | Proposed Existing Ongoing | 3    | 0.00     | 00:00    | 9.00     | 00.00    | 0.00     | 00.00   | 000     | 0.00    | 00:00   | 0.00    | 0.00    | 0.00   | 0.00     | +6+7+8+9                                    |
|           |                    |                        | tion under                         | Existing                  | Θ    | 0 15.25  | 0 255.05 | 0 272.93 | 0 266.82 | 0 79.97  | 0 70.36 | 0 55.40 | 0 19.20 | 33.51   | 50.63   | 14.12   | 0 2.76 | 0 1136.0 | Our no.(5                                   |
|           |                    |                        | Utilisa                            | Proposec                  | (2)  | 0.00     | 0.00     | 0.00     | 0.00     | 00.0     | 00'0    | 000     | 0.00    | 0.00    | 0.00    | 0.00    | 00.0   | 00.0     | 0,10 = Col                                  |
| {         |                    | 141                    | O EDOES                            |                           | (i)  | Jun      | Jul      | Aug      | Sep      | <u>8</u> | Nov     | Dec     | Jan     | Feb     | Mar     | Apr     | May    | Total    | Note: Column no.10 = Column no.(5+6+7+8+9). |

Table 4.10.15(d): Lower Coleroon Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

| Unit: MCM        |                    | Monthly                | water                                 | Dalance          | (11) | 8.22  | 55.93    | 89.85  | 102.17 | 3      | 54.44  | 58.66  | 18.49 | 10.12  | 12.18 | 9.62  | 5.72  | 485.19  |                                            |
|------------------|--------------------|------------------------|---------------------------------------|------------------|------|-------|----------|--------|--------|--------|--------|--------|-------|--------|-------|-------|-------|---------|--------------------------------------------|
| Unit:            |                    | Gross                  | water                                 | available        | (02) | 37.21 | 325.33   | 377.46 | 383.35 | 158.68 | 138.93 | 128.71 | 51.99 | \$6.46 | 77.00 | 37.50 | 22.67 | 1791.0  |                                            |
| į                |                    | Ground                 | water                                 | yields           | (61) | 1.62  | 27.08    | 28.97  | 28.33  | 8.49   | 7.47   | 5.88   | 2.04  | 3.56   | 5.37  | 1.50  | 0.29  | 120.6   |                                            |
|                  |                    | Surface                | water                                 | yields           | (81) | 78.6  | 25.85    | 17.72  | 70.86  | \$7.64 | 49.12  | 55.52  | 19.83 | 80.6   | 9.22  | 11.43 | 9.15  | 381.00  |                                            |
|                  | oility             |                        |                                       | <b>1</b>         | (17) | 11.27 | 30.60    | 32.02  | 31.20  | 6.73   | 15.63  | 14.78  | 11.92 | 12.02  | 14.41 | 11.18 | 19.01 | 212.4   |                                            |
|                  | Water Availability | from uses              | Indus-                                | trial            | (16) | 5.46  | 5.64     | 5.64   | 3.46   | 5.64   | 5.46   | 5.64   | 5.64  | 5.09   | 5.64  | 5.46  | 1.93  | 66.4    | (20-12)                                    |
|                  | Λ                  | Regeneration from uses | Dome                                  | stic             | (15) | 4.60  | 4.76     | 4.76   | 4.60   | 4.76   | 4.60   | 4.76   | 4.76  | 4.30   | 4.76  | 4.60  | 4.76  | 86.0    | Column no. 21 = Column no. (20-12)         |
|                  |                    | 24                     | Imiga-                                | Lion             | (14) | 1.21  | 20.21    | 21.62  | 21.14  | 6.34   | 5.57   | 4.39   | 1.52  | 2.66   | 4.01  | 1.12  | 0.22  | 0.06    | มาก no. 21 º                               |
|                  |                    |                        | Import                                |                  | (13) | 14.46 | 241.80   | 258.76 | 252.96 | 75.82  | 11.99  | 52.52  | 18.21 | 31.77  | 48.00 | 13.39 | 2.61  | 10.77.0 |                                            |
|                  |                    | Gross                  | total                                 | utilisation      | (12) | 28.99 | 269.41   | 287.61 | 281.17 | 94.64  | 84.50  | 70.06  | 33.50 | 46.34  | 64.82 | 27.88 | 16.95 | 1305.8  | 13+17+18+1                                 |
|                  |                    |                        | Ехроп                                 | Ti I             | (11) | 0.00  | 00.0     | 000    | 0.00   | 00.00  | 0.00   | 00.0   | 00.00 | 0.00   | 00.00 | 00:00 | 00.0  | 0.00    | Column no. 20 = Column no. (13+17+18+19)   |
|                  |                    |                        | Total                                 | 1001             | (10) | 28.99 | 269.41   | 287.61 | 281.17 | 2.64   | 84.50  | 20.06  | 33.50 | 46.34  | 64.82 | 27.88 | 16.95 | 1305.8  | mn no.20 = (                               |
|                  |                    |                        | Environ-                              | mental           | (6)  | 0.10  | 0.26     | 0.58   | 0.71   | 0.58   | 0,49   | 0.56   | 0.20  | 0.00   | 0.09  | 0.11  | 0.09  | 3.81    | Colu                                       |
|                  | ation              |                        | Hydro- 1                              | power            | (61) | 0.00  | 00.0     | 00:0   | 00:0   | 0.0    | 0.00   | 0.00   | 000   | 80     | 000   | 0.00  | 0.00  | 000     | 0. (10+11)                                 |
|                  | Water Utilisation  | nents                  | Indus-                                | Fial             | 3    | 6.82  | 7.05     | 7.05   | 6.82   | 7.05   | 6.82   | 7.05   | 7.05  | 6.37   | 7.05  | 6.82  | 7.05  | 83.00   | Column No. 12 # Column no. (10 + 11        |
|                  |                    | Water requirements     | Dome-                                 | stic             | (9)  | 6.82  | 7.05     | 7.05   | 6.82   | 7.05   | 6.82   | 7.05   | 7.05  | 6.37   | 7.05  | 6.82  | 7.05  | 83.00   | mn No. 12                                  |
|                  |                    | Wa                     | rojects                               | Total            | (5)  | 15.25 | 255.05   | 272.93 | 266.82 | 79.97  | 70.36  | 55.40  | 19.20 | 33.51  | 50.63 | 14.12 | 2.76  | 1136.0  | Colu                                       |
| $\left. \right $ |                    |                        | Utilisation under irrigation projects | Ongoing          | €    | 00.0  | 0.00     | 0.00   | 000    | 000    | 900    | 0.00   | 0.00  | 0.00   | 000   | 0.00  | 0.00  | 0.00    | 6+7+8+6).                                  |
|                  |                    |                        | ion under i                           | Existing Ongoing | (3)  | 15.25 |          | 272.93 | 266.82 | 79.97  | .      |        |       | 33.51  | 50.63 | 14.12 | 2.76  | 1136.0  | ਜ਼ਮ ਜ਼o.(5+                                |
|                  | _                  |                        | Utilisat                              | Proposed         | (2)  | 0.0   | 0.00     | 9.0    | 0.00   | 0.00   | 000    | 0.0    | 000   | 0.00   | 0.00  | 0.00  | 0.00  | 0.00    | o. 10 = Colu                               |
|                  | _                  | March                  | UNION I                               |                  | Θ    | un    | <u> </u> | Αug    | Sep    | ë<br>O | Š      | ដ្ឋ    | Urf   | Feb    | Mar   | Apr   | May   | Total   | Note: Column no.10 = Column no.(5+6+7+8+9) |

Table 4.10.15(e): Lower Coleroon Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water Unit: MCM

|                                               |                           |             |                                    |        |                    | Water Utilisation                    | ation        |          |              |             |                                     |         |               | 3                                | Water Availability | Aiji   |         |           | 1 4 4 - 1 4 E |
|-----------------------------------------------|---------------------------|-------------|------------------------------------|--------|--------------------|--------------------------------------|--------------|----------|--------------|-------------|-------------------------------------|---------|---------------|----------------------------------|--------------------|--------|---------|-----------|---------------|
| 1,40=01                                       |                           |             |                                    | Wa.    | Water requirements | nents                                |              |          |              |             | Gross                               |         |               | Regeneration from uses           | i from uses        |        | Surface | Gross     | Medicine      |
| מונוסוא                                       | Utilisatio                | in under i. | Julisation under impation projects | pects  | Dome-              | Indus-                               | Hydro        | Environ- | 1            | Ехроп       | total                               | Import  | Imga-         | Dome-                            | Indus-             | 7.00.1 | water   | water     | halance       |
|                                               | Proposed Existing Ongoing | Existing    | Ongoing                            | Total  | stic               | leial                                | power        | mental   | I DIST       |             | utilisation                         |         | tion          | stic                             | trial              | 1048   | yields  | available |               |
| (E)                                           | (2)                       | 3           | <b>⊕</b>                           | (5)    | 9                  | (7)                                  | (8)          | (6)      | (10)         | (1)         | (12)                                | (13)    | (14)          | (15)                             | (10)               | (17)   | (81)    | (61)      | (20)          |
| Jun                                           | 00.0                      | 15.25       | 00.0                               | 15.25  | 5.75               | 6.82                                 | 0.00         | 0.04     | 27.87        | 0.00        | 27.87                               | 14.46   | 1.21          | 4.60                             | 5.46               | 11.27  | 4.30    | 30.03     | 2,16          |
| 157                                           | 00:0                      | 255.05      | 000                                | 255.05 | 5.95               | 7.05                                 | 00.0         | 0.11     | 268.16       | 00.00       | 268.16                              | 241.80  | 20.21         | 4.76                             | 5.64               | 30.60  | 11.27   | 283 67    | 15.52         |
| Aug                                           | 000                       | 272.93      | 00:0                               | 272.93 | 5.95               | 7.05                                 | 0.00         | 0.25     | 286.18       | 00.0        | 286.18                              | 258.76  | 21.62         | 4.76                             | 5.64               | 32,02  | 25.17   | 315.95    | 79.77         |
| Sep                                           | 00.0                      | 266.82      | 00.00                              | 266.82 | 5.75               | 6.82                                 | 0.00         | 0.31     | 279.70       | 00.0        | 279.70                              | 252.96  | 21.14         | 4.60                             | 5.46               | 31.20  | 30.90   | 315.06    | 35 36         |
| ě                                             | 000                       | 79.97       | 0.00                               | 79.97  | 5.95               | 7.05                                 | 0.00         | 0.25     | 93.22        | 00:0        | 93.22                               | 75.82   | 6.34          | 4.76                             | 5.64               | 16.73  | 25.14   | 117.69    | 24.47         |
| Nov                                           | 00.0                      | 70 36       | 0.00                               | 70.36  | 5.75               | 6.82                                 | 0.00         | 0.21     | 83.15        | 00.0        | 83.15                               | 66.71   | 5.57          | 4.60                             | 5.46               | 15.63  | 21.42   | 103.76    | 20.61         |
| သို့                                          | 000                       | 55.40       | 00:00                              | 55.40  | 5.951              | 7.05                                 | 00'0         | 0,24     | 68.64        | 00:0        | 68.64                               | 52.52   | 4.39          | 4.76                             | 5.64               | 14.78  | 24.21   | 91.52     | 22.88         |
| Jan                                           | 00.0                      | 19.20       | 00.00                              | 19.20  | 5.95               | 7.05                                 | 0.00         | 60.0     | 32.28        | 000         | 32.28                               | 18.21   | 1.52          | 4 76                             | 5.64               | 11.92  | 8.65    | 38.77     | 61-9          |
| Feb                                           | 00:0                      | 33.51       | 00.0                               | 33.51  | 5.37               | 6.37                                 | 0.00         | 000      | 45.29        | 00.0        | 45.29                               | 31.77   | 2.66          | 4,30                             | \$.09              | 12.04  | 3 96    | 47.78     | 2,49          |
| Mar ,                                         | 00.00                     | 50.63       | 00:0                               | 50.63  | \$.95              | 7.05                                 | 0.00         | 100      | 99 29        | 000         | 63.66                               | 48.00   | 4.01          | 4.76                             | 5.64               | 14.41  | 4.02    | 66.42     | 2.76          |
| Apr                                           | 00.00                     | 14.12       | 00.0                               | 14.12  | 5.75               | 6.82                                 | 0.00         | 90.0     | 26.75        | 00.0        | 26 75                               | 13.39   |               | 4.60                             | 5.46               | 11.18  | 1.98    | 29.55     | 2.80          |
| May                                           | 00.0                      | 2.76        | 0.00                               | 2.76   | 5.95               | 7.05                                 | 0.00         | 00       | 15.79        | 00:0        | 15.79                               | 2.61    | 0.22          | 4.76                             | 5.64               | 10.61  | 3.88    | 17.22     | 1 43          |
| Total                                         | 0.00                      | 1136.0      | 000                                | 1136.0 | 70.00              | 83.00                                | 00.0         | 1.68     | 1290.7       | 00.0        | 1290.7                              | 10.77.0 | 0.06          | \$6.0                            | 66.4               | 212.4  | 163.0   | 1457.4    | 156.72        |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | , 10 = Colum              | in no.(5+t  | 5+7+8+9).                          | Colui  | mr No. 12          | Column No. 12 = Column no. (10 + 11) | 5. (10 + 11) |          | umn no. 19 = | · Column no | Column no.19 = Column no.(13+17+18) |         | 1 no. 20 = Co | Column no.20 = Column no.(19-12) | 1.12).             |        |         |           |               |

Table 4.10.15(f): Lower Coleroon Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                              | _            |                                       |                 |        | 1                  | Water Utilisation | sation                               |          |              |           |                                           |        |                                    |                        | Water Availability | bility |           |          |           |         |
|----------------------------------------------|--------------|---------------------------------------|-----------------|--------|--------------------|-------------------|--------------------------------------|----------|--------------|-----------|-------------------------------------------|--------|------------------------------------|------------------------|--------------------|--------|-----------|----------|-----------|---------|
| 1. 1.                                        |              |                                       |                 | Wa     | Water requirements | nenis             |                                      |          |              |           | Gross                                     |        |                                    | Regeneration from uses | ர் நில் மு         |        | Surface ( | Ground   | Gross     | Monthly |
| Month                                        | Utilisati    | Utilisation under irrigation projects | rigation pr     | ojects | -рише-             | Indus-            | Hydro-                               | Environ- | Light Street | Export    | lotal                                     | Import | Imign.                             | Dome                   | -snpu]             | 1,55.7 | Waler     | Water    | water     | halance |
|                                              | Proposed     | Existing Ongoing                      | Ongoing         | Total  | stic               | trial             | power                                | mental   | 0521         |           | utilisation                               |        | tion                               | stic                   | िंग                | 200    | yields    | yields n | nvailable |         |
| ε                                            | (2)          | 3                                     | <del>(</del> 4) | (5)    | 9                  | 6                 | (61)                                 | 6        | (01)         | (11)      | (33)                                      | (13)   | (14)                               | (15)                   | (16)               | (11)   | (81)      | (61)     | (30)      | ([])    |
| Jun                                          | 00:0         | 15.25                                 | 00'0            | 15.25  | 6.82               | 6.82              | 00.00                                | 0.04     | 28.94        | 000       | 28.94                                     | 14.46  | 1.21                               | 5.46                   | 5.46               | 17.12  | 4.30      | 1.62     | 32.50     | 3.56    |
| Ju.                                          | 00.0         | 255.05                                | 00.00           | 255.05 | 7.05               | 7.05              | 00'0                                 | 0.11     | 269.26       | 000       | 269.26                                    | 241.80 | 20.21                              | 5.64                   | 5.64               | 31.49  | 11.27     | 27.08    | 311.63    | 42.37   |
| Aug                                          | 00:0         | 272.93                                | 000             | 272.93 | 7.05               | 7.05              | 000                                  | 0.25     | 287.28       | 000       | 287.28                                    | 258.76 | 21.62                              | 5.64                   | 5.64               | 32.90  | 25.17     | 28.97    | 345.80    | 58.52   |
| Sep                                          | 00:00        | 28.997                                | 00:0            | 266.82 | 6.82               | 6.82              | 0.00                                 | 0.31     | 280.77       | 00:00     | 280.77                                    | 252.96 | 21.14                              | 5.46                   | 5.46               | 32.05  | 30.90     | 28.33    | 344.34    | 63.47   |
| Oct                                          | 00:0         | 19.97                                 | 00:0            | 79.97  | 7.05               | 7.05              | 0.00                                 | 0.25     | 94.32        | 00.0      | \$4.32                                    | 75.82  | 6.34                               | 5.64                   | 5.64               | 17.61  | 25.14     | 8.49     | 127.06    | 32.74   |
| Nov.                                         | 00'0         | 70.36                                 | 00:0            | 70.36  | 6.82               | 6.82              | 00.00                                | 0.21     | 84,22        | 00.00     | \$4.22                                    | 66.71  | 5.57                               | 5.46                   | 5.46               | 16.49  | 21.42     | 7.47     | 112.08    | 27.87   |
| 32                                           | 00'0         | 55.40                                 | 00.00           | 55.40  | 7.05               | 7.05              | 00.00                                | 0.24     | 69.74        | 00.0      | 69.74                                     | 52.52  | 4.39                               | 5.64                   | 5.64               | 15.67  | 24.21     | 5.88     | 98.28     | 28.54   |
| Jan                                          | 00.00        | 19.20                                 | 00.0            | 19.20  | 7.05               | 7.05              | 000                                  | 60.0     | 33.39        | 00.0      | 33.39                                     | 18.21  | 1.52                               | 5.64                   | 5.64               | 12.80  | 8.65      | 2.04     | 41.70     | 8.31    |
| Feb                                          | 00:0         | 33.51                                 | 000             | 33.51  | 6.37               | 6.37              | 0.00                                 | 0.04     | 46.29        | 000       | 46.29                                     | 31.77  | 2.66                               | 5.09                   | 5.09               | 12.84  | 3,96      | 3.56     | 52.13     | 5.85    |
| Mar                                          | 00:0         | 50.63                                 | 00:0            | 50.63  | 7.05               | 7.05              | 00:00                                | 0.0      | 64.77        | 0.00      | 64.77                                     | 48.00  | 401                                | 5.64                   | 5.64               | 15.29  | 4.02      | 537      | 72 68     | 7.9     |
| Apr                                          | 00.00        | 14.12                                 | 0.00            | 14.12  | 6.82               | 6.82              | 00.0                                 | 0.05     | 27.82        | 00.00     | 27.82                                     | 13.39  | 1.12                               | 5.46                   | 5.46               | 12.03  | 4.98      | 1.50     | 31.90     | 4.00    |
| May                                          | 00.00        | 2.76                                  | 0.00            | 2.76   | 7.05               | 7.05              | 0.00                                 | 0.04     | 16.89        | 0.00      | 16.89                                     | 2.61   | 0.22                               | 5.64                   | 5.64               | 11.50  | 3.99      | 0.29     | 18.39     | 1.50    |
| Total                                        | 0.00         | 1136.0                                | 00.00           | 1136.0 | 83.00              | 83.00             | 00.00                                | 1.68     | 1303.7       | 00:0      | 1303.7                                    | 1077.0 | 90.0                               | 66.4                   | 66,4               | 222.8  | 168.0     | 120.6    | 1588.4    | 284.72  |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 10.10 = Calu | mn no.(5+6                            | +7+8+9).        | Colur  | nn No. 12          | = Column n        | Column No. 12 = Column no. (10 + 11) |          | umn no. 20 a | Column no | Column no. 20 * Column no. (13+17+18+19). |        | Column no. 21 = Column no. (20-12) | ■ Column n             | 10.(20-12).        |        |           |          |           |         |

Table 4.10.15(g): Lower Coleroon Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

| Unit: MCM | 1                  | Monthly                | Water                              | Detailor          | (20) | -0.46      | 89.8        | 14.49       | 16.61       | 9.22       | 19'1       | 8.19        | 1.24       | 0.08       | 0.33       | -0.23      | 00:1-     | 57.25        |                                               |
|-----------|--------------------|------------------------|------------------------------------|-------------------|------|------------|-------------|-------------|-------------|------------|------------|-------------|------------|------------|------------|------------|-----------|--------------|-----------------------------------------------|
| Unit:     |                    | Gross                  | water                              | available         | (61) | 27.39      | 276.76      | 300.52      | 296.12      | 102.28     | 90.63      | 76.68       | 33.47      | 45.35      | 63.96      | 26.50      | 14.77     | 1354.4       |                                               |
| j         |                    | Surface                | Waler                              | yields            | (81) | 1.66       | 4.36        | 9.74        | 11.96       | 9.73       | 8.29       | 9.37        | 3.35       | 1.53       | 95 -       | 1.93       | 3         | 65.0         |                                               |
|           | dity               |                        | 1                                  | 1 043             | (۱٦) | 11.27      | 30.60       | 32.02       | 31.20       | 16.73      | 15.63      | 14.78       | 11.92      | 12.04      | 14.41      | 11.18      | 19.01     | 212.4        |                                               |
| !         | Water Availability | from uses              | Indus-                             | trial             | (91) | 5.46       | 5.64        | 5.64        | 5.46        | 5.64       | 5.46       | 5.64        | 5.64       | 5.09       | 5.64       | 5.46       | 5.64      | 66.4         | .12).                                         |
|           | Δ. I               | Regeneration from uses | Dome-                              | stic              | (15) | 4.60       | 4.76        | 4.76        | 4.60        | 4.76       | 4.60       | 4.76        | 4.76       | 4.30       | 4.76       | 4.60       | 4.76      | 56.0         | Column no.20 = Column no.(19.12)              |
|           |                    |                        | Imiga-                             | tion              | (14) | 1.21       | 20.21       | 21.62       | 21.14       | 6.34       | 5.57       | 4.39        | 1,52       | 2.66       | 4.01       | 1.12       | 0.22      | 0.06         | n no.20 ≈ Cc                                  |
|           |                    |                        | Import                             |                   | (13) | 14.46      | 241.80      | 258.76      | 252.96      | 75.82      | 12.99      | 52.52       | 18.21      | 31.77      | 48.00      | 13.39      | 2.61      | 1077.0       |                                               |
|           |                    | Gross                  | total                              | utilisation       | (12) | 27.84      | 268.09      | 286.02      | 279.51      | 93.06      | 83.02      | 68.49       | 32.23      | 45.27      | 63.64      | 26.72      | 15.77     | 1289.7       | Column no. 19 = Column no. (13+17+18).        |
|           |                    |                        | Export                             |                   | (11) | 00.00      | 0.00        | 00.0        | 00:00       | 00.00      | 00.0       | 00.0        | 0.00       | 00.0       | 0.00       | 00.0       | 00:0      | 00.0         | - Column no                                   |
|           |                    |                        | Tesail                             | Loren             | (10) | 27.84      | 268.09      | 286.02      | 279.51      | 93.06      | 83.02      | 68.49       | 32,23      | 45.27      | 63.64      | 26.72      | 15.77     | 1289.7       | umn no. 19 =                                  |
|           |                    |                        | Environ.                           | mental            | (6)  | 0.03       |             |             |             | 0.10       |            | 60.0        |            | 0.02       | 0.03       |            | 0.02      | 0.65         |                                               |
|           | lisation           |                        | Hydro-                             | power             | (8)  | 00'0       | 00.0        | 0.00        | 000         | 0.00       | 0.00       | 000         | 0.00       | 0.00       | 0.00       | 0.00       | 000       | 0.00         | Column No. 12 = Column no. (10 + 11)          |
|           | Water Utilisation  | ements                 | Indus.                             | trial             | 9    | 6.82       | 7.05        | 7.05        | 6.83        | 7.05       | 6.82       | 7.05        | 7.05       | 6.37       | 7.05       | 6.82       | 7.05      | 83.00        | 2 = Column                                    |
|           |                    | Water requirements     | Dome.                              | stic              | (9)  | 5.75       | 5.95        | 5.95        | 5.75        | 5.95       | 5.75       | 5.95        | 5.95       | 5.37       | 5.95       | 5.75       | 5.95      | 70.00        | umn No. 1                                     |
|           | į                  |                        | projects                           | Total             | (5)  | 0.00 15.25 | 0.00 255.05 | 0.00 272.93 | 0.00 266.82 | 0.00       | 0.00 70.36 | 0,00 55.40  | 0.00 19.20 | 0.00 33.51 | 0.00 50.63 | 0.00       | 0.00 2.76 | 0.00[ 1136.0 |                                               |
|           |                    |                        | er imgalior                        | Singoing 31       | (€)  |            |             |             |             |            |            |             |            |            |            |            | 2.76 0.   |              | +8+2+9+5                                      |
|           |                    |                        | Julisation under impation projects | Proposed Existing | (2)  | 0.00       | 0.00 255.05 | 0,00 272.93 | 0.00 266.82 | 0.00 79.97 | 0.00 70.36 | 0.00 \$5.40 | 0 00 19.20 | 0.00 33.51 | 0.00 50.63 | 0.00 14.12 | 0.00      | 0.00 1136.0  | Column no.(                                   |
|           |                    | 1,1                    |                                    | Prop              | ) (c |            |             |             |             |            |            |             |            |            |            |            | -         |              | Note: Column no. 10 = Column no. (5+6+7+8+9). |
|           |                    |                        | -<br>-                             |                   |      | Jun        | 3           | Aug         | Şeb         | ĕ          | 797        | 2           | Jan        | ę.         | Mar        | Αpτ        | May       | Total        | Note: C                                       |

Table 4.10.15(h): Lower Coleroon Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

| MCM       |                    | Monthly                | Water                                 | and and co        | (21)    | 0.95  | 35.53    | 43.25  | 11.72  | 17.48  | 14.87    | 13.85  | 3.06       | 3.4   | 5.48  | 1.07      | -0.93 | 182,75 |                                            |
|-----------|--------------------|------------------------|---------------------------------------|-------------------|---------|-------|----------|--------|--------|--------|----------|--------|------------|-------|-------|-----------|-------|--------|--------------------------------------------|
| Unit: MCM |                    | Gross                  | water                                 | available         | (30)    | 29.86 | 3<br>7.7 | 330.37 | 325.30 | 111.65 | 98.95    | 83.41  | 36.40      | 49.70 | 70.22 | 28.85     | 15.91 | 1485.4 |                                            |
| ,         |                    | Ground                 | Waler                                 | yields            | (61)    | 1.62  | 27.08    | 28.97  | 28.33  | 8.49   | 7.47     | 5.88   | 3.7<br>7.0 | 3.56  | 5.37  | 03.1      | 0.29  | 120.6  |                                            |
|           |                    | Surface                | Water                                 | yiclds            | (18)    | 1.66  | 4.36     | 9.74   | 11.96  | 9.73   | 8.29     | 9.37   | 3.35       | 1.53  | 1.56  | 1.93      | 1.5.1 | 65.0   |                                            |
|           | ability            |                        | ŀ                                     | 10131             | (1)     | 12.12 | 31.49    | 32,90  | 32.05  | 17.61  | 16.49    | 15.67  | 12.80      | 12.84 | 15.29 | 12.03     | 11.50 | 222.8  |                                            |
|           | Water Availability | इन्ड्रा mori           | Indus-                                | ਰ<br>ਤ            | (16)    | 5.46  | 5.64     | 5,64   | 5.46   | 5.64   | 5.46     | 5.64   | 26.        | \$.09 | 5.64  | 5.46      | 5.64  | 66.4   | .(20-12).                                  |
|           | 1                  | Regeneration from uses | Dome-                                 | stic              | (15)    | 5.46  | 5.64     | 5.64   | 5.46   | 5,64   | 5.46     | 5.64   | 5.64       | \$.09 | 5.64  | 5.46      | 5.64  | 66.4   | Column no. 21 = Column no. (20-12)         |
|           |                    | R                      | (miga-                                | tion              | (14)    | 1.21  | 20.21    | 21.62  | 21.14  | 6.34   | 5.57     | 4.39   | 1.52       | 2.66  | 4.01  | 1.12      | 0.22  | 0.06   | mn no. 21 =                                |
|           |                    |                        | Import                                |                   | (13)    | 14.46 | 241.80   | 258.76 | 252.96 | 75.82  | 12.99    | 52.52  | 18.21      | 31.77 | 48.00 | 13.39     | 2.61  | 1077.0 |                                            |
| I         |                    | Gross                  | _                                     | utilisation       | (12)    | 28.91 | 269.19   | 287.13 | 280.58 | 12     | 84.09    | 69.59  | 33,34      | 46.26 | 64.74 | 27.79     | 16.87 | 1302.7 | Column no.20 = Column no.(13+17+18+19)     |
|           |                    | G                      | Export                                | ntil              | (11)    | 000   | 00.00    | 0.00   | 0.00   | 00.0   | 0.00     | 0.00   | 0.00       | 0.00  | 00.0  | 0.00      | 00:0  | 0.00   | umn no.(13                                 |
|           |                    |                        |                                       | 4                 |         | 28.91 | 269.19   | 287,13 | 280.58 | 113    | 84.09    | 69.59  | 33.34      | 46.26 | 64,74 | 27.75     | 16.87 | 1302.7 | no. 20 = Col                               |
|           |                    |                        |                                       | ital 1012         | (10)    | 0.02  |          |        |        |        |          |        |            |       |       | 0.02      |       | 0.65   | Column                                     |
|           | -                  |                        | Hydro- Environ-                       | power menta       | (6)     | 0.00  | 000      | 000    | 0.00   | 0.00   | 0.00     | 0.00   | 90.0       | 0.00  | 0.00  | 0.00      | 000   | 0.00   | (11)                                       |
|           | Water Utilisation  | 8                      | Indus- Hye                            | trial pov         | (D) (D) | 6.82  | 7.05     | 7.05   | 6.82   | 7.05   | 6.82     | 7.05   | 7.05       | 6.37  | 7.05  | 6.82      | 7.05  | 83.00  | Column No. 12 = Column no. (10 + 11        |
|           | Wate               | Water tequirements     | Dome- Inc                             | stic tr           | ) (9)   | 6.82  | 7.05     | 7.05   | 6.82   | 7.05   | 6.82     | 7.05   | 7.05       | 6.37  | 7.05  | 6.82      | 7.05  | 83.00  | No. 12 = Co                                |
|           |                    | Water                  |                                       | Total             | (5)     | 15.25 | 255.05   | 272.93 | 266.82 | 79.97  | 70,36    | 55,40  | 19.20      | 33.51 | 50.63 | 14,12     | 2.76  | 1136.0 | Column                                     |
|           |                    |                        | gation proje                          | Ongoing 1         | (4)     | 0.00  | 0.00     | 0.00   | 0.00   | 0.00   | 0.00     | 0.00   | 0.00       | 0.00  | 0.00  | 00.0      | 0.0   | 0.00   | 7+8+9).                                    |
|           |                    |                        | Utilisation under irrigation projects | kisting Or        | (3)     | 15.25 | 255.05   | 272.93 | 266.82 | 79.97  | 70.36    | 55.40  | 19.20      | 33.51 | 50.63 | <u>-1</u> | 2.76  | 1136.0 | n no.(5+6+                                 |
|           |                    |                        | Utilisatio                            | Proposed Existing | (2)     | 0.00  | 0.00     | 0.00   | 0.00   | 00:00  | 00.00    | 0.00   | 0.00       | 0.00  | 0.00  | 000       | 0.00  | 0.00   | 10 = Colum                                 |
|           |                    | 7                      | יוסשונט                               |                   | (1)     |       |          |        |        |        | -        |        | -          |       |       |           |       |        | Note: Column no.10 = Column no.(5+6+7+8+9) |
|           |                    |                        | د<br>                                 |                   |         | ung   | Jul      | Aug    | Sep    | ő      | <u>%</u> | i<br>O | Jan        | Feb   | Var   | Apr       | May   | Fotal  | Note                                       |

Table 4.10.16(a): Cauvery Delta Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, Without Ground Water Unit: MCM

|                                           |                                            |           |                                    |         | , A                | Water Utilisation                    | alton       |          |              |                                       |             |         |                                  |                        | Water Availability | lity    |               |           | ) foresting |
|-------------------------------------------|--------------------------------------------|-----------|------------------------------------|---------|--------------------|--------------------------------------|-------------|----------|--------------|---------------------------------------|-------------|---------|----------------------------------|------------------------|--------------------|---------|---------------|-----------|-------------|
|                                           |                                            |           |                                    | Wate    | Water requirements | tents                                |             |          |              |                                       | Gross       |         |                                  | Regeneration from uses | i from uses        |         | Surface       | Gross     | water       |
| Month                                     | Utilisation                                | under imp | Julisation under impation projects | 1 :     | Роше-              | Indus-                               | Hydro-      | Environ- | Total        | Export                                | total       | Import  | Imiga-                           | Dome.                  | Indus-             | Total   | water         | Water     | balance     |
| <u> </u>                                  | Proposed Existing Ongoing                  | usting On | }-                                 | Total   | stic               | trial                                | power       | mental   | I Orași      |                                       | utilisation |         | lion                             | Stic                   | trial              |         | yields        | available |             |
| 5                                         | (2)                                        | (E)       | $\vdash$                           | 8       | 9                  | 0                                    | €           | <u>@</u> | (01)         | (11)                                  | (12)        | (13)    | (14)                             | (15)                   | (91)               | (11)    | (18)          | (13)      | (33         |
| 1                                         | 000                                        | [<br>[    | 8                                  | 121.80  | 31.97              | 37.89                                | 000         | 0.88     | 192.55       | 800                                   | 192.55      | 116.55  | 9.72                             | 25.58                  | 30.31              | 65.61   | 26.86         | 209.02    | 16,48       |
| 177                                       | 000 7037 47                                | 137.47    | 16.                                | 037 47  | 33.04              | 39.15                                | 000         | 0.88     | 2110.54      | 000                                   | 2110.54     | 1949.68 | 162.55                           | 26.43                  | 31.32              | 220.30  | 70.45         | 2240,44   | 129.89      |
| 01.4                                      | 0.00 2180 33                               | 180 33    | 000                                | 2180 33 | 33.04              | 39.15                                | 000         | 0.88     | 2253.41      | 00.0                                  | 2253.41     | 2086.39 | 173.95                           | 26.43                  | 31.32              | 231.70  | 157.17        | 2475.26   | 221.85      |
|                                           | 0.00 2131 49                               | 131 40    | 0.00                               | 2131.40 | 31 97              | 37.89                                | 000         | 0.88     | 2202 24      | 000                                   | 2202.24     | 2039,66 | 170.05                           | 25.58                  | 30.31              | 22.5    | 193.02        | 2458.62   | 256.38      |
| 1                                         | 000                                        | 28 82     | 000                                | 638 84  | 33.08              | \$1.65                               | 000         | 0.88     | 711.91       | 00.00                                 | 711.91      | 611.32  | 50.97                            | 26.43                  | 31.32              | 108.72  | 157.00        | 877.04    | 165.12      |
|                                           | 1_                                         | 80 cys    | 1                                  | \$62.08 | 31 97              | 37.89                                | 000         | 0.88     | 632.82       | 000                                   | 632,82      | 537.86  | 44.84                            | 25.58                  | 30.31              | 100.73  | 133.78        | 772.37    | 139.55      |
| 200                                       |                                            | 412 58    | 1                                  | 47 58   | 33.04              | 30.15                                | 000         | 0.88     | \$15.65      | 000                                   | \$15.65     | 423.51  | 35.31                            | 26.43                  | 31.32              | 93.06   | 152.20        | 668.77    | 153.12      |
| 12.                                       |                                            | 153.41    |                                    | 153 41  | 33 04              | 30.15                                | 000         | 0.88     | 226.48       | 00.0                                  | 226.48      | 146.80  | 12.34                            | 26.43                  | 31.32              | 66'69   | 80.÷ <u>S</u> | 270.87    | 44,39       |
| 4                                         | _                                          | 267.73    |                                    | 267.73  | 29.84              | 35 36                                | 0.00        | 0.88     | 333.82       | 080                                   | 333.82      | 256.19  | 21.36                            | 23.87                  | 28.29              | 13.52   | 24.77         | 354.49    | 20,67       |
| ) der                                     | 1                                          | 14.14     |                                    | 401.43  | 33.6               | 39 15                                | 000         | 0.88     | 477.50       | 00'0                                  | 477.50      | 387.01  | 32.27                            | 26.43                  | 31.32              | 90.02   | 25.17         | 502.20    | 24.69       |
| A DC                                      | Ĭ.                                         | 112 82    | 1                                  | 112.82  | 31.97              | 37.89                                | 000         | 0.88     | 183.56       | 00.0                                  | 183.56      | 107.96  | 00.6                             | 25.58                  | 30.31              | 64.89   | 31.17         | 204 02    | 20.46       |
| May                                       | l_                                         | 20.02     | 0000                               | 22.02   | 33 04              | 39.15                                | 000         | 0.83     | 95.09        | 000                                   | 95.09       | 21.07   | 1.76                             | 26.43                  | 31.32              | 19.51   | 24.96         | 105.54    | 10.45       |
| Total                                     | 0.00 9075.01                               | 10.570    | 0.00 9075.01                       | 075.01  | 389.0              | 461.0                                | 000         | 10.56    | 9935.57      | 00.0                                  | 9935.57     | 8684.0  | 724.0                            | 311.2                  | 368.8              | 1.404.0 | 1050.6        | 11138.6   | 1203.06     |
| Mor Column r                              | Votr (Column no 10 = Column no (1+6+7+8+9) | 1945,00   | 1+8+9)                             | Colora  | o No 12 -          | Column No. 12 = Column no. (10 + 11) | 9. (10 + 11 |          | ren no. 19 - | Column no. 19 = Column no. (13+17+18) | (13+17+18)  | ١.      | Column no.20 = Column na.(19-12) | lumn na.(15            | 1-12).             |         |               |           |             |
| 1. C. C. C. C. C. C. C. C. C. C. C. C. C. |                                            | 2         |                                    |         |                    |                                      |             |          |              |                                       |             |         |                                  |                        | -                  |         |               |           |             |

Table 4.10.16(b): Cauvery Delta Sub-basin-Monthly Water Balance for 75% Water Year Dependable Flow, With Ground Water

|                                             |             |                                       | *           |              |                    | Water Utilisation                   | tation       |          |           |             |                                        |         |                                   |                        | Water Availability | bility  |         |        |           | Lenthly |
|---------------------------------------------|-------------|---------------------------------------|-------------|--------------|--------------------|-------------------------------------|--------------|----------|-----------|-------------|----------------------------------------|---------|-----------------------------------|------------------------|--------------------|---------|---------|--------|-----------|---------|
|                                             |             |                                       |             | Wat          | Water requirements | nents                               |              |          |           |             | Gross                                  |         | oe .                              | Regeneration from uses | from uses          |         | Surface | Ground | Gross     | water   |
| Month                                       | Unlisation  | Utilisation under irrigation projects | igation pro | jects        | Dome-              | Indus-                              | Hydro        | Environ- | Total     | Export      | total                                  | Import  | Imga-                             | Dome-                  | Indus-             | Total   | Waler   | _      | water     | balance |
|                                             | Proposed E  | Existing Ongoing                      | ngoing      | Total        | stic               | trial                               | power        | mental   | ig<br>S   |             | utilisation                            |         | tion                              | stic                   | trial              |         | yields  | ,,     | available | -       |
| Ξ                                           | 8           | 8                                     | €           | 2            | (9)                | 6                                   | (61)         | 6)       | (00)      | au          | (12)                                   | (13)    | (14)                              | (18)                   | (9)                | (63)    | (8)     | (61)   | (30)      | (31)    |
| - Jul                                       | 80          | 121.80                                | 000         | 121.80       | 37.89              | 37.89                               | 000          | 0.88     | 192.55    | 00.0        | 198.46                                 | 116.55  | 9.72                              | 30.31                  | 30.31              | 70.34   | 26.86   | 3.01   | 21677     | 18.31   |
| 19                                          | 000         | 0.00 2037.47                          | 000         | 0.00 2037.47 | 39.15              | 39.15                               | 000          | 0.88     | 2110.54   | 000         | 2116.66                                | 1949.68 | 162.55                            | 31.32                  | 31.32              | 225.19  | 70.45   | 50.43  | 2295.75   | 179,10  |
| Aug                                         | 000         | 0.00 2180.33                          | 000         | 0.00 2180.33 | 39.15              | 39.15                               | 000          | 0.88     | 2253.41   | 000         | 22.59.52                               | 2086.39 | 173.95                            | 31.32                  | 31.32              | 236.59  | 157.17  | 53.96  | 2534 11   | 274.59  |
| ,                                           | 000         | 0.00 2131 49                          | 000         | 0.00 2131.49 | 37.89              | 37.89                               | 000          | 0.88     | 2202.24   | 00'0        | 2208.16                                | 2039.66 | 170.05                            | 30.31                  | 30.31              | 230.67  | 193.02  | 52.75  | 2516.10   | 307.95  |
| D.C.                                        | 000         | 638.84                                | 000         | 638.84       | 39.15              | 39.15                               | 000          | 0.88     | 16.117    | 000         | 718.03                                 | 611.32  | 50.97                             | 31.32                  | 31.32              | 113.61  | 157.00  | 12.81  | 897.74    | 179.71  |
| Z Z                                         | 000         | \$62.08                               | 000         | \$62.08      | 37.89              | 37.89                               | 000          | 0.88     | 632.82    | 000         | 638.74                                 | 537.86  | 44.84                             | 30.31                  | 30.31              | 105.47  | 133.78  | 13.91  | 791.02    | 152.28  |
| 1                                           | 000         | 412.58                                | 000         | 412 58       | 39.15              | 39.15                               | 000          | 0.88     | \$15.65   | 00.00       | 521.77                                 | 423.51  | 35.31                             | 31.32                  | 31.32              | 97.95   | 152.20  | 10.95  | 684.62    | 162.85  |
| Ian                                         | 000         | 153.41                                | 000         | 153.41       | 39.15              | 39.15                               | 000          | 0.88     | 226.48    | 000         | 232.60                                 | 146.80  | 12.24                             | 31.32                  | 31.32              | 74.88   | \$4.08  | 3.80   | 279.56    | 46.96   |
| f                                           | 000         | 267.73                                | 000         | 267.73       | 35.36              | 35.36                               | 000          | 0.88     | 333.82    | 000         | 339.34                                 | 256.19  | 21.36                             | 28.29                  | 28.29              | 77.94   | 24.77   | 6.63   | 365.53    | 36.19   |
| Na                                          | 80          | 54.43                                 | 000         | 404          | 39.15              | 39.15                               | 00.00        | 0.88     | 477.50    | 00:0        | 483.62                                 | 387.01  | 32.27                             | 31.32                  | 31.32              | 16.16   | 25.17   | 10.01  | 517.10    | 33.48   |
| E S                                         | 8           | 112.82                                | 0.00        | 112.82       | 37.89              | 37.89                               | 0.00         | 0.88     | 183.56    | 00:0        | 189.48                                 | 107.96  | 00.6                              | 30.31                  | 30.31              | 69.63   | 31.17   | 2.79   | 211.55    | 22.07   |
| May                                         | 00.0        | 22.02                                 | 0.00        | 22.02        | 39,15              | 39.15                               | 00.0         | 98.0     | 95.09     | 000         | 101.21                                 | 21.07   | 1.76                              | 31.32                  | 31.32              | 64.40   | 24.96   | 0.54   | 110.98    | 277     |
| Total                                       | 00:0        | 0.00 9075.01                          | 00'0        | 0.00 9075.01 | 80.19              | 461.00                              | 000          | 10.56    | 9935.57   | 0.00        | 10007.57                               | 8684.00 | 724.00                            | 368.80                 | 358.8              | 1461.60 | 1050.63 | 774.6  | 11420.8   | 1413.3  |
| Note: Column no. 10 = Column no (5+6+7+8+9) | .10 = Colum | n no (5+6+                            | +7+8+9)     | Colum        | nn No. 12          | Column No. 12 = Column no. (10 + 11 | 10. (10 + 11 |          | umn no.20 | E Column no | Column no.20 = Column no.(13+17+18+19) |         | Column no. 21 = Column no.(20-12) | = Ըօկսուտ ու           | 0.(20-12).         |         |         |        |           |         |

Table 4.10.16(c): Cauvery Delta Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, Without Ground Water

| MCM       | 3                  | Monthly                | Water                                 | oalance          | (02) | 31.34       | .68 88       | 308.83       | 363.19       | 252 00      | 213.58      | 237.34      | 74 32       | 34.38       | 38.62       | 37.71       | 24 26      | 1784.43      |                                            |
|-----------|--------------------|------------------------|---------------------------------------|------------------|------|-------------|--------------|--------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|--------------------------------------------|
| Unit: MCM |                    | Gross                  |                                       | ٠,               | (61) | 223.89      | 2279.42      | 2562.23      | 2565.42      | 963.91      | 8.46.40     | 752.99      | 300.80      | 368.19      | 516.12      | 221.27      | 119.35     | 11720.0      |                                            |
|           |                    | Surface                |                                       | yields a         | (18) | 41,72       | 109.43       | 244.14       | 299.83       | 243.88      | 207.81      | 236.42      | 10.48       | 38.48       | 39.10       | 48.42       | 38.77      | 1632.00      |                                            |
|           | lity               | S                      | Г                                     | I TENO           | (17) | 19:59       | 220.30       | 231.70       | 225.9        | 108.72      | 100.73      | 93.06       | 66.69       | 73.52       | 90.02       | 64.89       | 15.65      | 1404.0       |                                            |
|           | Water Availability | िराज्या पाइन्ड         | Indus-                                | lein             | (91) | 30.31       | 31.32        | 31.32        | 30.31        | 31.32       | 30.31       | 31.32       | 31.32       | 28.29       | 31.32       | 30.31       | 31.32      | 368.8        | 12).                                       |
|           | W                  | Regeneration from uses | Dome-                                 | stic             | (15) | 25.58       | 26.43        | 26.43        | 25.58        | 26.43       | 25.58       | 26.43       | 26.43       | 23.87       | 26.43       | 25.58       | 26,43      | 311.2        | Column no.20 = Column no.(19-12)           |
|           |                    | H                      | Imiga-                                | tion             | (14) | 9.72        | 162,55       | 173.95       | 170.05       | 50.97       | 44.84       | 35.31       | 12,24       | 21.36       | 32.27       | 9.00        | 1.76       | 724.0        | a no.20 = Ca                               |
| 9         |                    |                        | Import                                |                  | (13) | 116.55      | 1949.68      | 2086.39      | 2039.66      | 611.32      | 537.86      | 423.51      | 146.80      | 256.19      | 387.01      | 107.96      | 21.07      | 8684.0       |                                            |
|           |                    | Gross                  | tota                                  | utilisation      | (12) | 192.55      | 2110.54      | 2253,41      | 2202,24      | 711.91      | 632.82      | \$15.65     | 226.48      | 333.82      | 477.50      | 183.56      | 95.09      | 9935.57      | Column no.19 = Column no.(13+17+18)        |
|           |                    |                        | Export                                |                  | (11) | 0.00        | 0.00         | 0.00         | 0.00         | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 0.00        | 00:00       | 0.00       | 0.00         | = Column no                                |
|           |                    |                        | 7.04.                                 | 104              | (10) | 192.55      | 2110.54      | 2253,41      | 2202.24      | 711.91      | 632.82      |             | 226.48      |             | 477.50      | 183.56      | 95.09      | 9935.57      | olumn no.19                                |
|           |                    |                        | Environ-                              | mental           | (6)  | 0.88        | 0.2          | 0.88         | 0.88         | 0.88        | 880         | 0.8         | 0.88        | Ì           | 0.88        |             | 0.88       | 10.56        |                                            |
|           | lisation           |                        | Hydro-                                | power            | (8)  | 0.00        | 0.00         | 00.0         | 000          | 00:00       | 0.00        | 0.00        | 0.00        |             | 0.00        | 000         | 000        | 0000         | no. (10+1                                  |
|           | Water Utilisation  | ements                 | Indus-                                | trial            | (1)  | 37.89       | 39.15        | 39.15        | 37.89        | 39.15       | 37.89       | 39.15       | 39.15       | 35.36       | 39.15       | 37.89       | 39.15      | 461.00       | 2 = Column                                 |
| 1         |                    | Water requirements     | Donke-                                | stic             | (9)  | 31.97       | 33.04        | 33.04        | 31.97        | 33.04       | 31.97       | 33.04       | 33.04       | 29.84       | 33.04       | 31.97       | 33.04      | 389.0        | Column No. 12 = Column no. (10 + 11)       |
| •         |                    |                        | n projects                            | g Total          | (5)  | 0.00 121.80 | 0.00 2037.47 | 0.00 2180.33 | 0.00 2131.49 | 0.00 638.84 | 0.00 562.08 | 0.00 442.58 | 0.00 153.41 | 0.00 267.73 | 0.00 404.43 | 0,00 112.82 | 0.00 22.02 | 0.00 9075.01 |                                            |
| ;         |                    |                        | der irrigatio                         | Existing Ongoing | Ð    |             |              |              |              |             |             |             | _           |             |             |             | 22.02      |              | (5+6+7+8+                                  |
|           |                    |                        | Utilisation under irrigation projects | Proposed Existi  | (3)  | 0.00 121.80 | 0.00 2037.5  | 0.00 2180.3  | 0.00 2131.5  | 0.00 638.84 | 0.00 562.08 | 0.00 442.58 | 0.00 153.41 | 0.00 267.73 | 0.00 404.43 | 0.00 112.82 | 0.00       | 0.00 9075.0  | = Column no.                               |
|           |                    | 1,400.0                |                                       | F.               | (1)  |             |              |              |              | _           |             |             |             |             |             |             | _          |              | Note: Column no.10 = Column no.(5+6+7+8+9) |
|           |                    | _                      | •                                     |                  |      | 'n          | 11           | Aug          | Sep          | ğ           | Nov         | ä           | Clan        | Feb.        | \/ar        | Apr         | A<br>A     | Total        | Note                                       |

Table 4.10.16(d): Cauvery Delta Sub-basin-Monthly Water Balance for 50% Water Year Dependable Flow, With Ground Water

|                                              |                   |             |                                       |              | *                                   | Water Utilisation | tation       |          |             |             |                                        |         |                                   |                        | Water Availability | ability |         |          |           |               |
|----------------------------------------------|-------------------|-------------|---------------------------------------|--------------|-------------------------------------|-------------------|--------------|----------|-------------|-------------|----------------------------------------|---------|-----------------------------------|------------------------|--------------------|---------|---------|----------|-----------|---------------|
| 1,000                                        |                   |             |                                       | Wate         | Water requirements                  | ents              |              |          |             |             | Gross                                  |         |                                   | Regeneration from uses | from uses          |         | Surface | Ground   | Gross     | Monthly       |
| บแกรง                                        | Utilisatio        | n under irt | Utilisation under irrigation projects |              | Dome-                               | Indus-            | Hydro        | Environ- | F           | Export      | total                                  | [mpart  | Imiga-                            | Боте-                  | Indus-             |         | water   | weler    | water     | water         |
|                                              | Proposed Existing | Kisting O   | Ongoing                               | Total        | stic                                | trial             | power        | mental   | l OLA!      |             | utilisation                            |         | lion                              | stic                   | trial              | lotal   | yields  | <b>"</b> | available | Dalance       |
| Ξ                                            | (2)               | (3)         | (4)                                   | (5)          | (9)                                 | 3                 | (19)         | (6)      | (10)        | (11)        | (12)                                   | (13)    | (14)                              | (51)                   | (91)               | (17)    | (81)    | (61)     | 8         | [ <u>[</u> 2] |
| Jun                                          | 0.00              | 121.80      | 000                                   | 121.80       | 37.89                               | 37.89             | 0.00         | 0.88     | 192,55      | 00.0        | 198.46                                 | 116.55  | 9.72                              | 25.58                  | 30.31              | 68.07   | 41.72   | 3.01     | 229.36    | 30.90         |
| lui                                          | 0.00              | 2037.5      | 000                                   | 0.00 2037.47 | 39.15                               | 39.15             | 0.00         | 0.88     | 2110.54     | 00.00       | 2116.66                                | 1949.68 | 162.55                            | 26.43                  | 31.32              | 261.50  | 109.43  | 56.43    | 2371.04   | 254.39        |
| Aug                                          | 00.0              | 2180.3      | 7 000                                 | 0.00 2180.33 | 39.15                               | 39.15             | 0.00         | 0.88     | 2253.41     | 00:0        | 2259.52                                | 2086.39 | 173.95                            | 26.43                  | 31.32              | 275.79  | 244,14  | 53.96    | 2660.28   | 400,76        |
| Scp                                          | 0.00              | 2131.5      | 0.00                                  | 0.00 2131.49 | 37.89                               | 37.89             | 0.00         | 0.88     | 2202.24     | 0.00        | 2208.16                                | 2039.66 | 170.05                            | 25.58                  | 30.31              | 269.04  | 299.83  | 52.75    | 2661.28   | 153.12        |
| Oa                                           | 0.00              | 638.84      | 0.00                                  | 0.00 638.84  | 39.15                               | 39,15             | 0.00         | 0.88     | 711.91      | 00.0        | 718.03                                 | 611.32  | 50.97                             | 26.43                  | 31.32              | 121.64  | 243.88  | 15.81    | 992.69    | 274.61        |
| Nev                                          | 0.00              | \$62.08     | 0.00                                  | 562.08       | 37.89                               | 37.89             | 0.00         | 0.88     | 632.82      | 00.0        | 638,74                                 | 537.86  | 11.8.1                            | 25.58                  | 30.31              | 112.10  | 207.81  | 13.91    | 871.67    | 232.94        |
| Dec                                          | 0.00              | 412.58      | 000                                   | 442.58       | 39.15                               | 39.15             | 0.00         | 0.88     | \$15.65     | 00.00       | 521.77                                 | 423.51  | 35.31                             | 26.43                  | 31.32              | 10201   | 236.42  | 10.95    | 772.90    | 251.13        |
| Jan                                          | 0.00              | 153.41      | 00.0                                  | 153.41       | 39.15                               | 39.15             | 0.00         | 0.88     | 226.48      | 00.00       | 232.60                                 | 146.80  | 12.24                             | 26.43                  | 31.32              | 3.09    | 10.48   | 3.80     | 307.70    | 75.10         |
| Feb                                          | 0.00              | 267.73      | 000                                   | 267.73       | 35.36                               | 35.36             | 0.00         | 0.88     | 333.82      | 00.0        | 339.34                                 | 256.19  | 21.36                             | 23.87                  | 28.29              | 78.5    | 38.48   | 6.63     | 380.23    | 6.3           |
| May                                          | 0.00              | 401.43      | 000                                   | 404.43       | 39.15                               | 39.15             | 0.00         | 0.83     | 477.50      | 00.0        | 483,62                                 | 387.01  | 32.27                             | 26.43                  | 31.32              | 98.20   | 39 10   | 10.01    | 534.31    | 50.69         |
| Apr                                          | 0.00              | 112,82      | 000                                   | 112.82       | 37.89                               | 37.89             | 0.00         | 0.88     | 183.56      | 00.00       | 189,48                                 | 107.96  | 00'6                              | 25.58                  | 30.31              | 67.17   | 48.42   | 2.79     | 226.34    | 36.86         |
| May                                          | 0.00              | 22 02       | 000                                   | 22.02        | 39.15                               | 39.15             | 0.00         | 0.88     | 95.09       | 00.0        | 101.21                                 | 21.07   | 1.76                              | 26.43                  | 31.32              | 86.65   | 38.77   | 7,0      | 120.34    | 19,14         |
| Total                                        | 0.00              | 9075.0      | 0.00                                  | 0.00 9075.01 | +61.0                               | 461.00            | 0.00         | 10.56    | 9935.57     | 00.0        | 10007.6                                | 8684.00 | 724.00                            | 311.2                  | 368.8              | 1587.5  | 1632.00 | 224.6    | 12128.1   | 2120.5        |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | 1.10 = Colun      | m no.(5+6   | +7+8+9)                               | Colum        | Column No. 12 = Column no. (10 + 11 | Column n          | 0. (10 + 11) | (Sol     | umn no.20 = | * Column no | Column no.20 = Column no.(13+17+18+19) |         | Column po. 21 = Column no.(20-12) | - Column n             | 0.(20-12).         |         |         |          |           |               |

Table 4.10.16(e): Cauvery Delta Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, Without Ground Water

|                    | IVIORENLY              |                                       | _                | (20)              | 197.22 4.68 | 2209.49 98.94 | 2406.20 152.79 | 1373.81 171.57 | 808.06    | 713.59 80.77 | 601.90 86.25 | 247.11 20.63 | 343.61 9.79 |           |           | P. 58 -0.51 | 10677.0 741.43 |                                               |
|--------------------|------------------------|---------------------------------------|------------------|-------------------|-------------|---------------|----------------|----------------|-----------|--------------|--------------|--------------|-------------|-----------|-----------|-------------|----------------|-----------------------------------------------|
| ,<br> <br> <br>    | ce Gross               | r water                               | is available     | (61)              | 15.06       | 39.50 220     | 88.11 240      | 108.21 237.    | 88.02     | 75.00        | 85.33 60     | 30.32 24     | 13.89 34.   | 14.11     | 17.45 194 | 14.00       | 589.00         |                                               |
|                    | Surface                | Г                                     | il yields        | (18)              | 65.61       | 220 30        | 231.70         | 225.94         | 108.72    | 100.73       | 93.06        | 66.69        | 73.52       | 50:05     | 64.89     | 15.65       | 10.104         |                                               |
| Water Availability | m uses                 | L                                     | trial Lotal      | (16) (17)         | 30.31       | 31.32         | 31.32 23       | 30.31 22       | L         | 30.31        | 31.32        | 31.32 6      | 28.29 7.    | 31.32     | 30.31     | 31.32       | 368.8          |                                               |
| Water              | Regeneration from uses | Dorne- In                             |                  | (15)              | 25.58       | 26.43         | 26.43          | 25.58          | 26.43     | 25.58        | 26.43        | 26.43        | 23.87       | 26.43     | 25.58     | 26.43       | 311.21         | Column no.20 = Column no.(19-12)              |
|                    | Re                     | Irriga-                               |                  | ( <del>†</del> 1) | 9.72        | 162.55        | 173.95         | 170.05         | 50.97     | 44.84        | 35.31        | 12.24        | 21.36       | 32.27     | 00.6      | 1.76        | 724.0          | no.20 = Colu                                  |
|                    |                        | Import                                |                  | (13)              | 116.55      | 89.0+61       | 2036.39        | 3039.66        | 611.32    | 537.86       | 423.51       | 146.80       | 256.19      | 387.01    | 107.96    | 21.07:      | 8684.0         |                                               |
|                    | Gross                  | total                                 | utilisation      | (12)              | 192.55      | 2110.54       | 2253.41        | 2202.24        | 711.91    | 632.82       | \$15.65      | 226.48       | 333:82      | 477.50    | 183.56    | 95.09       | 9935.57        | Column no. 19 = Column no.(13+17+18)          |
|                    |                        | Export                                |                  | ε                 | 0.00        | 00.0          | 00'0           | 000            | 00.0      | 00'0         | 00'0         | 000          | 000         | 000       | 00.0      | 00.0        | 00'0           | =Column                                       |
|                    |                        | _                                     | lotal            | (OI)              | 8 192.55    | 8 2110.54     | 8 2253.41      | 8 2202.24      | 8 711.91  | 8 632.82     | 8 515.65     | 8 226.48     | 8 333.82    | 8 477.50  | 8 183.56  | 8 95.09     | 6 9935.57      | Johnn no. 15                                  |
|                    |                        | - Environ-                            |                  | (6)               | 0.00        | 0.00          | 0.00 0.88      | 0.00           | 0.00      | 0.00         | 0.00         | 0.00         | 0.00        | 0.00      | 0000      | 0000        | 0.00           | _                                             |
| Water Utilisation  |                        | - Hydro-                              | power            | (8)               | 37.89 0.    | 39.15 0.      | 39.15 0.       | 37.89 0.       | 39.15 0   | 37.89 0.     | 39.15        | 39,15, 0,    | 35,36 0.    | 39.15 0.  | 37.89 0.  | 39.15 0.    | 461.0 0.       | Column No. 12 = Column no. (10 + 1)           |
| Water              | Water requirements     | - Indus-                              | trial            | (2)               | 31.97       | 33.04 39      | 33.04 39       | 31.97 37       | 33.04 39  | 31.97 37     | 33.04 39.    | 33.04 39     | 29.84 35.   | 33.04 39. | 31.97 37. | 33.04 39.   | 389.0 46       | . 12 = Colur                                  |
|                    | Water red              | s Dome-                               | tal stic         | (9)               | 121.80 31   |               |                |                | 638.84 33 | 562.08       | 442.58 33    | 153.41 33    | 267.73 29   | 404.43 33 | 112,82 31 | 22.02       |                | Column No                                     |
|                    |                        | ation project                         | coing Total      | (4) (5)           | 0.00        | 0.00 2037.47  | 0.00 2180.33   | 0.00 2133,49   | 0.00      | 0.00         | 0.00         | 0.00         | 0.00 26     | 0.00      | 0.00      | 0.00        | 0.00 9075.01   | +8+6).                                        |
|                    |                        | Utilisation under irrigation projects | Existing Ongoing | (3)               | 121.80      | 0.00 2037.47  | 0.00 2180.33   | 0.00 2131.49   | 638.84    | \$62.08      | 442.58       | 153.41       | 267,73      | 404.43    | 112.82    | 22.02       | 0.00 9075.01   | n no.(5+6+7                                   |
|                    |                        | Utilisatio                            | Proposed E       | (2)               | 000         | 00.0          | 0.00           | 0.00           | 0.00      | 0.00         | 0.00         | 0.00         | 0.00        | 0.00      | 00.0      | 0.00        | 0.00           | . 10 = Colum                                  |
| :                  | 1 Cough                | initožo.                              | •                | (1)               | Jun         | luľ           | Aug            | Sep            | Oct       | Nov          | Dec<br>Dec   | Jan          | Feb         | Mar       | Apr       | Mar         | Tota,          | Note: Column no. 10 = Column no. (5+6+7+8+9). |

Table 4.10.16(f): Cauvery Delta Sub-basin-Monthly Water Balance for 90% Water Year Dependable Flow, With Ground Water Unit : MCM

|                                               |               |                                      |                |              |                    | Water Utilisation                    | sation       |          |            |                                        |             |         |                                    |                        | Water Availability | bility   |         |        |           | \ fontblu |
|-----------------------------------------------|---------------|--------------------------------------|----------------|--------------|--------------------|--------------------------------------|--------------|----------|------------|----------------------------------------|-------------|---------|------------------------------------|------------------------|--------------------|----------|---------|--------|-----------|-----------|
| Month                                         | 1             |                                      |                | Wat          | Water requirements | nents                                |              |          |            |                                        | Gross       |         |                                    | Regeneration from uses | from uses          |          | Surface | Ground | Gross     | water     |
|                                               | Utilisatio    | Julisation under irrigation projects | igation pro    | yects        | Dome-              | -supuj                               | Hydro-       | Environ- | ŀ          | Export                                 | total       | Import  | Irriga-                            | Dome                   | Indus-             | F        | waler   | water  | water     | halance   |
|                                               | Proposed      | Existing Ongoing                     | agoing         | Total        | stic               | £i.                                  | power        | mental   | 1 0121     |                                        | utilisation |         | Tion                               | stic                   | E/al               | <b>5</b> | yields  | yelds  | available |           |
| (1)                                           | (2)           | (3)                                  | <del>(t)</del> | (2)          | (9)                | (7)                                  | (61)         | (6)      | (01)       | (11)                                   | (13)        | (13)    | (34)                               | (31)                   | (91)               | (11)     | (81)    | (61)   | (30)      | ([]       |
| Jun                                           | 0.00          | 121.80                               | 0.00           | 121.80       | 37.89              | 37.89                                | 00.00        | 0.88     | 192.55     | 00'0                                   | 198.46      | 116.55  | 9.72                               | 30.31                  | 30.31              | 70.34    | 15.06   | 3.01   | 204.97    | 6.51      |
| Įri                                           | 0.00          | 0.00 2037.47                         | 0.00           | 0.00 2037.47 | 39.15              | 39.15                                | 00:0         | 0.88     | 2110.54    | 00:0                                   | 2116.66     | 1949.68 | 162.55                             | 31.32                  | 31.32              | 225 19   | 39.50   | 50.43  | 2264.80   | 148.15    |
| Aug                                           | 0.00          | 0.00 2180.33                         | 0.00           | 0.00 2180.33 | 39.15              | 39.15                                | 000          | 0.88     | 2253.41    | 00:00                                  | 2259.52     | 3086.39 | 173.95                             | 31.32                  | 31.32              | 236.59   | 88.11.  | 53.96  | 2465.05   | 205.53    |
| ch()                                          | 000           | 0.00 2131.49                         | 00.0           | 2131.49      | 37.89              | 37.89                                | 000          | 0.88     | 2202.24    | 00.0                                   | 2208.16     | 2039.66 | 170,05                             | 30.31                  | 30.31              | 230.67   | 108.21  | \$2.75 | 2431,29   | 223.14    |
| Sct                                           | 000           | 638.84                               | 0.00           | 638.84       | 39.15              | 39.15                                | 0.00         | 0.88     | 111.91     | 0.00                                   | 718.03      | 611.32  | 50.97                              | 31.32                  | 31.32              | 113 61   | 88.03   | 18.81  | 828.76    | 110.73    |
| Not.                                          | 0.00          | 562.08                               | 0.00           | \$62.08      | 37.89              | 37.89                                | 00.0         | 0.88     | 632.82     | 00:00                                  | 638.74      | 537.86  | 44.84                              | 30.31                  | 30.31              | 105.47   | 75.00   | 13.91  | 732.24    | 93.50     |
| Dec                                           | 00.00         | 442.58                               | 0.00           | 442.58       | 39.15              | 39.15                                | 00.0         | 0,88     | 515.65     | 00.00                                  | 521.77      | 423.51  | 35.31                              | 31.32                  | 31.32.             | 97.95    | 85.33   | 10.95  | 617.75    | 95.98     |
| Jan                                           | 00.00         | 153.41                               | 0.00           | 153.41       | 39.15              | 39.15                                | 00.0         | 88.0     | 226.48     | 0.00                                   | 232.60      | 146.80  | 12.24                              | 31.32                  | 31.32              | 74.88    | 30.32   | 3.80   | 255.80    | 23.20     |
| Feb                                           | 0.00          | 267.73                               | 0.00           | 267.73       | 35.36              | 35.36                                | 00.0         | 0.88     | 333.82     | 00.0                                   | 339.34      | 256.19  |                                    | 28.29                  | 28.29              | スト       | 13.89   | 6.63   | 3\$4.65   | 15.31     |
| Mar                                           | 0.00          | 404.43                               | 0.00           | 404.43       | 39.15              | 39.15                                | 00.0         | 0.88     | 477.50     | 000                                    | 483.62      | 387.01  | 32.27                              | 31.32                  | 31.32              | 5<br>3   | 14.11   | 10.01  | 506.04    | 22.42     |
| Apr                                           | 80            | 112.82                               | 0.00           | 112.82       | 37.89              | 37.89                                | 00.00        | 88.0     | 183.56     | 00.0                                   | 189.48      | 107.96  | 00.6                               | 30.31                  | 30.31              | 69.63    | 17.45   | 2.79   | 197.83    | 8.35      |
| May                                           | 0.00          | 22.02                                | 0.00           | 22.02        | 39.15              | 39.15                                | 00.0         | 0.85     | 95.09      | 00.0                                   | 101.21      | 21.07   | 1.76                               | 31.32                  | 31.32              | 3        | 14.00   | 0.54   | 100.03    | 61.1.     |
| Total                                         | 0.00          | 0.00 9075.01                         | 0.00           | 0.00 9075.01 | 161.0              | 461.0                                | 0.00         | 10.56    | 9935.57    | 0.00                                   | 10007.6     | 8684.00 | 724.00                             | 368.8                  | 368.8              | 1461.6   | 589.00  | 234.6  | 10959.2   | 921.6     |
| Noce : Column no. 10 = Column no. (5+6+7+8+9) | o. 10 = Calum | n no.(5+61                           | 7+8+9)         | Colun        | nn No. 12          | Column No. 12 = Column no. (10 + 11) | io. (10 + 11 |          | ита по. 20 | Column no.20 = Column no.(13+17+18+19) | (13+17+18+  |         | Column no. 21 = Column no. (20-12) | - Column               | .o.(20-12).        |          |         |        |           |           |

Unit: MCM Table 4.10.16(g): Cauvery Delta Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, Without Ground Water

| Water requirements Water requirements Water requirements Water requirements Water Phyloseps Water requirements Water Phyloseps Water Phyloseps Water Requirements | Water Utilisation Water requirements Dome Indus- Hydro- | Water Utilisation Water requirements Dome Indus- Hydro- | Water Utilisation Water requirements Dome Indus- Hydro- | Utilisation<br>is- Hydro- | Utilisation<br>is- Hydro- | 8                                    | Envir      | -E -  | Total      | Expon     | Gross                               | Import  | Imiga-                           | Regeneration from uses Dorne- Indus- | Water Availability on from uses Indus- To | Total  | Surface<br>water | Gross<br>water | Monthly<br>water<br>balance |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------|---------------------------|---------------------------|--------------------------------------|------------|-------|------------|-----------|-------------------------------------|---------|----------------------------------|--------------------------------------|-------------------------------------------|--------|------------------|----------------|-----------------------------|
|                                                                                                                                                                   | (2)                                                     | (S)                                                     |                                                         | (5)                       | (9)                       |                                      | (8)        | (6)   | (01)       | (11)      | (12)                                | (13)    | (14)                             | (15)                                 | (16)                                      | (71)   | (18)             | (61)           | (20)                        |
|                                                                                                                                                                   | 000                                                     | 121.80                                                  | 000                                                     | 121.80                    | 31.97                     | 37.89                                | 0.00       | 0.88  | 192.55     | 0.00      | 192.55                              | 116.55  | 9.72                             | 25.58                                | 30.31                                     | 65.61  | 4.96             | 187.12         | -5.42                       |
|                                                                                                                                                                   | 000                                                     | 0.00 2037.5                                             | 0.00                                                    | 0.00 2037.47              | 33.04                     | 39.15                                | 0.00       | 0.88  | 2110.54    | 00.0      | 2110.54                             | 1949.68 | 162.55                           | 26.43                                | 31.32                                     | 220.30 | 13.01            | 2183.0         | 72.45                       |
|                                                                                                                                                                   | 0.00                                                    | 0.00 21 80.3                                            | 8.0                                                     | 0.00 2180.33              | 33.04                     | 39.15                                | 0.00       | 0.88  | 2253.41    | 00.00     | 2253.41                             | 2086.39 | 173.95                           | 26.43                                | 31.32                                     | 231.70 | 29.02            | 2347.1         | 93.70                       |
|                                                                                                                                                                   | 0.00                                                    | 0.00 2131.5                                             | 8                                                       | 0.00 2131.49              | 31.97                     | 37.89                                | 00.0       | 0.88  | 2202.24    | 00.00     | 2202.24                             | 2039.66 | 170.05                           | 25.58                                | 30.31                                     | 225.94 | 35.64            | 2301.24        | 00.66                       |
|                                                                                                                                                                   | 00.0                                                    | 638.84                                                  | 80                                                      | 638.84                    | 33.04                     | 39.15                                | 0.00       | 0.88  | 16.117     | 00.00     | 11.91                               | 611.32  | 50.97                            | 26.43                                | 31.32                                     | 108.72 | 26.00            | 746.04         | 34.12                       |
|                                                                                                                                                                   | 00:0                                                    | \$62.08                                                 | 000                                                     | \$62.08                   | 31.97                     | 37.89                                | 00'0       | 0.88  | 632.82     | 00'0      | 632.82                              | 537.86  | 4-1.8-1                          | 25.58                                | 30.31                                     | 100,73 | 24.70            | 663.29         | 30.47                       |
|                                                                                                                                                                   | 000                                                     | 112.58                                                  | 80                                                      | 442.58                    | 33.04                     | 39.15                                | 0.00       | 0.88  | \$15.65    | 00.00     | 515.65                              | 423.51  | 35.31                            | 26.43                                | 31.32                                     | 93.06  | 28.10            | 544.67         | 29.03                       |
| <br> <br>                                                                                                                                                         | 000                                                     | 153.41                                                  | 80                                                      | 153.41                    | 33.04                     | 39.15                                | 00'0       | 0.88  | 226.48     | 00.00     | 226,48                              | 146.80  | 12.24                            | 26.43                                | 31.32                                     | 66.69  | 66.6             | 226.78         | 0.30                        |
|                                                                                                                                                                   | 000                                                     | 267.73                                                  | 000                                                     | 267.73                    | 29.84                     | 35.36                                | 000        | 0.88  | 333.82     | 0.00      | 333.82                              | 256.19  | 21.36                            | 23.87                                | 28.29                                     | 73.52  | 4.57             | 334.29         | 0.47                        |
|                                                                                                                                                                   | 00:0                                                    | 7 7                                                     | 0.00                                                    | 404.43                    | 33.04                     | 39.15                                | 00.00      | 0.88  | 177.50     | 00.0      | 477.50                              | 387.01  | 32.27                            | 26.43                                | 31.32                                     | 90.02  | 4.65             | 481.68         | 4.17                        |
|                                                                                                                                                                   | 000                                                     | 112.82                                                  | 0.00                                                    | 112.82                    | 31.97                     | 37.89                                | 0.00       | 0.88  | 183.56     | 00.0      | 183.56                              | 107.96  | 9.00                             | 25.58                                | 30.31                                     | 68.49  | 5.75             | 178.60         | 4.96                        |
|                                                                                                                                                                   | 000                                                     | 22.02                                                   | 0.00                                                    | 22.02                     | 33.04                     | 39.15                                | 0.00       | 0.88  | 95.09      | 00'0      | 95.09                               | 21.07   | 1.76                             | 26.43                                | 31.32                                     | 59.51  | 197              | 85.19          | 06.6                        |
|                                                                                                                                                                   | 0.00                                                    | 9075.0                                                  | 0.00                                                    | 0.00 9075.01              | 389.0                     | 161.0                                | 0.00       | 10.56 | 9935.57    | 0.00      | 9935.57                             | 8684.0  | 724.0                            | 311.2                                | 368.8                                     | 1404.0 | 191.00           | 10279.0        | 343.43                      |
| od similo                                                                                                                                                         | Note : Column no. 10 = Column no. (5+6+7+8+9)           | in no.(5+6                                              | +7+8+9)                                                 | Colun                     | rm No. 12 :               | Column No. 12 = Column no. (10 + 11) | 0. (10+11) | 0     | = 91.0n nm | Column no | olumn no.19 = Column no.(13+17+18). |         | Column no.20 = Column no.(19-12) | lumn no.(19                          | .12).                                     |        |                  |                |                             |

Unit - MCM Table 4.10.16(h): Cauvery Delta Sub-basin-Monthly Water Balance for 100% Water Year Dependable Flow, With Ground Water

|           |                                               |            |                                      |                                        |                    | Water Utilisation | tation                               |          |             |             |                                           |         |            |                                    | Water Availability | bility |         |        | _         |         |
|-----------|-----------------------------------------------|------------|--------------------------------------|----------------------------------------|--------------------|-------------------|--------------------------------------|----------|-------------|-------------|-------------------------------------------|---------|------------|------------------------------------|--------------------|--------|---------|--------|-----------|---------|
|           |                                               |            | E                                    | Wate                                   | Water requirements | nemis             |                                      |          |             |             | Gross                                     |         | 14         | Regeneration from uses             | from uses          |        | Surface | Ground | Gross     | Monthly |
| dinoM     | Utilisation                                   | under irn  | Julisation under irrigation projects |                                        | Dame-              | Indus-            | Hydro- I                             | Environ- | Thatai      | Export      | totaj                                     | Import  | Irriga.    | Dome-                              | Indus-             | Tabel  | water   | _      | water     | Palci   |
|           | Proposed Existing Ongoing                     | cisting O  | ngoing                               | Total                                  | slic               | G is              | power                                | mental   | TOPI        |             | utilisation                               |         | tion       | stic                               | trial              | 1001   | yields  | yields | available |         |
| ΙΞ        | <u> </u>                                      | <u>ල</u>   | Ŧ                                    | (S)                                    | (9)                | (1)               | (91)                                 | (6)      | (10)        | (11)        | (12)                                      | ((3)    | (14)       | (3)                                | (16)               | (11)   | (81)    | (61)   | (20)      | (21)    |
|           | 000                                           | 121.80     | 000                                  | 121.80                                 | 37.89              | 37.89             | 00.0                                 | 0.88     | 198.46      | 00'0        | 198.46                                    | 116.55  | 9.72       | 30.31                              | 30.31              | 10.3T  | 4.96    | 3.01   | 194.87    | -3.59   |
|           | 0.00 2037.5                                   | 037.5      | 800                                  | 0.00 2037.47                           | 39.15              | 39.15             | 00.0                                 | 0.88     | 2116.66     | 00.00       | 2116.66                                   | 1949.68 | 162.55     | 31.32                              | 31.32              | 225.19 | 13.01   | 50.43  | 2238.31   | 121.66  |
|           | 0.00 2180.3                                   | 180.3      | 000                                  | 0.00 2180.33                           | 39.15              | 39.15             | 00'0                                 | 0.88     | 2259.52     | 0.00        | 2259.51                                   | 2086.39 | 173.95     | 31.32                              | 31.32              | 236.59 | 29.02   | 53.96  | 2405.96   | 146.41  |
|           | 0.00(2131.5                                   | 131.5      | 0.00                                 | 0.00 2131.49                           | 37.89              | 37.89             | 00.0                                 | 0.88     | 2208.16     | 00.00       | 2208.16                                   | 2039.66 | 170.05     | 30.31                              | 30.31              | 230.67 | 35.64   | \$2.75 | 2358.72   | 150.57  |
|           | 000                                           | 638.84     | 0.00                                 | 638.84                                 | 39.15              | 39.15             | 00.00                                | 0.88     | 718.03      | 00.00       | 718.03                                    | 611.32  | 50.97      | 31.32                              | 31.32              | 113.61 | 26.00   | 18.81  | 766.74    | 48 71   |
|           | 00.0                                          | \$67.08    | 0.00                                 | \$62.08                                | 37.89              | 37 89             | 00.0                                 | 0.88     | 638.74      | 00.0        | 638,74                                    | 537.86  | 44.84      | 30.31                              | 30.31              | 105.47 | 24.70   | 13.91  | #<br>189  | 13.20   |
|           | 00.0                                          | 442.58     | 000                                  | 442.58                                 | 39.15              | 39.15             | 00.0                                 | 0.88     | 521.77      | 00.00       | 521.77                                    | 423.51  | 35.31      | 31.32                              | 31.32              | 97.95  | 28.10   | 10.95  | 560.52    | 38 75   |
|           | 000                                           | 153,41     | 00.0                                 | 153.41                                 | 39.15              | 39.15             | 00.0                                 | 0.88     | 232.60      | 00.0        | 232.60                                    | 146.80  | 12.24      | 31.32                              | 31.32              | 74.88  | 66.6    | 3.80   | 235.47    | 2.87    |
|           | 000                                           | 267.73     | 000                                  | 267.73                                 | 35.36              | 35.36             | 000                                  | 0.88     | 339.34      | 0.00        | 339.34                                    | 256.19  | 21.36      | 28.29                              | 28.29              | 77.94  | 4.57    | 6.63   | 345.33    | 5.99    |
|           | 000                                           | 404.43     | 000                                  | ###################################### | 39.15              | 39.15             | 00'0                                 | 0.88     | 483.62      | 00.00       | 483.62                                    | 387.01  | 32.27      | 31.32                              | 31.32              | 94.91  | 4.65    | 10.01  | 496,58    | 12.96   |
|           | 00:00                                         | 11 2.82    | 00.0                                 | 112.82                                 | 37.89              | 37.89             | 0.00                                 | 0.88     | 189.48      | 00.0        | 189.48                                    | 107.96  | 00.6       | 30.31                              | 30.31              | 69.63  | 5.75    | 2.79   | 186.13    | 3.35    |
|           | 00:00                                         | 22.02      | 0.00                                 | 22.02                                  | 39,15              | 39 15             | 000                                  | 0.88     | 101.21      | 00.00       | 101.21                                    | 21.07   | 1.76       | 31.32                              | 31,32              | 61.40  | 191     | 0.54   | 50.63     | .10.58  |
|           | 0.00                                          | 9075.0     | 0.00 9075.0                          | 10.27.04                               | 0.161.0            | 161.0             | 0.00                                 | 10.56    | 10007.6     | 0.00        | 10007.6                                   | 8684.00 | 724.00     | 368.8                              | 368.8              | 1+61.6 | 191.00  | 224.6  | 10561.2   | 553.6   |
| Column no | Note: Column no. 10 = Column no. (5+6+7+8+9). | , no.(5+6+ | 7+8+9)                               | Colum                                  | m No. 12 ±         | = Column n        | Column No. 12 = Column no. (10 + 11) |          | mn no. 20 : | - Column no | Column no. 20 = Column no. (13+17+18+19). |         | dumn no. 2 | Column no. 21 = Column no. (20-12) | 3.(20-12).         |        |         |        |           |         |

Table 4.10.17(a): Cauvery Basin-Sub-basinwise Monthly Water Balance (surplus or deficit) for 75% Water Year Dependable Flow, Without Ground Water

Sub-basinwise Monthly surplus or deficit.

| 276.8         -0.1         -30.4         -4.4         -1.1         6.0         -460.2         -128.2         -49.7           261.4         -36.8         -66.8         -27.5         -17.1         -30.7         -156.7         55.0         -30.7           285.3         -38.6         -79.9         -4.1         -17.0         -21.5         -170.1         -65.4         -26.5           -78.9         -77.2         -47.0         -6.0         -10.0         -3203.5         -8.1         -11.2           252.2         302.3         9.3         65.9         6.5         1.8         -4322.6         178.8         106.4           -24.9         90.6         -53.2         58.5         3.8         -13.7         -2940.8         230.9         53.4           -247.1         -41.0         -146.1         -0.9         -19.1         -656.2         106.0         23.2           -431.4         -71.6         -167.3         -22.7         -14.6         -24.8         -219.1         -134.0         -20.1           -206.5         -36.4         -77.2         -18.5         -8.2         -16.2         -222.5         -296.4         -25.3           -0.1         -16.6                                                                                                                                                                                                                                                                        | Month | Up.Cau. | Kabini | Shims. | Arkav. | Mid.Ca. | Suvar. | Palar  | Chiran.  | Bhava. | Noyil | Amara. | Thiru. | Роппа | Up.Col. | I.Cole. | Cau.Def. | Total   |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------|--------|--------|--------|---------|--------|--------|----------|--------|-------|--------|--------|-------|---------|---------|----------|---------|
| 1221.7         261.4         -36.8         -66.8         -77.5         -17.1         -30.7         -156.7         55.0         -30.7         -109.3         -40.9         -11.5           765.9         285.3         -38.6         -79.9         4.1         -17.0         -21.5         -170.1         -55.4         -26.5         -82.1         -65.2         -11.5           -536.6         -78.9         47.5         -5.2         47.0         -6.0         -10.0         -3203.5         -81         -11.2         -3.1         -60.9         -89.1           -733.2         252.2         302.3         -8.5         -1.8         432.5         17.8         106.4         128.2         26.7         -81.5           -99.2         -247.1         -1.4         -1.4         -0.9         -19.1         -656.2         100.0         23.2         15.0         80.5         -1.6         -1.6         -10.1         -13.4         -1.6         -1.6         -1.6         -2.4         -1.6         -1.6         -1.6         -1.9         -1.8         -1.6         -1.6         -1.6         -1.6         -1.6         -1.6         -1.6         -1.6         -1.6         -1.6         -1.6         -1.6         -1                                                                                                                                                                                                                             | Jun   | -284.3  |        | -0.1   | -30.4  |         |        | 6.0    | -460.2   |        | 49.7  | -143.5 | -51.6  |       | -2.8    | 3.6     | 16.5     | -866.0  |
| 765.9         285.3         -38.6         -79.9         4.1         -17.0         -21.5         -17.0   -6.54         -26.5         -82.1         -65.2         -11.5           -536.6         -78.9         47.5         -5.2         47.0         -6.0         -10.0         -3203.5         -8.1         -11.2         -3.1         -60.9         8.9           -733.2         235.2         302.3         9.3         6.5         1.8         -4322.6         178.8         106.4         128.2         267.4         9.8           -23.8         23.2         6.5         1.8         -4322.6         178.8         106.4         128.2         267.4         9.8           -99.2         -247.1         41.0         -146.1         -0.9         -9.9         -19.1         -656.2         100.0         23.2         15.0         9.5         -1.6           -169.8         -474.7         -71.6         -167.3         -22.7         -14.6         -24.8         -219.1         -134.0         -1.6         -1.6           -169.8         -474.7         -71.6         -167.3         -22.7         -14.6         -24.9         -219.1         -134.0         -22.9         -113.9         -13.0 <tr< td=""><td>Ja.</td><td>1221.7</td><td>_</td><td>-36.8</td><td></td><td></td><td>-17.1</td><td>-30.7</td><td>-156.7</td><td></td><td>-30.7</td><td>.109.3</td><td>40.9</td><td></td><td></td><td>19.4</td><td>129.9</td><td>1083.0</td></tr<> | Ja.   | 1221.7  | _      | -36.8  |        |         | -17.1  | -30.7  | -156.7   |        | -30.7 | .109.3 | 40.9   |       |         | 19.4    | 129.9    | 1083.0  |
| -536.6         -78.9         47.5         -5.2         47.0         -60         -10.0         -3203.5         -8.1         -11.2         -3.1         -60.9         8.9           -733.2         252.2         302.3         9.3         6.5         1.8         4322.6         178.8         106.4         128.2         267.4         9.8           -99.2         -247.1         41.0         -146.1         -0.9         -9.9         -19.1         -556.2         100.0         23.2         156.0         50.5         -1.6           -169.8         -474.7         -116.1         -167.3         -22.7         -146         -24.8         -219.1         -134.0         -20.1         -61.8         -37.2         -13.7           -216.8         -31.4         -37.2         -18.5         -32.7         -16.2         -22.5         -22.9         -113.9         -10.3         -22.9         -13.4         -147.4         -147.4         -147.4         -77.2           -217.0         -206.5         -36.5         -37.2         -16.2         -22.5         -22.9         -13.9         -37.2         -147.4         -147.4         -77.2           -27.1         -37.2         -37.2         -37.2         -                                                                                                                                                                                                                                    | Aug   | 765.9   |        | -38.6  |        |         | -17.0  | -21.5  | -170.1   | -65.4  | -26.5 | -82.1  | -65.2  | -11.5 | -61.2   | 38.4    | 221.9    | 676.5   |
| -733.2         252.2         302.3         9.3         65.9         6.5         1.8         -432.6         178.8         106.4         128.2         26.74         9.8           -23.8         24.9         90.6         -53.2         58.5         3.8         -13.7         -2940.8         230.9         53.4         192.5         107.7         43.8         1           -99.2         -24.7.1         -41.0         -146.1         -0.9         -19.1         -656.2         100.0         23.2         156.0         50.5         -1.6           -169.8         -47.7         -116.1         -0.2         -14.6         -24.8         -219.1         -134.0         -20.1         -61.8         -37.2         -1.6           -216.8         -31.4         -16.7         -12.3         -12.2         -12.9         -27.3         -196.3         -247.2         -22.9         -113.9         -10.3         -0.2           -217.0         -26.5         -36.4         -37.2         -12.2         -16.2         -22.2         -20.4         -37.4         -47.4         -47.4         -47.4         -47.4         -47.4         -47.4         -47.4         -47.4         -47.4         -47.4         -47.4         -47.4<                                                                                                                                                                                                                            | Sep   | -536.6  |        | 47.5   |        |         | 0.9-   | -10.0  | -3203.5  | -8.1   | -11.2 | -3.1   | 6.09   | 6.8   | -17.5   | 46.0    | 256.4    | -3535.0 |
| -23.8         -53.6         -53.2         58.5         3.8         -13.7         -2940.8         230.9         53.4         192.5         107.7         43.8           -99.2         -247.1         -41.0         -146.1         -0.9         -9.9         -19.1         -656.2         100.0         23.2         156.0         50.5         -1.6           -169.8         -474.7         -71.6         -167.3         -22.7         -14.6         -24.8         -219.1         -134.0         -20.1         -61.8         -37.2         -13.7           -216.8         -431.4         -57.9         -112.3         -22.7         -14.6         -24.3         -247.2         -22.9         -113.9         -103.0         -0.2           -217.0         -206.5         -36.4         -77.2         -18.5         -8.2         -16.2         -227.3         -247.2         -25.3         -144.4         -147.4         -77.2           -27.1         -0.1         -16.6         -43.5         -8.2         -5.4         -168.4         -89.2         -20.9         -54.7         -82.8         -8.8           -27.1         -3.0         -3.2         -3.2         -3.6         -3.6         -3.6         -3.6                                                                                                                                                                                                                                             | ğ     | -733.2  |        | 302.3  |        |         | 6.5    | 1.8    | 4322.6   | 178.8  | 106.4 | 128.2  | 267.4  | 9.8   | 45.7    | 33.1    | 165.1    | -3483.2 |
| -99.2        247.1         -41.0         -146.1         -0.9         -9.9         -19.1         -655.2         100.0         23.2         156.0         50.5         -1.6           -169.8         -474.7         -71.6         -167.3         -22.7         -14.6         -24.8         -219.1         -134.0         -20.1         -61.8         -37.2         -13.7           -216.8         -431.4         -37.2         -12.9         -27.3         -196.3         -247.2         -22.9         -113.9         -103.0         0.2           -217.0         -206.5         -36.4         -77.2         -18.5         -82         -16.2         -222.5         -296.4         -25.3         -144.4         -147.4         -77.2           -27.1         -0.1         -16.6         -43.5         -8.3         -2.9         -5.4         -168.4         -89.2         -20.9         -54.7         -82.8         -8.8           -27.1         -0.1         -16.6         -43.5         -8.3         -2.9         -5.4         -168.4         -89.2         -20.9         -54.7         -82.8         -8.8           -27.1         -27.3         -27.9         -27.9         -27.9         -27.9         -27.9                                                                                                                                                                                                                                            | Nov   | -23.8   |        | 90.6   |        |         |        | -13.7  | -2940.8  |        | 53.4  | 192.5  | 107.7  | 43.8  |         | 28.0    | 139.6    | -1925.4 |
| -169.8         -474.7         -71.6         -167.3         -22.7         -14.6         -24.8         -219.1         -134.0         -20.1         -61.8         -37.2         -13.7           -216.8         -431.4         -57.9         -112.3         -22.7         -12.9         -219.3         -247.2         -22.9         -113.9         -103.0         0.2           -217.0         -206.5         -36.4         -77.2         -18.5         -8.2         -16.2         -222.5         -296.4         -25.3         -144.4         -147.4         -77.2           -27.1         -0.1         -16.6         -43.5         -8.3         -2.9         -5.4         -168.4         -89.2         -20.9         -54.7         -82.8         -8.8           -44.8         69.9         9.3         -26.5         -3.6         -36.7         -20.9         -54.7         -82.8         -8.8           -275.5         -271.1         150.7         -799.2         66.9         -79.6         -161.5         -13103.1         -423.6         -66.4         -750.6         -23.6         -750.6         -750.6         -750.9         -13.7                                                                                                                                                                                                                                                                                                                  | Dec   | -99.2   | ·      | 41.0   |        | 6.0-    | 6.6-   | -19.1  | -656.2   |        | 23.2  | 156.0  | 50.5   | -1.6  | 9.99    | 31.2    | 153.1    | -640.3  |
| -216.8         -431.4         -57.9         -112.3         -23.2         -12.9         -27.3         -196.3         -247.2         -22.9         -113.9         -103.0         0.2           -217.0         -206.5         -36.4         -77.2         -18.5         -8.2         -16.2         -222.5         -296.4         -25.3         -144.4         -147.4         -77.2           -27.1         -0.1         -16.6         -43.5         -8.3         -2.9         -5.4         -168.4         -89.2         -20.9         -54.7         -82.8         -88.8           -4.8         69.9         9.3         -26.5         -3.1         -0.5         -0.6         -386.7         -24.9         -42.2         -34.9         -62.5         -2.0           -275.5         -275.5         -271.1         150.7         -799.2         66.9         -79.6         -161.5         -13103.1         -423.6         -66.4         -750.6         -25.9         -13.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Jan   | -169.8  |        | -71.6  |        |         |        | -24.8  | -219.1   | -134.0 | -20.1 | -61.8  | -37.2  | -13.7 | 7.6     | 9.5     | 44.4     | -1367.7 |
| -217.0         -206.5         -36.4         -77.2         -18.5         -8.2         -16.2         -222.5         -296.4         -25.3         -144.4         -147.4         -77.2           -27.1         -0.1         -16.6         -43.5         -8.3         -2.9         -5.4         -168.4         -89.2         -20.9         -54.7         -82.8         -8.8           44.8         69.9         9.3         -26.5         -3.1         -0.5         -36.7         -24.9         -42.2         -34.9         -62.5         -2.0           -275.5         -271.1         150.7         -799.2         66.9         -79.6         -161.5         -13103.1         -423.6         -66.4         -750.6         -255.9         -13.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Feb   | -216.8  |        | 6.73-  |        |         |        | -27.3  | -196.3   | -247.2 | -22.9 | -113.9 | -103.0 | 0.2   | -3.8    | 3.9     | 20.7     | -1544.4 |
| -27.1         -0.1         -16.6         -43.5         -8.3         -2.9         -5.4         -168.4         -89.2         -20.9         -54.7         -82.8         -8.8           44.8         69.9         9.3         -26.5         -3.1         -0.5         -0.6         -386.7         -24.9         -42.2         -34.9         -62.5         -2.0           -275.5         -275.1         150.7         -799.2         66.9         -79.6         -161.5         -13103.1         -423.6         -66.4         -750.6         -225.9         -13.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Mar   | -217.0  |        | -36.4  |        |         | -8.2   | -16.2  | -222.5   |        | -25.3 | -144.4 | -147.4 | -7.2  | _       | 4.1     | 24.7     | -1407.8 |
| 44.8         69.9         9.3         -26.5         -3.1         -0.5         -0.6         -386.7         -24.9         -42.2         -34.9         -62.5         -2.0           -275.5         -275.5         -271.1         150.7         -799.2         66.9         -79.6         -161.5         -13103.1         -423.6         -66.4         -750.6         -225.9         -13.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Apr   | -27.1   | -0.1   | -16.6  |        |         | -2.9   | -5.4   | -168.4   |        | -20.9 | -54.7  | -82.8  |       | -3.9    | 4.5     | 20.\$    | -507.5  |
| -275.5 -271.1 150.7 -799.2 66.9 -79.6 -161.5 -13103.1 -423.6 -66.4 -750.6 -225.9 -13.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | May   | 44.8    |        | 9.3    | -26.5  |         | -0.5   | 9.0-   | -386.7   |        | -42.2 | -34.9  | -62.5  | -2.0  | 4.8     | 2.8     | 10.4     | -441.9  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Total | -275.5  |        | 150.7  |        |         | 9.6/-  | -161.5 | -13103.1 | -423.6 | -66.4 | -750.6 | -225.9 | -13.7 | 9.98    | 222.2   | 1203.1   | -14441  |

Table 4.10.17(b): Cauvery Basin-Sub-basinwise Monthly Water Balance (surplus or deficit) for 75% Water Year Dependable Flow, With Ground Water

Sub-basinwise Monthly surplus or deficit.

| Month | Ho Can  | Kahini | Shime     | Arkay       | Mid Ca | Surrar  | Palar | Chinn   | Bhava   | Nowi  | Amara          | Third: | Ponns | ThCol | 1. Cole | Cau Del. | Total   |
|-------|---------|--------|-----------|-------------|--------|---------|-------|---------|---------|-------|----------------|--------|-------|-------|---------|----------|---------|
|       | , L.    |        | Civiliano | - Christian |        | 200.440 |       | Cuttur. | Cine of |       | California de. | 1      | 1000  | 100   |         |          |         |
| Jun   | -238.6  | 284.7  | 8.0       | -27.6       | -2.4   | 4.0     | 1.6   | 460.2   | -104.7  | -42.1 | -112.7         | -32.5  | 2.0   | 0.6   | 5.3     | 22.0     | -691.1  |
| Jul   | 1328.4  | 330,2  | 16.7      | -60.1       | 11.3   | -5.0    | -3.1  | -156.7  | 86.5    | -26.4 | -68.5          | -26.4  | 4.3   | -12.4 | 46.5    | 221.5    | 1687.0  |
| Aug   | 873.5   | 352.6  | 21.4      | -70.9       | 39.7   | -5.9    | 4.0   | -170.1  | -36.7   | -23.2 | 46.5           | 39.9   | 2.3   | -0.5  | 67.4    | 319.9    | 1287.1  |
| Sep   | 431.1   | -25.1  | 93.2      | 5.1         | 75.6   | 3.1     | 9'01  | -3203.5 | 4.7     | -9.5  | 15.2           | -28.8  | 21.0  | 41.8  | 74.3    | 352.2    | -3001.1 |
| ્લ    | -618.0  | 258.2  | 309.0     | 16.7        | 68.5   | 7.3     | 4.3   | 4322.6  | 179.8   | 9.901 | 130.1          | 293.1  | 39.0  | 63.5  | 41.6    | 193.9    | -3229.0 |
| Nov   | 1.91.   | 42.7   | 128.2     | 44.5        | 67.2   | 6.5     | -6.5  | -2940.8 | 231.9   | 53.7  | 193.8          | 137.2  | 8.29  | 148.1 | 35.5    | 164.8    | -1730.6 |
| Dec   | -82.3   | -211.9 | 28.3      | -129.8      | 17.0   | 4.2     | -7.0  | -656.2  | 104.8   | 24.4  | 163.2          | 7.1.7  | 30.9  | 79.0  | 37.1    | 173.0    | -362.1  |
| Jan   | -149.9  | -423.7 | 20.2      | -149.2      | 2.8    | -6.1    | -101  | -219.1  | -117.4  | -17.9 | -43.7          | -26.3  | 11.9  | 14.0  | 11.5    | 51.3     | -1051.7 |
| Feb   | 8.191.8 | -385.1 | 14.4      | -100.7      | 0.1    | -5.3    | -11.8 | -196.3  | -222.9  | -20.0 | -87.0          | -57.4  | 5.8   | 3.6   | 7.4     | 32.7     | -1214.5 |
| Mar   | -192.9  | -182.4 | 2.7       | 6'69-       | -2.5   | -3.9    | .7.0  | -222.5  | -269.3  | -22.2 | -113.4         | 7.67-  | 4.0   | -2.2  | 9.5     | 42.9     | -1108.7 |
| Apr   | -23.0   | 9.6    | -1.4      | -40.1       | -2.7   | -1.7    | -2.9  | -168.4  | -79.3   | -18.5 | -43.5          | -48.1  | 0.4   | -0.7  | 0.9     | 25.5     | -392.7  |
| May   | 44.8    | 72.5   | 16.1      | -24.6       | -2.1   | -0.2    | 0.2   | -386.7  | -18.2   | -36.0 | -23.8          | -38.6  | 4.3   | 5.4   | 3.1     | 11.4     | -372.5  |
| Total | 303.0   | 115,3  | 656.7     | -695.7      | 272.5  | -15.7   | -21.8 | -13103  | -235.9  | -31.2 | -442.6         | 124.2  | 193.7 | 339.2 | 342.8   | 1611.2   | .10587  |

Table 4.10.17(c): Cauvery Basin-Sub-basinwise Monthly Water Balance (surplus or deficit) for 90% Water Year Dependable Flow, Without Ground Water

Sub-basinwise Monthly surplus or deficit.

| -60.12         124.43         -3.01         -2.20         -2.92         2.90         -35.25         -11.54           -40.05         -115.47         -37.19         -31.73         0.02         -19.28         -37.27         -124.16         -179.61           -341.94         -83.38         -39.34         -41.34         8.43         -18.15         -29.63         -131.97         -91.56           -255.04         -161.60         30.85         -152.09         19.23         -12.96         -19.02         -2399.1         -31.01           -171.40         257.47         237.62         -138.94         17.77         -0.48         -0.49         -3228.5         44.94           -165.97         -3.14         65.98         -70.38         17.27         -3.26         -13.78         -2203.2         45.14           -94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -26.33         -56.72         45.14           -122.16         -239.02         -55.79         -26.85         -2.491         -3.44         -2.13         -13.56         -17.23         -9.54           -122.16         -39.05         -35.79         -26.85         -2.491         -3.43         -8.27 </th <th>Month Up.Cau.</th> <th>Kabini</th> <th>Shirns.</th> <th>Arkav.</th> <th>Mid.Ca.</th> <th>Suvar.</th> <th>Palar</th> <th>Chinn.</th> <th>Bhava.</th> <th>Noyil</th> <th>Annara.</th> <th>Thiru.</th> <th>Ponna</th> <th>Up.Col.</th> <th>L.Cole.</th> <th>Cau.Del.</th> <th>Total</th>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Month Up.Cau. | Kabini  | Shirns. | Arkav.  | Mid.Ca. | Suvar. | Palar   | Chinn.  | Bhava.  | Noyil  | Annara. | Thiru. | Ponna  | Up.Col. | L.Cole. | Cau.Del. | Total    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|---------|---------|---------|---------|--------|---------|---------|---------|--------|---------|--------|--------|---------|---------|----------|----------|
| -40.05         -115.47         -37.19         -31.73         0.02         -19.28         -37.27         -124.16         -179.61           -341.94         -83.38         -39.34         -41.34         8.43         -18.15         -29.63         -131.97         -91.56           -255.04         -161.60         30.85         -152.09         19.23         -12.96         -19.02         -23.99.1         -33.01           -171.40         257.47         237.62         -138.94         17.73         -0.48         -0.49         -328.5         44.94           -165.97         -3.14         65.98         -70.38         17.27         -3.26         -13.78         -20.32         43.97           -45.15         -166.18         -42.21         -41.15         2.23         -10.27         -20.33         -506.72         45.14           -94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -25.67         -172.38         -9.54           -122.16         -239.02         -55.79         -26.85         -2.491         -3.43         -8.27         -16.53         -9.54           -122.16         -33.04         -3.343         -16.88         -3.491         -3.43         -8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | -60.12        | 124.43  | -3.01   | -32.01  | -2.98   | -2.22  | 2.90    | -355.25 | -111.54 | -49.77 | -157.5  | -51.66 | -13.1  | 4.23    | 2.16    | 4.68     | -709.17  |
| -341.94         -83.38         -39.34         -41.34         8.43         -18.15         -29.63         -131.97         -91.56           -255.04         -161.60         30.85         -152.09         19.23         -12.96         -19.02         -239.1         -33.01           -171.40         257.47         237.62         -138.94         17.73         -0.48         -0.49         -3228.5         44.94           -155.97         -3.14         65.98         -70.38         17.27         -3.26         -13.78         -2203.2         43.97           -45.15         -166.18         -42.21         -41.15         2.23         -10.27         -20.33         -506.72         45.14           -94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -256.72         -57.9           -122.16         -239.02         -55.79         -26.85         -2.69         -13.00         -27.87         -165.32         -9.54           -122.16         -33.43         -16.85         -24.91         -3.43         -8.27         -16.68         -182.1         -35.30         -173.38           -259.58         31.32         -16.85         -24.91         -2.94         -1.75         -16.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 40.05         |         | -37.19  | -31.73  | 0.02    | -19.28 | -37.27  | -124.16 | -179.61 | -30.76 | -208.3  | 40.99  | -19.2  | -76.14  | 15.52   | 98.94    | -845.71  |
| -255.04         -161.60         30.85         -152.09         19.23         -12.96         -19.02         -2399.1         -33.01           -171.40         257.47         237.62         -138.94         17.73         -0.48         -0.49         -328.5         44.94           -151.40         257.47         237.62         -138.94         17.77         -0.48         -0.49         -328.5         44.94           -45.15         -166.18         -42.21         -41.15         2.23         -10.27         -20.33         -506.72         45.14           -94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -25.67         -172.58         -9.54           -122.16         -239.02         -55.79         -26.85         -2.69         -13.00         -27.87         -165.32         -95.23           -122.16         -35.79         -26.85         -2.69         -13.00         -27.87         -165.32         -95.23           -122.58         33.43         -16.85         -24.91         -3.43         -8.27         -16.68         -183.67         -172.38           -13.22         -13.36         -3.15         -3.29         -1.75         -143.32         -48.21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -341.94       | -83.38  | -39.34  | -41.34  | 8.43    | -18.15 | -29.63  | -131.97 | -91.56  | -26.54 | -148.9  | -65.16 | -12.0  | -71.20  | 29.77   | 152.79   | -910.15  |
| -171.40         257.47         237.62         -138.94         17.73         -0.48         -0.49         -3228.5         44.94           165.97         -3.14         65.98         -70.38         17.27         -3.26         -13.78         -2203.2         43.97           -45.15         -10.27         -20.33         -506.72         45.14           -94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -25.67         -17.58         -9.54           -122.16         -239.02         -55.79         -26.85         -2.69         -13.00         -27.87         -165.32         -95.23           -128.36         -84.99         -35.26         -24.91         -3.43         -82.77         -16.68         -188.67         -172.38           -229.58         33.43         -16.85         -24.91         -3.29         -5.50         -143.32         -48.21           -31.32         133.96         -4.51         -2.94         -1.75         -1.15         -304.84         -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | -255.04       | -161.60 | 30.85   | -152.09 | 19.23   | -12.96 | -19.02  | -2399.1 | -33.01  | -11.50 | -34.98  | -61.49 | 5.28   | -35.69  | 35.36   | 171.57   | -2914.19 |
| 165.97         -3.14         65.98         -70.38         17.27         -3.26         -13.78         -2203.2         43.97           -45.15         -166.18         -42.21         -41.15         2.23         -10.27         -20.33         -506.72         45.14           -94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -25.67         -17.58         -9.54           -122.16         -239.02         -55.79         -26.85         -2.69         -13.00         -27.87         -16.53         -95.23           -128.36         -84.99         -35.26         -24.91         -3.43         -8.27         -16.68         -188.67         -17.38           229.58         33.43         -16.85         -23.06         -3.15         -3.23         -5.50         -143.32         -48.21           311.32         133.96         -4.51         -2.94         -1.75         -1.15         -304.84         -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -171.40       | 257.47  | 237.62  | -138.94 | 17.73   | -0.48  | -0.49   | -3228.5 | 44.94   | 100.16 | 41.00   | 254.53 | . 4.01 | 29.54   | 24.47   | 96.14    | -2432.20 |
| -45.15         -166.18         -42.21         -41.15         2.23         -10.27         -20.33         -506.72         45.14           -94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -25.67         -172.8         -9.54           -122.16         -239.02         -55.79         -26.85         -2.69         -13.00         -27.87         -165.32         -95.23           -128.36         -84.99         -35.26         -24.91         -3.43         -82.7         -16.68         -188.67         -173.38           229.58         33.43         -16.85         -23.06         -3.15         -3.23         -5.50         -143.32         -48.21           311.32         133.96         4.51         -2.94         -1.75         -1.15         -304.84         -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 165.97        | -3.14   | 65.98   | -70.38  | 17.27   | -3.26  | -13.78  | -2203.2 | 43.97   | 50.01  | 147.29  | 100.69 | 33.06  | 06.90   | 20.61   | 80.77    | -1468.23 |
| .94.52         -262.22         -68.96         -34.47         -2.13         -14.55         -2.567         -172.88         -9.54           -122.16         -239.02         -55.79         -26.85         -2.69         -13.00         -27.87         -165.32         -95.23           -128.36         -84.99         -35.26         -24.91         -3.43         -82.77         -16.68         -188.67         -173.38           229.58         33.43         -16.85         -23.06         -3.15         -3.23         -5.50         -143.32         -48.21           311.32         133.96         -4.51         -2.94         -1.75         -1.15         -304.84         -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 45.15         | -166.18 | 42.21   | -41.15  | 2.23    | -10.27 | -20.33  | -506.72 | 45.14   | 21.25  | 11.47   | 46.31  | -5.87  | 48.24   | 22.88   | 86.25    | -554,10  |
| -122.16         -239.02         -55.79         -26.85         -2.69         -13.00         -27.87         -165.32         -95.23           -128.36         -84.99         -35.26         -24.91         -3.43         -8.27         -16.68         -188.67         -172.38           229.58         33.43         -16.85         -24.91         -3.43         -8.27         -16.68         -183.67         -172.38           311.32         133.96         -4.51         -29.41         -2.94         -1.75         -1.15         -304.84         -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -94.52        | -262.22 | -68.96  | -34.47  | -2.13   | -14.55 | -25.67  | -172.58 | -9.54   | -20.10 | -79.57  | -37.17 | -15.2  | 5.45    | 6.49    | 20.63    | -804.15  |
| 128.36       -84.99       -35.26       -24.91       -3.43       -8.27       -16.68       -188.67       -172.38         229.58       33.43       -16.85       -23.06       -3.15       -3.23       -5.50       -143.32       -48.21         311.32       133.96       4.51       -29.11       -2.94       -1.75       -1.15       -304.84       -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -122.16       | -239.02 | -55.79  | -26.85  | -2,69   | -13.00 | -27.87  | -165.32 | -95.23  | -22.89 | -178.9  | -103.0 | -1.19  | -6.44   | 2.49    | 62.6     | -1048.04 |
| 229.58         33.43         -16.85         -23.06         -3.15         -3.23         -5.50         -143.32         -48.21           311.32         133.96         4.51         -29.11         -2.94         -1.75         -1.15         -304.84         -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | .128.36       | -84.99  | -35.26  | -24.91  | -3.43   | -8.27  | -16.68  | -188.67 | -172.38 | -25.34 | -205.1  | -147.3 | -8.07  | -15.60  | 2.76    | 13.63    | -1047.92 |
| 311.32 133.96 4.51 -29.11 -2.94 -1.75 -1.15 -304.84 -3.63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 229.58        | 33.43   | -16.85  | -23.06  | -3.15   | -3.23  | -5.50   | -143.32 | -48.21  | -20.90 | 49.03   | -82.74 | -9.21  | -5.00   | 2.80    | 6.74     | -137.66  |
| CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT 400 CT | 311.32        | 133.96  | 4.51    | -29.11  | -2.94   | -1.75  | -1.15   | -304.84 | -3.63   | -42.01 | 22.68   | -62.52 | -3.17  | 2.81    | 1.43    | 15.0-    | 25.08    |
| -863.02 37.79 -883.19 12.43 -108.4 -194.49 -13183 -829.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | -551.86       | -863.02 | 37.79   | -883.19 | 12.43   | -108.4 | -194.49 | -13183  | -829.10 | -78.40 | -839.9  | -250.5 | 44.7   | -28.36  | 166.72  | 741.43   | -16896.7 |

Table 4.10.17(d): Cauvery Basin-Sub-basinwise Monthly Water Balance (surplus or deficit) for 90% Water Year Dependable Flow, With Ground Water

Sub-basinwise Monthly surplus or deficit.

|   | Kabini  | Shims. | Arkav.  | Mid.Ca. | Suvar. | Palar  | Chinn.  | Bhava.  | Noyil  | Amara. | Thiru. | Роппа. | Up.Col. | L.Cole. | Caut.Del. | Total    |
|---|---------|--------|---------|---------|--------|--------|---------|---------|--------|--------|--------|--------|---------|---------|-----------|----------|
| - | 132.43  | 6.73   | -30.60  | 16:0-   | -1.57  | 4,47   | -342.28 | -88.14  | -41.35 | -121.2 | -32.51 | 1.60   | -0.84   | 3.78    | 7.69      | -517.04  |
| l | 45.80   | 27.11  | -62.30  | 38.96   | -7.21  | -9.64  | -117.26 | -148.11 | -26.32 | 0.091- | -26.52 | 3.91   | -19.43  | 42.59   | 149.37    | -294.03  |
|   | -15.22  | 32.77  | -74.99  | 44.26   | -7.06; | 4.24   | -127.25 | -62.87  | -23.13 | 6'901- | -39.86 | 1.84   | -10.51  | 58.74   | 206.76    | -361.94  |
|   | -107.21 | 85.83  | -23.99  | 47.99   | -3.93  | 1.57   | -2382.5 | -20.25  | -9.85  | -13.31 | -29.49 | 17.41  | 23.64   | 63.68   | 224.32    | -2275.65 |
|   | 263.51  | 246.28 | 89.6-   | 20.32   | 0.32   | 2.01   | -3214.9 | 45.93   | 100.39 | 43.29  | 280.12 | 33.20  | 47.32   | 32.96   | 111.95    | -2053.19 |
|   | 14.85   | 111.35 | -55.36  | 25.98   | -0.58  | -6.63  | -2187.1 | 44.89   | 50.30  | 148.88 | 130.17 | 57.07  | 115.5   | 28.08   | 94.68     | -1254.13 |
|   | .130.61 | 40.92  | -132.72 | 20.22   | -4.54  | -8.26  | 487.77  | 49.95   | 22.16  | 20.00  | 67.47  | 26.61  | 60.56   | 28.76   | 97.20     | -358.33  |
|   | -210.71 | 41.11  | -150.31 | 23.57   | -6.09  | -11.04 | -163.23 | 7.03    | -17.78 | -58.13 | -26,28 | 10.43  | 9.72    | 8.53    | 24.43     | -593.41  |
| t | -192,16 | 31.03  | -101.43 | 20.59   | -5.43  | -12.40 | .145.93 | 86.07-  | -19.87 | -147.0 | -57.43 | 4.39   | 1.01    | 6.05    | 16.42     | -770.31  |
| 1 | -60.64  | 11.61  | -70.50  | 12.74   | -3.92  | -7.45  | -165.00 | -145.23 | -22.00 | -168.4 | .79.73 | 3.11   | 4.35    | 8.14    | 23.64     | -772.25  |
| i | 39.15   | 1.32   | -40.92  | 2.48    | -2.09  | -2.91  | -125.10 | -38.34  | -18.36 | -35.68 | 48.13  | 0.03   | -1.86   | 4.30    | 9.53      | -22.84   |
|   | 136.54  | 12.72  | -26.86  | -1.90   | -1.42  | -0.37  | -287.70 | 3.02    | -37.71 | 35.87  | -38.58 | 3.09   | 3.42    | 1.72    | 0.03      | 113.20   |
| i | -476.37 | 646.06 | 69.61   | 219.15  | -44.52 | -54.79 | -13005  | -641.57 | 43.52  | -531.6 | 99.24  | 162.7  | 224.2   | 287.32  | 966.03    | -13217.4 |

Table 4.10.17(e): Cauvery Basin-Sub-basinwise Monthly Water Balance (surplus or deficit) for 100% Water Year Dependable Flow, Without Ground Water

Sub-basinivise Monthly surplus or deficit.

|       | Up Cau. | Nabini  | Shims.  | Arkav.  | Mid.Ca. | Suvar. | Palar   | Chira.  | Bhava.  | Noyil  | Amara. | Thiru. | Розпи. | Up.Col. | L.Cole. | Cau.Del. | Total    |
|-------|---------|---------|---------|---------|---------|--------|---------|---------|---------|--------|--------|--------|--------|---------|---------|----------|----------|
| Jun   | -83.48  | 10.28   | -7.62   | -26.88  | -3.07   | -2.63  | -2.17   | -168.06 | -120.69 | 49.79  | -166.4 | -51 76 | -14.3  | -7.74   | -0.46   | -5.42    | -700.11  |
| Jul   | -95.77  | -172.78 | -40.07  | -27.92  | -1.64   | -20.09 | 47.94   | -65.74  | -148.77 | -30.82 | -184.4 | 41.29  | -20.4  | -93.44  | 89.8    | 72.45    | 06.606-  |
| Aug   | -396.86 | -170.23 | -42.99  | -34.32  | 4.10    | -18.59 | 43.02   | -63.62  | -171.34 | -26.54 | -144.3 | -65.16 | -13.6  | -95.77  | 14,49   | 93.70    | -1174.00 |
| Sep   | -276.52 | -174.77 | 4.28    | -101.55 | 11.54   | -15.48 | -33.79  | -960.76 | -54.01  | -11.82 | -59.49 | -63.04 | -5.95  | -80,26  | 19'91   | 00.06    | -1706.02 |
| Oct   | -381.83 | 55.33   | 142.20  | -93.08  | 06'01   | -2.98  | 4.29    | -1272.3 | 54.29   | 93.94  | 33.15  | 223.93 | -13.9  | -10.02  | 9.22    | 34.12    | .1121.31 |
| Nov   | 33.12   | 40.77   | 28.09   | -51.60  | 10.52   | -5.79  | -13.91  | -884.49 | 6.10    | 46.64  | 12.73  | 84.11  | -0.12  | 20.03   | 191     | 30.47    | -635.72  |
| Dec   | -92.91  | -172.39 | -47.01  | -36.06  | 0.18    | -10.41 | -22.32  | -240.05 | 16.67   | 19.24  | -7.95  | 36.43  | -19.1  | 3,21    | 8.19    | 29.03    | 472.76   |
| Jan   | -107.76 | -261.15 | -69.10  | -32.46  | -2.89   | -14.57 | -27.15  | -89.92  | -92.03  | -20.10 | -93.39 | -37.17 | 6.61-  | 4.96    | 1.24    | 0.30     | -871.00  |
| Feb   | -83.64  | -240.86 | -55.83  | -25.55  | -3.13   | -13.05 | -28.76  | -109.68 | -142.24 | -22.89 | -176.2 | -103.0 | -5.48  | -12.81  | 80.0    | 0.47     | -1022.52 |
| Mar   | -128.79 | -111.89 | -35.33  | -23.93  | -3.63   | -8.30  | -17.48  | -128.66 | -167.30 | -25.34 | -178.7 | -147.3 | -10.9  | -20.75  | 0.33    | 4,17     | -1003.71 |
| Apr   | 63.81   | 6.62    | -17.93  | -21.62  | -3,24   | -3.36  | -5.59   | 18'86-  | 13.97   | -20.90 | -1.53  | -82.74 | -10.4  | .7.78   | -0.22   | 4.96     | -194.78  |
| May   | 153.72  | 98.65   | -2.75   | -25.14  | -3.06   | -2.18  | -2.07   | -158.19 | -27.18  | -42.01 | -36.90 | -62.52 | -6.83  | -2.07   | -1.00   | -9.90    | -129.41  |
| Total | -1398.8 | -1910.4 | -151.19 | -963.19 | -73.57  | -118.4 | -248.48 | -13326  | -1124.1 | -90.40 | +1004  | -309.5 | -141   | -312.4  | 64.75   | 343.43   | -20763,0 |

Table 4.10.17(f): Cauvery Basin-Sub-basinwise Monthly Water Balance (surplus or deficit) for 100% Water Year Dependable Flow, With Ground Water

With Ground Water
Sub-basinwise Monthly surplus or deficit.

| Month | Up.Cau. | Kabini  | Shims. | Arkav.  | Mid.Ca. | Suvar. | Palar   | Chinn.  | Bhava.  | Noyil  | Aunara. | Thiru. | Ponna. | Up.Col. | L.Cole. | Cau.Del. | Total    |
|-------|---------|---------|--------|---------|---------|--------|---------|---------|---------|--------|---------|--------|--------|---------|---------|----------|----------|
| Jun   | -37.75  | 18.29   | 0.57   | -33.41  | •1.00   | -1.98  | 09.0-   | -155.09 | -97.29  | 41.37  | -190.2  | -32.61 | 0.43   | 4.35    | 1.16    | 0.05     | -575.09  |
| Jul   | 10.93   | -103.11 | 13.67  | -64.39  | 37.29   | -8.02  | -20.31  | -58.84  | -117.28 | -26.38 | -185.9  | -26.82 | 2.74   | -36.73  | 35.75   | 164.08   | -333.25  |
| Aug   | -289.16 | -102.07 | 17.29  | -78.84  | 39.92   | -7.50  | -17.63  | -58,90  | -142.66 | -23.13 | 107.7   | -38.86 | 0.29   | -35.08  | 43.47   | 191.75   | -609.83  |
| Sep   | -171.06 | -120.38 | \$0.50 | .51.71  | 40.31   | -6.45  | -13.20  | -944.16 | 41.25   | -10.17 | -10.26  | +31.04 | 6.18   | -20.93  | 44.93   | 194.85   | -1033.84 |
| Ş     | -266.63 | 61.37   | 150.51 | -34.83  | 13.49   | -2.18  | -1.79   | -1258.7 | 55.27   | 94.17  | 48.74   | 249.52 | 15.34  | 7.76    | 17.71   | 62.85    | -787.45  |
| Nov   | 40.86   | 58.76   | 66.41  | -65.66  | 19.24   | -3.11  | 92.9    | -868.40 | 7.03    | 46.93  | 38.29   | 113.59 | 23.89  | 35.68   | 15.08   | 55.75    | 422.41   |
| Dec   | :76.05  | -136.83 | 22.48  | -135.51 | 18.17   | 4.68   | -10.25  | -221.09 | 84.52   | 20.15  | -17.16  | 57.59  | 13.34  | 15.53   | 14.07   | 48.92    | -306,79  |
| Jan   | -87.89  | -209.63 | 22.83  | -151.41 | 22.81   | -6.11  | -12.52  | -80.57  | .75.46  | -17.78 | -56.20  | -26.28 | 5.77   | 69.0    | 3.28    | 7.20     | -662.64  |
| Feb   | -58.65  | -194.00 | 16.69  | -102.14 | 20.15   | -5.48  | -13.29  | -90.29  | -118.00 | -19.87 | -117.8  | -57.43 | 01.0   | -5.36   | 3.64    | 12.51    | -729.22  |
| Mar   | -104.68 | -87.53  | 3.82   | -71.04  | 12.55   | -3.95  | -8.25   | -104.99 | -140.16 | -22.00 | -166.5  | -79.73 | 0.31   | -9.50   | 5.70    | 22.36    | -753.62  |
| Apr   | 67.94   | 12.34   | -2.74  | 41.71   | 2.39    | -2.22  | -3.00   | -80.59  | 23.85   | -18.36 | -36.81  | -48.13 | -1.14  | -4.64   | 1.28    | 0.11     | -131.41  |
| May   | 153.72  | 101.24  | 4.19   | -29.04  | -2.02   | -1.85  | -1.29   | -141.05 | -20.53  | -37.71 | 11.65   | -38.58 | -0.57  | -1.46   | 0.71    | -8.91    | .12.91   |
| Total | -1917.7 | -1523.8 | 358.97 | -859.69 | 133.15  | -54.52 | -108.78 | -13148  | -936.57 | -55.52 | -695.6  | 40.24  | 69.99  | -59.76  | 185.35  | 751.53   | -17824.5 |

Table 4.11.1(a): Abstract : Cauvery Basin-Sub-basinwise Water Balance for 75% Water Year Dependable Flow, Without Ground Water Unit : MCM

|                                                |                           |            |                                       |       |                    | Water Utilisation                    | sation      |          |               |             |                                      |       |              | T.                               | Water Availability | ility  |         |           |         |
|------------------------------------------------|---------------------------|------------|---------------------------------------|-------|--------------------|--------------------------------------|-------------|----------|---------------|-------------|--------------------------------------|-------|--------------|----------------------------------|--------------------|--------|---------|-----------|---------|
| Name of                                        |                           |            |                                       | Wat   | Water requirements | ments                                |             |          |               |             | Gross                                |       | . =          | Regeneration from uses           | r from uses        |        | Surface | Gross     | Maler   |
| Sub-basin                                      | Utilisation               | under irr  | Utilisation under irrigation projects | yects | Dome-              | -snpul                               | Hydro-      | Environ- | 1040          | Export      | leioi                                | Impon | Imiga-       | Dome-                            | -sapul             | 100    | water   | water     | balance |
|                                                | Proposed Existing Ongoing | visting O  | ngoing                                | Total | stic               | trial                                | power       | mental   | Inor          |             | utilisation                          |       | tion         | stic                             | trial              | a Dead | yields  | available |         |
| ε                                              | (2)                       | <u> </u>   | €                                     | 3     | (9)                | (2)                                  | (8)         | (6)      | (10)          | (E)         | (13)                                 | (13)  | (14)         | (51)                             | (91)               | (L)    | (18)    | (61)      | (30)    |
| Upper Cauvery                                  | 463                       | 6341       | 1011                                  | 3053  | 233                | 321                                  | 0           | Z        | 3661          | 3640        | 1059                                 | 0     | 189          | 186                              | 157                | 632    | 5394    | 9709      | -274    |
| Kabini                                         | 1035                      | 188        | 877                                   | 2573  | 225                | 280                                  | 6           | w.       | 3124          | 1795        | 4919                                 | 359   | 247          | 180                              | 224                | 159    | 3641    | 4651      | .268    |
| Shimsha                                        | 263                       | 1830       | 1056                                  | 3151  | 259                | 348                                  | 0           | 9        | 3764          | 15          | 3779                                 | 2490  | 335          | 207                              | 278                | 821    | 619     | 3930      | 151     |
| Arkavathi                                      | 196                       | -181       | 122                                   | 196+  | 479                | \$58                                 | 0           |          | 1536          | 810         | 2347                                 | 60#   | 21           | 383                              | 447                | 851    | 287     | 1547      | 799     |
| Middle Cauvery                                 | 205                       | 260        | 205                                   | 1780  | 83                 | 109                                  | 0           | 8        | 1985          | 211         | 2196                                 | 1587  | 193          | 99                               | 87                 | 347    | 330     | 2264      | 67      |
| Suvarnavathi                                   | 3021                      | 136        | 203                                   | 640   | 35                 | 63                                   | 0           | 0        | 739           | 0           | 439                                  | 492   | 50           | 100                              | 50                 | 128    | 38      | 658       | -80     |
| Palar                                          | 220                       |            | 35                                    | 268   | Ξ                  | #                                    | 0           |          | 323           | Φ           | 323                                  | 0     | 13           | 6                                | 35                 | 57     | 105     | 162       | .161    |
| Chinnar                                        | 534                       | 148        | 0                                     | 682   | 87                 | 123                                  | 0           |          | 968           | 12712       | 13608                                | 0     | 25           | 70                               | 98                 | 193    | 312     | 505       | -13103  |
| Bhavani                                        | 170                       | 1033       | 126                                   | 1330  | 179                | 229                                  | 35          | 19       | 1792          | 1036        | 2828                                 | 12    | 147          | 143                              | 183                | 474    | 1917    | 2403      | 425     |
| Novil                                          | 871                       | 7.7        | 200                                   | 71.5  | 210                | 252                                  |             | 2        | 0911          | 0           | 1160                                 | 446   | 53           | 168                              | 202                | 423    | 225     | 1094      | 99      |
| Amaravathi                                     | 673                       | 1420       | 유                                     | 2133  | 230                |                                      |             | 6        | 2678          | 0           | 2678                                 | 475   | 130          | 184                              | 244                | 558    | 898     | 1931      | 7+7     |
| Trumanimuttar                                  | 422                       | 2307       | 0                                     | 2728  | 412                |                                      | 0           | 9        | 3677          | 0           | 3673                                 | 1769  | 276          | 330                              | 424                | 1030   | 649     | 3-1-18    | -126    |
| Ponnanai Ar                                    | 33.1                      | 8          | 0                                     | 693   | 126                | 155                                  | 0           | 2        | 116           | 0           | 1.1.6                                | 494   | 80           | 101                              | 124                | 305    | 161     | 963       | 4[-     |
| Upper Colerron                                 | 1772                      | 822        | ō                                     | 1099  | 110                | 蓝                                    | 0           | 9        | 1349          | 0           | 1349                                 | 582   | 69           | 00                               | 107                | 264    | 589     | 1435      | 87      |
| Lower Coleroon                                 | 0                         | 1136       | 0                                     | 1136  | 2                  | 83                                   | 0           | 2        | 1291          | 0           | 1291                                 | 1077  | 06           | 99                               | 99                 | 212    | 224     | 1513      | 222     |
| Cauvery Delta                                  | 0                         | 2075       | 0                                     | 5075  | 389                | 194                                  | 0           | Ξ        | 9836          | 0           | 9666                                 | 8684  | 724          | 311                              | 369                | 1404   | 1051    | 11139     | 1203    |
| Total                                          | 4941                      | 22254      | 4369                                  | 31562 | 3138               | 3996                                 | 45          | 165      | 38887         | 19219       | 58102                                | 18849 | 2642         | 2510                             | 3197               | 83-19  | 16470   | 43669     | -14434  |
| Note : Column no. 10 = Column no. (5+6+7+8+9). | .10 = Column              | 1 no.(5+6- | -7+8+9).                              | Colun | nn No. 12          | Column No. 12 = Column no. (10 + 11) | no. (10 + 1 |          | lumn ñō. 19 ։ | = Column oc | Johnny 86, 19 = Column 66 (13+17+18) |       | 1 no.20 = Cc | Column no.20 = Column no.(19-12) | 3-12)              |        |         |           |         |

Table 4.11.1(b): Abstract : Cauvery Basin-Sub-basinwise Water Balance for 75% Water Year Dependable Flow, With Ground Water

| 7.40-11-11-1       | Monthly                | halance                               |                           | (21) | 286           | 108    | 040      | £1 <i>L</i> - | 269            | -22          | .28   | -12932 | -247    | 40   | 454        | 101            | 188         | 334            | 340            | 1413                  | -10756 |        |
|--------------------|------------------------|---------------------------------------|---------------------------|------|---------------|--------|----------|---------------|----------------|--------------|-------|--------|---------|------|------------|----------------|-------------|----------------|----------------|-----------------------|--------|--------|
|                    | Gross                  | water                                 | available                 | (30) | 6675          | 5081   | 4507     | 1715          | 2490           | 745          | 328   | 111    | 2630    | 1181 | 2299       | 3892           | 1193        | 1707           | 1191           | 11431                 | 48221  |        |
|                    | Ground                 | Water                                 | yields                    | (61) | 579           | 386    | 905      | 101           | 206            | 64           | 140   | 178    | 188     | ス    | 308        | 350            | 207         | 253            | 121            | 225                   | 3866   |        |
|                    | Surface                | water                                 | yields                    | (81) | 5394          | 3641   | 619      | 287           | 330            | 38           | 105   | 312    | 1917    | 225  | 868        | 649            | 161         | 685            | 224            | 1051                  | 16:170 |        |
| ability            |                        | Total                                 | 1 000                     | (L1) | 703           | 869    | 268      | 516           | 367            | 151          | 83    | 222    | 513     | 456  | 819        | 1124           | 328         | 283            | 223            | 1462                  | 9036   |        |
| Water Availability | from uses              | Indus-                                | trial                     | (16) | 257           | 224    | 278      | 447           | 87             | 90           | 35    | 86     | 183     | 202  | 244        | 424            | 124         | 107            | 8              | 369                   | 3197   |        |
|                    | Regeneration from uses | Dome-                                 | stic                      | (51) | 257           | 224    | 278      | 447           | 87             | 20           | 35    | 86     | 183     | 202  | 244        | 424            | 124         | 107            | 99             | 369                   | 3197   |        |
|                    | R                      | Irriga-                               | tion                      | (14) | 189           | 247    | 335      | 21            | 193            | - 20         | 13    | ង      | 147     | 53   | 130        | 276            | 80          | 69             | 8              | 724                   | 2642   |        |
|                    |                        | Import                                |                           | (13) | 0             | 359    | 2490     | 409           | 1587           | 492          | 0     | 0      | 12      | 446  | 475        | 1769           | 191         | 582            | 1077           | 8684                  | 18819  |        |
|                    | Gross                  | total                                 | utilisation               | (12) | 6389          | 4974   | 3867     | 2427          | 2221           | 767          | 357   | 13644  | 2878    | 1221 | .2753      | 3791           | 1005        | 1373           | 1304           | 80001                 | 87685  |        |
|                    |                        | Ехроп                                 | un                        | (11) | 2640          | 1795   | 15       | 810           | 211            | 0            | 0     | 12712  | 1036    | 0    | 0          | 0              | 0           | 0              | 0              | 0                     | 19219  | <br> - |
|                    |                        |                                       | JORGI                     | (01) | 3749          | 3179   | 3852     | 1617          | 2010           | 767          | 357   | 932    | 1842    | 1221 | 2753       | 3791           | 1005        | 1373           | 1304           | 9936                  | 3968   |        |
|                    |                        | Environ-                              | mental                    | (6)  | 3             | 36     | 9        | 3             | 3              | 0            |       | 3      | 61      | 77   | ٥          | 9              | 2           | 9              | 2              | ~                     | 165    |        |
| ion                |                        | Hydro- E                              | power   r                 | (61) | 0             | 6      | 0        | 0             | 0              | 0            | 0     | 0      | 35      | 0    | -          | 0              | 0           | 0              | 0              | 0                     | 45     |        |
| Water Utilisation  | mts                    | Indus-                                | trial                     | (2)  | 321           | 280    | 348      | 559           | 109            | 63           | 4     | 123    | 229     | 252  | 305        | 530            | 155         | 75.            | 83             | -<br>-<br>-<br>-<br>- | 30%    |        |
| W                  | Water requirements     | Боше.                                 | stic                      | (9)  | 321           | 280    | 348      | 559           | 8              | 63           | 4     | 123    | 229     | 252  | Š          | 530            | 155         | 134            | 83             | 197                   | 3996   |        |
|                    | Wate                   |                                       | Total                     | 3    | 3053          | 2573   | 3150     | 496           | 1789           | 0.33         | 368   | 682    | 1330    | 715  | 2133       | 2725           | 693         | 10%            | 1136           | 57.02                 | 31557  |        |
|                    |                        | Utilisation under irrigation projects | ) going                   | €    | 1011          | 872    | 1056     | 132           | ğ              | 203          | 33    | 0      | 126     | ล    | \$         | 0              | 0           | 3              | 0              | 3                     | 4367   |        |
|                    |                        | n under ir                            | Existing C                | Ĉ    | 1489          | 989    | 1831     | 120           | 96             | 136          | 52    | 148    | 1033    | 7.7  | 57         | 1000           | 18          | 8222           | 138            | 2005                  | 22252  |        |
|                    |                        | Utilisatic                            | Proposed Existing Ongoing | 3    | 463           | 1035   | 263      | 136           | 205            | 302          | 220   | 534    | 170     | 148  | 673        | 122            | 33          | 277            | 0              | 0                     | 1941   |        |
|                    | Name of                | Sub-basin                             |                           | ε    | Upper Cauvery | Kabini | Shirpsha | Arkavathi     | Middle Cauvery | Suvernavathi | Palar | Chimar | Bhavani | Novi | Ameravathi | Tirumanimultar | Ponnanai Ar | Upper Colerron | Lower Coleroon | Cauvery Delta         | Total  |        |

Table 4.11.2(a): Abstract: Cauvery Basin-Sub-basinwise Water Balance for 50% Water Year Dependable Flow, Without Ground Water

Unit: MCM

|                                               |                           |             |                                       |       |                                     |                   |             |          | -            |           |                                     |        |            |                                  |                    |       |         |           |            |
|-----------------------------------------------|---------------------------|-------------|---------------------------------------|-------|-------------------------------------|-------------------|-------------|----------|--------------|-----------|-------------------------------------|--------|------------|----------------------------------|--------------------|-------|---------|-----------|------------|
|                                               |                           |             |                                       |       | حـ                                  | Water Utilisation | sation      |          |              |           |                                     |        |            | <u> </u>                         | Water Availability | ility |         |           | 1.60=16(1) |
| Name of                                       |                           |             |                                       | Wa    | Water requirements                  | nents             |             |          |              |           | Gross                               |        |            | Regeneration from uses           | from uses          |       | Surface | Gross     | Municip    |
| Sub-basin                                     | Utilisati                 | on under it | Utilisation under irrigation projects |       | Dome-                               | Indus-            | Hydro-      | Environ- | 1            | Export    | total                               | Import | Imiga-     | Ботс-                            | Indus-             |       | water   | waler     | halance    |
|                                               | Proposed Existing Ongoing | Existing K  | Sniogne                               | Total | Strc                                | trial             | power       | mental   | 101          |           | utilisation                         |        | tion       | stic                             | trial              | 90    | yields  | available |            |
| Ξ                                             | (3)                       | 6           | 3                                     | ઈ     | 9                                   | 8                 | æ           | (6)      | (10)         | (E)       | (12)                                | (13)   | (14)       | (3)                              | (91)               | (1)   | (18)    | (61)      | (20)       |
| Upper Cauvery                                 | 463                       | 1489        | \$:001 <b>7</b>                       | 3053  | 233                                 | 321               | 0           | 63.19    | 3670         | 3092      | 6762.43                             | 0      | 188.9      | 186.4                            | 256.8              | 632.1 | 6318.6  | 1.0569    | 188.3      |
| Kabini                                        | 1035                      | 999         | 872                                   | 2573  | 222                                 | 280               | 6           | 4        | 3131         | 1795      | 4926                                | 359    | 247        | 180                              | 224                | 651   | 4376    | 5386      | 460        |
| Shimsha                                       | 263                       | 1830        | 1056                                  | 3151  | 259                                 | 348               | 9           | 0        | 3764         | 15        | 3779                                | 2490   | 335        | 207                              | 278                | 821   | 763     | 4074      | 295        |
| Arkavathi                                     | 961                       | 181         | 122                                   | 961   | 479                                 | \$59              |             | 2        | 1536         | 810       | 2347                                | 409    | 21         | 383                              | 447                | 158   | 389     | 1649      | -697       |
| Middle Cauvery                                | 202                       | 790         | 795                                   | 067.1 | 83                                  | 1001              | 0           | 3        | 1985         | 211       | 2196                                | 1587   | 193        | 8                                | 87                 | 77    | 392     | 2326      | 129        |
| Suvarnavathi                                  | 302                       | 136         | 203                                   | 95    | 35                                  | 69                | 0           | 0        | 739          | 0         | 739                                 | 492    | \$0        | 28                               | 20                 | 128   | 56      | 715       | -23        |
| Patar                                         | 220                       | 15          | 35                                    | 268   | =                                   | \$                | 0           | -        | 323          | 0         | 323                                 | 0      | 13         | 6                                | 35                 | 57    | 171     | 228       | -95        |
| Chirnar                                       | 534                       | 148         | 0                                     | 682   | 87                                  | 123               | 0           | 3        | 968          | 15646     | 16542                               | 0      | 25         | 70                               | 86                 | 193   | 384     | 577       | -15965     |
| Bhavani                                       | 170                       | 1033        | 126                                   | 1330  | 179                                 | 229               | 35          | 19       | 1792         | 1036      | 2828                                | 12     | 147        | 143                              | 183                | 474   | 2444    | 2930      | 102        |
| Noyil                                         | 148                       | द्र         | 20                                    | 715   | 210                                 | 252               | 0           | 2        | 1160         | 0         | 0911                                | 116    | 53         | 168                              | 202                | 423   | 234     | 1103      | -57        |
| Amaravathi                                    | 673                       | 1420        | 3                                     | 2133  | 230                                 | 305               | -           | 6        | 2678         | 0         | 2678                                | 475    | 130        | 184                              | 244                | \$58  | 1108    | 2141      | -537       |
| Tinumanimuttar                                | 422                       | 2307        | ō                                     | 2728  | 412                                 | \$30              | 0           | 9        | 3677         | 0         | 3673                                | 1369   | 276        | 330                              | 424                | 0.01  | 1108    | 3907      | 233        |
| Ponnanai Ar                                   | 33                        | 188         | 0                                     | 693   | 126                                 | 155               | 0           | Ċ        | 7776         | 0         | .776                                | 467    | 08         | 101                              | 124                | 305   | 241     | 1013      | 36         |
| Upper Colerron                                | 276.65                    | 822         | 0                                     | 1099  | 110                                 | 134               | 0           | 5.91     | 1349         | 0         | 1348.56                             | 582    | 69         | 00                               | 107.2              | 264.2 | 739     | 1585.2    | 236.64     |
| Lower Coleroon                                | 0                         | 1136        | 0                                     | 1136  | 70                                  | 83                | 0           | 4        | 1293         | 0         | 1293                                | 1077   | 8          | 8                                | 99                 | 212   | 381     | 1670      | 378        |
| Cauvery Delta                                 | 0                         | 9075        | O                                     | 5005  | 389                                 | 25                | 0           | =        | 9836         | 0         | 9936                                | 8684   | 724        | 311                              | 369                | 1401  | 1632    | 11720     | 1784       |
| Total                                         | 4941                      | 22234       | 4369                                  | 31562 | 3138                                | 3996              | 54          | 921      | 38905        | 22605     | 61507                               | 18849  | 2642       | 2510                             | 3197               | 8349  | 20776   | 47974     | -13532     |
| Note : Column no. 10 = Column no. (5+6+7+8+9) | 10 = Colun                | 3n no. (5+6 | +7+8+9).                              | Colui | Column No. 12 = Column no. (10 + 11 | - Column p        | 5. (10 + 11 | පි       | umn no. 19 = | Column ne | uma no. 19 = Column no. (13+17+18). | Column | no 20 = Co | Column no.20 = Column no.(19-12) | -12).              | į     |         |           | ļ          |
|                                               |                           |             |                                       |       |                                     |                   |             |          |              |           | -                                   |        | -          |                                  |                    |       |         |           |            |

Table 4.11.2(b): Abstract : Cauvery Basin-Sub-basinwise Water Balance for 50% Water Year Dependable Flow, With Ground Water

Unit: MCM

| ì                                             |               |                                     |             |        | ×                                    | Water Utilisation | ation       |          |             |             |                                          |        |             |                                    | Water Availability | ability |         |          |           | Manakhi    |
|-----------------------------------------------|---------------|-------------------------------------|-------------|--------|--------------------------------------|-------------------|-------------|----------|-------------|-------------|------------------------------------------|--------|-------------|------------------------------------|--------------------|---------|---------|----------|-----------|------------|
| Name of                                       |               |                                     |             | Wal    | Water requirements                   | ichts             |             |          |             |             | Gross                                    |        |             | Regeneration from uses             | from uses          |         | Surface | Ground   | Gross     | Monthly    |
| Sub-basin                                     | Utilisati     | Utilisation under imgation projects | ngation pro | pjects | Dome-                                | -snpul            | Hydro-      | Environ- | Takel       | Export      | total                                    | Import | Imiga-      | Dome-                              | Indus-             | Total   | water   | _        | water     | balance    |
|                                               | Proposed      | Proposed Existing Ongoing           | ngoing      | Total  | stic                                 | trial             | power       | mental   | 1023        | i           | utilisation                              |        | tion        | stic                               | trial              | 100     | yields  | yields   | available |            |
| (1)                                           | (2)           | (3)                                 | 9           | (5)    | (9)                                  | 0                 | (61)        | (6)      | (10)        | (11)        | (12)                                     | ((3)   | (14)        | (15)                               | (16)               | (11)    | (18)    | (61)     | (50)      | (2)        |
| Upper Cauvery                                 | 463           | 1489                                | 1101        | 3053   | 321                                  | 321               | 0           | 42       | 3757        | 2640        | 0889                                     | 0      | 189         | 257                                | 257                | 703     | 6230    | 579      | 7511.3    | · <u>8</u> |
| Kabini                                        | 1035          | 999                                 | 872         | 2573   | 280                                  | 280               | 6           | 4        | 3186        | 1795        | 4981                                     | 359    | 247         | 224                                | 224                | 695     | 4376    | 386      | 9886      | 835        |
| Shimsha                                       | 263           | 1831                                | 1056        | 3150   | 348                                  | 328               | 90          | 0        | 3853        | 15          | 3868                                     | 2490   | 335         | 278                                | 278                | 892     | 763     | 905      | 4651      | 783        |
| Arkavathi                                     | 961           | 150                                 | 122         | 496    | 559                                  | 559               | 3           | 2        | 1619        | 810         | 2429                                     | 400    | 21          | 383                                | 447                | 188     | 389     | 104      | 1753      | -676.6     |
| Middle Cauvery                                | 205           | 280                                 | 794         | 1789   | 109                                  | 601               | 0           | 3        | 2010        | 211         | 1222                                     |        | 193         | 83                                 | 170                | 367     | 392     | 306      | 2552      | 330.95     |
| Suvarnavathi                                  | 302           | 136                                 | 203         | 640    | 63                                   | 63                | 0           | 0        | 767         | 0           | 767                                      | 492    | \$          | 28                                 | 30                 | 128     | 95      | 3        | 677       | 12         |
| Palar                                         | 220           | 12                                  | 35          | 268    | 4                                    | 7                 | 0           |          | 323         | 0           | 323                                      | ō      | 13          | 6                                  | 35                 | 2.5     | 171     | 140      | 368       | 44         |
| Chinar                                        | 534           | 148                                 | 0           | 682    | 123                                  | 123               | 0           | 3        | 932         | 15646       | 16577,                                   | 0      | 25          | 707                                | 86                 | 193     | 384     | 178      | 755       | -15823     |
| Bhavani                                       | 170           | 1033                                | 126         | 1330   | 229                                  | 229               | 35.         | 61       | 1842        | 1036        | 2878                                     | 12     | 147         | 143                                | 183                | 473     | 2444    | 188      | 3117      | 239        |
| Noyil                                         | 148           | 527                                 | 20          | 715    | 252                                  | 252               | 0           | 2        | 1221        | 0           | 1221                                     | 446    | 53          | 168                                | 202                | 423     | 234     | <b>X</b> | 1157      | -65        |
| Amaravathi                                    | 673           | 1420                                | 8           | 2133   | 305                                  | 305               | -           | 6        | 2753        | 0           | 2753                                     | ·      | 130         | 184                                | 44.                | 858     | 1108    | 308      | 2449      | -304       |
| Tirumanimuttar                                | 422           | 2304                                | 0           | 2775   | 530                                  | 530               | 0           | œ.       | 3791        | 0           | 3791                                     | 69/1   | 276         | 330                                | 424                | 1030    | 1108    | 350      | 4257      | 465.24     |
| Ponnanai Ar                                   | 33            | 199                                 | 0           | 693    | 155                                  | 155               | 0           | 2        | 1005        | 0           | 1005                                     |        | 08          | 101                                | 124                | 305     | 241     | 207      | 1220      | 214.97     |
| <b>Оррег Colemon</b>                          | 277           | 822                                 | 0           | 6601   | 134                                  | 134               | 0           | 9        | 1373        | 0           | 1373                                     | 582    | 69          | 107                                | 101                | 283     | 739     | 253      | 1857      | 484,44     |
| ower Coleroon                                 | 0             | 1136                                | 0           | 1136   | 83                                   | 83                | 0           | 4        | 1306        | 0           | 1306                                     |        | 8           | 99                                 | 99                 | 212     | 381     | 121      | 1621      | 485        |
| Cauvery Delta                                 | 0             | 2700                                | 0           | 2700   | 197                                  | 192               | 0           | E        | 98.66       | P           | 10008                                    | 1898   | 27          | 311                                | 369                | 1588    | 1632    | 225      | 12128     | 2121       |
| Potal                                         | 1+6+          | 22222                               | 4367        | 31557  | 3996                                 | 3996              | 35          | 175      | 39674       | 22153       | 62352                                    | 18849  | 2642        | 2736                               | 3197               | 8228    | 20687   | 3866     | 19175     | 10101      |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | o. 10 = Colun | nn no. (5+6-                        | +7+8+9).    | Colun  | Column No. 12 = Column no. (10 + 11) | Column            | b. (10 + 11 |          | umn no.20 - | - Column no | Column no. 20 = Column no. (13+17+18+19) |        | Jumn no. 21 | Column no. 21 = Column no. (20-12) | 0.(20-12)          |         |         |          |           |            |
|                                               |               |                                     |             |        |                                      |                   |             |          |             |             |                                          |        |             |                                    |                    |         |         |          |           |            |

Table 4.11.3(a): Abstract : Cauvery Basin-Sub-basinwise Water Balance for 90% Water Year Dependable Flow, Without Ground Water Unit : MCM

|                    | Monthly                | Palaci                              | O STELLE                  | (30)        | -552          | -863   | 38      | -883      | 13             | 801-         | ま     | -13183 | -829    | .78   | 0+8-       | -250           | *           | -28                  | 167            | 74}           | .16896 |  |
|--------------------|------------------------|-------------------------------------|---------------------------|-------------|---------------|--------|---------|-----------|----------------|--------------|-------|--------|---------|-------|------------|----------------|-------------|----------------------|----------------|---------------|--------|--|
|                    | Gross                  | water                               | available                 | (61)        | 5472          | 4050   | 3817    | 1463      | 2209           | 630          | 129   | 425    | 1999    | 1082  | 1838       | 3423           | 932         | 1320                 | 1457           | 10677         | 40923  |  |
|                    | Surface                | water                               | yields                    | (81)        | 01-81         | OT 0X  | 909     | 203       | 275            | 10           | 72    | 232    | 1513    | 213   | 808        | 624            | 091         | 474                  | 168            | 589           | 13724  |  |
| lity               |                        | Į.                                  | 1810                      | (17)        | 632           | 651    | 821     | 851       | 347            | 128          | S7    | 193    | 474     | 423   | 558        | 1030           | 305         | 797                  | 212            | 1-10+1        | 8349   |  |
| Water Availability | from uses              | Indus-                              | trial                     | (16)        | 257           | 224    | 278     | 447       | 87             | 20           | 35    | 86     | 183     | 202   | 244        | 424            | 124         | 107                  | 99             | 369           | 3197   |  |
| Wa                 | Regeneration from uses | Dome-                               | stic                      | (15)        | 186           | 180    | 207     | 383       | 8              | 28           | 6     | 70     | 143     | 168   | 184        | 330            | 101         | 000                  | 56             | 311           | 2510   |  |
|                    | R                      | Irriga-                             | tion                      | (14)        | 189           | 247    | 335     | 21        | 193            | 50           | 13    | 25     | 147     | 53    | 130        | 276            | 80          | 69                   | 06             | 724           | 2642   |  |
|                    |                        | Import                              |                           | (13)        | 0             | 359    | 2490    | 409       | 1587           | 492          | 0     | 0      | 12      | 446   | 475        | 1769           | 467         | 582                  | 1077           | 8684          | 18849  |  |
|                    | Gross                  | total                               | zilisation                | (12)        | 6024          | 4913   | 3779    | 2347      | 2196           | 739          | 323   | 13608  | 2828    | 1160  | 2678       | 3673           | 77.6        | 1349                 | 1291           | 9936          | 57819  |  |
|                    | -                      | Export                              | 2                         | (11)        | 2369          | 1795   | 15      | 810       | 211            | 0            | 0     | 12712  | 1036    | 0     | 0          | 0              | 0           | 0                    | 0              | 0             | 18948  |  |
|                    |                        |                                     | 10431                     | (10)        | 3655          | 3118   | 3764    | 1536      | 1985           | 739          | 323   | 896    | 1792    | 1160  | 2678       | 3677           | 577         | 1349                 | 1291           | 9636          | 38874  |  |
|                    |                        | Environ-                            | mental                    | (6)         | 48            | 30     | 0       | 2         | 3              | 0            | -     | 3      | 19      | 2     | Ó          | 9              | 2           | 9                    | 2              | 11            | 145    |  |
| ation              |                        | Hydro I                             | power                     | (8)         | 0             | 6      | 9       | 0         | 0              | 0            | 0     | 0      | 35      | 0     | 1-         | 0              | 0           | 0                    | 0              | 0             | 51     |  |
| Water Utilisation  | rents                  | -snpuI                              | trial                     | (7)         | 321           | 280    | 348     | 655       | 109            | 63           | 4     | 123    | 229     | 252   | 305        | 530            | 155         | 134                  | 83             | 461           | 3996   |  |
|                    | Water requirements     | Dome-                               | stic                      | 9           | 233           | 22.5   | 259     | 479       | 83             | 35           |       | 87     | 179     | 210   | 230        | 412            | 126         | 110                  | 70             | 389           | 3138   |  |
|                    | W                      | rojects                             | Total                     | (5)         | 3053          | 2573   | 3151    | 96#       | 1790           | 0+0          | 268   | 682    | 1330    | 715   | 2133       | 2728           | 693         | 1099                 | 1136           | 9075          | 31562  |  |
|                    |                        | mgation p                           | Ongoing                   | <br> ⊕      | 1011          | 872    | 1056    | 122       | 795            | 203          | 35    | 0      | 126     | 20    | 40         | 0              | 0           | 0                    | 0              | 0             | 4369   |  |
|                    |                        | Utilisation under impation projects | Existing                  | (3)         | 1489          | 988    | 1830    | 181       | <u>\$</u>      | 136          | 12    | 148    | EE01    | 547   | 1430       | 2307           | 199         | 822                  | 1136           | 50025         | 22254  |  |
|                    |                        | Utilisatio                          | Proposed Existing Ongoing | <u>(2</u> ) | 463           | 1035   | 263     | 961       | 205            | 302          | 220   | 534    | 170     | 148   | 673        | 725            | 33          | 217                  | 0              | 0             | 1941   |  |
|                    | Name of                | Sub-basin                           |                           | ε           | Upper Cauvery | Kabini | Shimsha | Arkavathi | Middle Cauvery | Suvarnavathi | Paler | Chimar | Bhavani | Novil | Amaravathi | Tirumanimuttar | Ponnanai Ar | <b>Upper Colemon</b> | Lower Colercon | Cauvery Delta | Total  |  |

Table 4.11.3(b): Abstract : Cauvery Basin-Sub-basinwise Water Balance for 90% Water Year Dependable Flow, With Ground Water

|                                              |                   |                                       |             |       | W                                   | Water Utilisation | ation   |          |            |             |                                      |        |            |                                   | Water Availability | ability |         |          |           | \[ \frac{1}{2} |
|----------------------------------------------|-------------------|---------------------------------------|-------------|-------|-------------------------------------|-------------------|---------|----------|------------|-------------|--------------------------------------|--------|------------|-----------------------------------|--------------------|---------|---------|----------|-----------|----------------|
| Name of                                      |                   |                                       |             | Water | Water requirements                  | urts              |         |          |            |             | Gross                                |        |            | Regeneration from uses            | i from uses        |         | Surface | Ground   | Gross     | Monthly        |
| Sub-basin                                    | Utilisatio        | Utilisation under irrigation projects | ation proje |       | Dome-                               | Indus-            | Hydro-  | Environ- |            | Export      | total                                | Import | Irriga-    | Dome-                             | Indus-             | -       | water   | water    | water     | Water          |
|                                              | Proposed Existing | xisting Ong                           | Ongoing     | Total | stic                                | lein              | power   | mental   | i Oldi     |             | utilisation                          |        | tion       | stic                              | trial              | 1800    | yiclds  | yields   | available | 3187           |
| Ē                                            | (2)               | (E)                                   | (4)         | (5)   | (9)                                 | (I)               | (61)    | (6)      | (10)       | (11)        | (12)                                 | (13)   | (14)       | (31)                              | (91)               | (11)    | (18)    | (61)     | (30)      | (21)           |
| Upper Cauvery                                | 463               | 1489                                  | 11011       | 3053  | 321                                 | 321               | 0       | ***      | 3743       | 2640        | 6112                                 | 0      | 681        | 157                               | 257                | 703     | 4840    | 579      | 6121      | -262           |
| Kabini                                       | 1035              | 999                                   | 872         | 2573  | 280                                 | 280               | 6       | 30       | 3173       | 1795        | 4968                                 | 359    | 247        | 224                               | 224                | 695     | 30.40   | 386      | 4480      | 187            |
| Shimsha                                      | 263               | 1831                                  | 1056        | 3150  | 348                                 | 348               | 5       | 0        | 3851       | 15          | 3866                                 | 2490   | 335        | 278                               | 278                | 892     | 206     | 909      | 4494      | 628            |
| Arkovalhi                                    | 961               | 181                                   | 122         | 961   | 589                                 | 559               | 0       | 2        | 1616       | 810         | 2427                                 | 409    | 21         | 447                               | 447                | 918     | 503     | <u>5</u> | 1631      | -796           |
| Middle Couvery                               | 502               | 790                                   | 794         | 1789  | 109                                 | 109               | ٥       | 3        | 2010       | 211         | 2221                                 | 1587   | 193        | 87                                | 87                 | 367     | 275     | 206      | 2435      | 215            |
| Suvamavalhi                                  | 302               | 136                                   | 203         | 640   | 63                                  | 63                | 0       | 0        | 767        | 0           | 767                                  | 492    | 50         | 50                                | 50                 | 151     | 20      | হ        | 717       | -20            |
| Palar                                        | 220               | 12                                    | 35]         | 368   | 7                                   | 3                 | 0       | -        | 357        | 0           | 357                                  | 0      | 13         | 35                                | 35                 | 83      | 72      | 140      | 395       | -61            |
| Chimar                                       | 534               | 148                                   | 0           | 682   | 123                                 | 123               | 0       | 3        | 932        | 12712       | 13644                                | 0      | 25         | 86                                | 86                 | 222     | 232     | 178      | 631       | -13012         |
| Bhavani                                      | 170               | 1033                                  | 126         | 1330  | 229                                 | 229               | 35      | 19       | 1842       | 1036        | 2878                                 | 12     | 147        | 183                               | 183                | 513     | 1513    | 1881     | 2226      | -652           |
| Noyil                                        | 148               | 547                                   | 30          | 715   | 252                                 | 252               | 0       | 7        | 1221       | 0           | 1221                                 | 914    | 53         | 202                               | 202                | 456     | 213     | স        | 1169      | -52            |
| Amaravathi                                   | 673               | 1420                                  | OF.         | 2133  | 305                                 | 305               | -       | 6        | 2753       | 0           | 2753                                 | 475    | 130        | 244                               | 244                | 819     | 805     | 308      | 2206      | -547           |
| Tinmanimutlar                                | 422               | 2304                                  | 0           | 2725  | 530                                 | 530               | 0       | 9        | 3791       | 0           | 3791                                 | 1769   | 276        | 424                               | 424                | 1124    | 624     | 350      | 3867      | 1,6            |
| Ponnanai Ar                                  | 33                | 661                                   | 0           | 693   | 155                                 | 155               | 0       | 63       | 1005       | 0           | 1005                                 | 467    | 80         | 124                               | 124                | 328     | 160     | 202      | 1162      | 157            |
| Upper Colerron                               | 277               | 822                                   | 0           | 1099  | 134                                 | 134               | 0       | 9        | 1373       | 0           | 1349                                 | 582    | 69         | 107                               | 101                | 283     | 474     | 253      | 1592      | 243            |
| Lower Coleroon                               | 0                 | 1136                                  | 0           | 1136  | 83                                  | 83                | 0       | 7        | 1301       | 0           | 1304                                 | 1017   | 8          | 99                                | 99                 | 223     | 168     | 121      | 1588      | 285            |
| Cauvery Delta                                | 0                 | 57.06                                 | 0           | 2075  | 461                                 | ∓<br>12           | 0       | =        | 9936       | 0           | 10008                                | 8684   | 7.         | 369                               | 369                | 1462    | 589     | 225      | 10959     | 952            |
| Total                                        | 4941              | 22252                                 | 4367        | 31557 | 3996                                | 3996              | 32      | 145      | 39672      | 19219       | 58668                                | 18849  | 2642       | 3197                              | 3197               | 9036    | 13724   | 3966     | 45575     | -13364         |
| Note: Column no. 10 = Column no. (5+6+7+8+9) | . 10 = Colum      | n no.(5+6+7                           | +8+6).      | Colum | Column No. 12 = Column no. (10 + 11 | Column ne         | (10+11) | S)       | um no.20 = | - Column no | lumn no.20 = Column no.(13+17+18+19) |        | Jumn no. 2 | Column no. 21 = Column no.(20-12) | 10.(20-12).        |         |         |          |           |                |

Table 4.11.4(a): Abstract : Cauvery Basin-Sub-basinwise Water Balance for 100% Water Year Dependable Flow, Without Ground Water

|                                               | _                         |            |                                       |        |                    | Water Utilisation                  | sation    |          |             | -         |                                       |       |                                    |                        | Water Availability | ality |         |           |         |
|-----------------------------------------------|---------------------------|------------|---------------------------------------|--------|--------------------|------------------------------------|-----------|----------|-------------|-----------|---------------------------------------|-------|------------------------------------|------------------------|--------------------|-------|---------|-----------|---------|
| Name of                                       |                           |            |                                       | Wa     | Water requirements | Thenls                             |           |          |             |           | Gross                                 |       |                                    | Regeneration from uses | n from uses        |       | Surface | Gross     | Monthly |
| Sub-basin                                     | Utilisatic                | m under ir | Utilisation under irrigation projects | ojects | Dome               | Indus-                             | Hydro-    | Environ- |             | Export    | total                                 | Logmi | Г.                                 | Dome-                  | Indus-             |       | water   | water     | walcr   |
|                                               | Proposed Existing Ongoing | Existing ( | Ingoing                               | Total  | stic               | trial                              | power     | mental   | [2]0        | •         | utilisation                           |       | Ejon.                              | stic                   | trial              | 150   | yields  | available | Dalance |
| <b>©</b>                                      | (2)                       | (3)        | (4)                                   | (5)    | (9)                | (ر)                                | (%)       | 6        | (10)        | (11)      | (21)                                  | (13)  | (14)                               | (15)                   | (91)               | (=)   | (81)    | (6i)      | (30)    |
| Upper Cauvery                                 | 463                       | 1489       | 1101                                  | 3053   | 233                | 321                                | 0.0       | 31.5     | 3638        | 1543      | 1815                                  | 0     | 189                                | 186                    | 257                | 632   | 3150    | 3782      | -1399   |
| Kabini                                        | 1035                      | 999        | 872                                   | 2573   | 225                | 280                                | 0.6       | 19.8     | 3107        | 1795      | 4902                                  | 359   | 247                                | 180                    | 224                | 651   | 1982    | 2662      | 0161-   |
| Shimsha                                       | 263                       | 1830       | 1056                                  | 3151   | 259                | 348                                | 6.2       | 0.0      | 3764        | 15        | 3779                                  | 2490  | 335                                | 207                    |                    | 821   | 317     | 3628      | 51-     |
| Arkavathi                                     | 961                       | 181        | 122                                   | 496    | 419                | 559                                | 2.9       | 2.0      | 1536        | 347       | 1884                                  | 409   | 21                                 | 383                    | 417                | 851   | 123     |           | -500    |
| Middle Cauvery                                | 305                       | 790        | 795                                   | 1 790  | 83                 | 109                                | 0.0       | 3.3      | 1985        | 211       | 2196                                  | 1587  | 193                                | 3                      | 87                 | 77    | 681     | 2123      | 1.      |
| Suvarnavathi                                  | 302                       | 136        | 203                                   | 640    | 35                 | 63                                 | 0.0       | 0.4      | 739         | 0         | 739                                   | 492   | \$0                                | 28                     | \$0                | 128   | 0       | 620       | 17      |
| Palar                                         | 220                       | 12]        | 35                                    | 368    | 1                  | 4                                  | 0.0       | 1.0      | 323         | 0         | 323                                   | Ô     | . 13                               | Ó                      | 35                 | 57    | 81      | 75        | -248    |
| Chinnar                                       | 534                       | 148        | Û                                     | 682    | 87                 | 123                                | 0.0       | 3.1      | 968         | 12712     | 13                                    | 0     | 25                                 | 70                     | 86                 | 193   | 68      | 282       |         |
| Bhavani                                       | 170                       | 1033       | 126                                   | 1330   | 179                | 229                                | 35.0      | 19.2     | 1792        | 1036      | 2828                                  | 12    | 147                                | 143                    | 183                | 474   | 1218    | _         | -1124   |
| Noyıl                                         | 148                       | E          | 30                                    | 715    | 210                | 252                                | 0.0       | 2.3      | 1160        | 0         |                                       | 977   | 53                                 | 168                    | 202                | 423   | 102     | 1070      | 06-     |
| Amaravathi                                    | 673                       | 1420       | 9                                     | 2133   | 230                | 305                                | 1.0       | 0.6      | 2678        | 0         | 2678                                  | 475   | 130                                | 184                    |                    | 558   | 641     | 1674      | -1004   |
| Tinamanimutta                                 | 422                       | 2307       | Û                                     | 2728   | 412                | 530                                | 0.0       | 6.5      | 3677        | 0         | 3673                                  | 6911  | 276                                | 330                    | 124                | 1030  | \$65    | 3364      | -310    |
| Ponnanai Ar                                   | 33                        | 8          | 0                                     | 693    | 126                | 155                                | 0.0       | 6.1      | 716         | 0         | 116                                   | 467   | 08                                 |                        | 124                | 305   | ま       | 836       | -1-     |
| Upper Colerron                                | 277                       | 822        | 0                                     | 1099   | 110                | 134                                | 0.0       | 5.9      | 1349        | 0         | 1349                                  | 582   | 69                                 | 88                     | 101                | 264   | 061     | 1036      | -312    |
| Lower Colcroon                                | 0                         | ×<br>=     | 0                                     | 138    | 70                 | 83                                 | 0.0       | 0.7      | 1290        | 0         | 1290                                  | 1077  | 8                                  | 98                     | 99                 | 212   | 65      |           |         |
| Cauvery Delta                                 | 0                         | 50.02      | 0                                     | 9075   | 389                | 461                                | 0.0       | 10.6     | 9636        | 0         | 9636                                  | 8684  | 724                                | 311                    | 69€                | 1404  | 161     | 10279     | 7       |
| Total                                         | 1941                      | 22254      | 4369                                  | 31562  | 3138               | 3996                               | ¥         | 117      | 38846       | 65911     | 10595                                 | 18849 | 2642                               | 2510                   | 3197               | 83-19 | 9003    | 36202     | .20300  |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 10. 10 = Colum            | n no.(5+6  | +7+8+9)                               | Colui  | mn No. 12          | Column No. 12 * Column no. (10+11) | 0. (10+11 |          | umn no.19 = | Column ne | Column no. 19 = Column no. (13+17+18) |       | Column no. 20 = Column no. (19-12) | ) on number            | 9-12)              |       |         |           |         |

Table 4.11.4(b): Abstract: Cauvery Basin-Sub-basinwise Water Balance for 100% Water Year Dependable Flow, With Ground Water

|                                               |               |                                       |                  |        |                    |                                      |             |          |            |                                        |             |        |                |                                    |                    |            |            |        | Unit: MCM | MCM      |
|-----------------------------------------------|---------------|---------------------------------------|------------------|--------|--------------------|--------------------------------------|-------------|----------|------------|----------------------------------------|-------------|--------|----------------|------------------------------------|--------------------|------------|------------|--------|-----------|----------|
|                                               |               |                                       |                  |        |                    | Water Utilisation                    | sation      |          |            |                                        |             |        |                |                                    | Water Availability | ability    |            |        |           | 111      |
| Name of                                       |               |                                       |                  | Wal    | Water requirements | ments                                |             |          |            |                                        | Gross       |        |                | Regeneration from uses             | from uses          |            | Surface    | Ground | Gross     | Monthly  |
| Sub-basin                                     | Utilisatic    | Utilisation under irrigation projects | igation pro      | ojects | Dome               | -snpul                               | Flydro.     | Environ- |            | Export                                 | total       | Import | Irriga-        | Dome                               | Indus-             | -          | Water      | water  | water     | Valei    |
|                                               | Proposed      | Proposed Existing Ongoing             | ngoing           | Total  | stic               | trial                                | power       | mental   | Lotal      |                                        | utilisation |        | tion           | stic                               | Lial               | 2          | yields     | yields | available | Dat ance |
| Ξ                                             | (2)           | (3)                                   | ( <del>†</del> ) | (5)    | (9)                | (2)                                  | (61)        | 6)       | (01)       | (3)                                    | (12)        | (13)   | ( <del>†</del> | (15)                               | (91)               | <u>(1)</u> | (35)       | (61)   | (30)      | (31)     |
| Upper Cauvery                                 | 463           | 1489                                  | 1101             | 3053   | 321                | 321                                  | 3           | 0 32     | 3726       | 2640                                   | 5269        | ō      | 681            | 257                                | 257                | 703        | 3150       | 579    | 157       | -1935    |
| Kabini                                        | 1035          | 999                                   | 872              | 2573   | 280                | 280                                  | 5           | 02       |            | 1795                                   | 4957        | 359    | 247            | 224                                | 224                | 695        | 1982       | 386    | ¥ 22      | -1535    |
| Shimsha                                       | 263           | 1831                                  | 1056             | 3150   | 348                | 348                                  |             | 0        | 3849       | 15                                     | 3864        | 2490   | 335:           | 278                                | 278                | 892        | 317        | 206    | 4205      | Ħ        |
| Arkavathi                                     | 196           | 181                                   | 122              | 496    | 559                | 559                                  |             | 3        | 1619       | 347                                    | 1966        | 409    | 21:            | 447                                | 447                | 915        | 123        | 3      | 1551      | 415      |
| Middle Cauvery                                | 205           | 06/                                   | 794              | 1789   | 109                | 109                                  | 3           | 3        | 2010       | 211                                    | 2221        | 1587   | 193            | 78                                 | 87                 | 367        | 189        | 206    | 23.49     | 128      |
| Suvarnavathi                                  | 302           | 136                                   | 203              | 640    | 63                 | 63                                   |             | 0        | 767        | 0                                      | 767         | 1921   | 50             | 50                                 | 50                 | 151        | 0          | 7      | 707       | 09-      |
| Palar                                         | 220           | 12                                    | 35               | 268    | 44                 | 4                                    |             | 0        | 357        | 0                                      | 357         |        | 13             | 35                                 | 35                 | 83         | 181        | 97     | 17.       | -115     |
| Chinnar                                       | 534           | 148                                   | 0                | 682    | 123                | 123                                  |             | 3        | 932        | 12712                                  | []          |        | 23             | 86                                 | 86                 | 222        | 8          | 178    | 188       | -13155   |
| Bhavani                                       | 170           | 1033                                  | 126              | 1330   | 229                | 229                                  | 35          | 19       | 1842       | 1036                                   | 2878        | 12     | 147            | 183                                | 183                | 513        | 1218       | 188    | 1631      | -947     |
| Noyi                                          | 148           | 547                                   | 20               | 715    | 252                | 252.                                 | 3           | 2        | 1221       | 0                                      | 1221        | 416    | 53             | 202                                | 202                | 456        | 301        | X      | 1157      | \$       |
| Amaravathi                                    | 673           | 1420                                  | 9                | 2133   | 305                | 305                                  |             | 9        | 2753       | 0                                      | 2753        | 475    | 130            | 244                                | 244                | 819        | Ī          | 308    | 댗         | -711     |
| Firumanimuttar                                | 422           | 2304                                  | 0                | 2725   | 530                | 530                                  |             | 9        | 3791       | 0                                      | 3791        | 1769   | 276            | 424                                | 424                | 1124       | :8         | 350    | 3808      | 17       |
| Ponnanai Ar                                   | 33            | 93                                    | Ó                | 693    | 155                | 155                                  | 3           | 2        | 1005       | 0                                      | 1005        |        | 08             | 124                                | 124                | 328        | ತ          | 207    | 28        | 19       |
| Upper Colerron                                | 772           | \$22                                  | 0                | 660    | 134                | 134                                  | 0           | 9        | 1373       | 0                                      | 1373        | 582    | 69             | 107                                | 101                | 283        | %1         | 253    | 1308      | 59       |
| Lower Colercon                                | 0             | 139                                   | 0                | 1136   | 83                 | 83                                   | J           |          | 1303       | 0                                      | 1303        | 1077   | 8              | 8                                  | 8                  | 223        | <u>ç</u> 9 | 121    | 1485      | 183      |
| Cauvery Delta                                 | 0             | 875                                   | 0                | 9075   | 461                | 461                                  | 0           | 11       | 10008      | 0                                      | 10008       | 8684   | 12.5           | 369                                | 369                | 1462       | [6]        | 225    | 10561     | 554      |
| Total                                         | 4941          | 22222                                 | 4367             | 31557  | 3996               | 3996                                 | 51          | 117      | 39717      | 95281                                  | 57376       | 18849  | 2642           | 3197                               | 3197               | 9036       | 5003       | 3866   | 17.07     | 17719    |
| Note: Column no. 10 = Column no. (5+6+7+8+9). | 2.10 = Colun. | m no.(5+6                             | 17+8+6).         | Solun  | nn No. 12          | Column No. 12 - Column no. (10 + 11) | 10. (10 + 1 | <br> _   | numn no.20 | Column no.20 = Column no.(13+17+18+19) | (13+17+18   |        | umn no. 21     | Column no. 21 = Column no. (20-12) | 0.(20-12).         |            |            |        |           |          |

Table 4.11.5: Abstract of Annual Water Balance for Cauvery Basin for 75%, 50%, 90% and 100% Water Year Dependable Flow,

#### Without and With Ground Water

|                        |           |             |                                       |                    | Water    | Water Utilisation   | uo      |         |       |        |             |        |        |                        | Wate     | Water Availability | ability |        |           | Cauvery |
|------------------------|-----------|-------------|---------------------------------------|--------------------|----------|---------------------|---------|---------|-------|--------|-------------|--------|--------|------------------------|----------|--------------------|---------|--------|-----------|---------|
| Case of                |           |             |                                       | Water requirements | quiremen | ts                  |         |         |       |        | Gross       |        | Rege   | Regeneration from uses | from use |                    | Surface | Ground | Gross     | Basin   |
| Water balance          | Utilisati | on under in | Utilisation under irrigation projects |                    | Dome-    | Dome- Indus- Hydro- |         | Shviom- | Total | Export | total       | Import | Imiga- | Dome-                  | [ndus-   | Total              | water   | water  | water     | water   |
|                        | Proposed  | Existing    | Ongoing                               | Total              | stic     | trial               | power n | nental  |       |        | utilisation |        | tion   | stic                   | trial    | -                  | yields  | yields | available | balance |
| (1)                    | (2)       | (3)         | (4)                                   | (5)                | (9)      | (2)                 | (8)     | (6)     | (01)  | (11)   | (12)        | (13)   | (14)   | (51)                   | (16)     | (11)               | (81)    | (19)   | (20)      | (21)    |
| 75% Dep. Without G.W.  | 4941      | 22254       | 4369                                  | 31562              | 3138     | 3996                | 45      | 165     | 38887 | 19219  | 58102       | 18849  | 2642   | 2510                   | 3197     | 8349               | 16470   | 0      | 43669     | -14434  |
| 75% Dep. With G.W.     | 4941      | 22252       | 4369                                  | 31562              | 3996     | 3996                | 45      | 165     | 39516 | 19219  | \$8807      | 18849  | 2642   | 3197                   | 3197     | 9036               | 16470   | 3866   | 48221     | -10586  |
| 50% Dep. Without G.W.  | 4941      | 22254       | 4369                                  | 31562              | 3138     | 3996                | 45      | 176     | 38905 | 19219  | 61546       | 18849  | 2642   | 2510                   | 3197     | 8349               | 20776   | 0      | 47974     | -13572  |
| 50% Dep. With G.W.     | 4941      | 22252       | 4369                                  | 4369 31562         | 3996     | 3668                | 45      | 176     | 36373 | 19219  | 61834       | 18849  | 2456   | 3197                   | 3197     | 8572               | 20687   | 3866   | \$1975    | 6586-   |
| 90% Dep. Without G.W.  | 1664      | 22254       | 4369                                  | 31562              | 3138     | 3996                | 45      | 145     | 38874 | 19219  | 57819       | 18849  | 2642   | 2510                   | 3197     | 8349               | 13724   | 0      | 40923     | -16896  |
| 90% Dep. With G.W.     | 4941      | 22252       |                                       | 4369 31562         | 3996     | 3996                | 45      | 145     | 39672 | 19219  | 58668       | 18849  | 2642   | 3197                   | 3197     | 9036               | 13724   | 3966   | 45575     | -13364  |
| 100% Dep. Without G.W. | 4941      | 22254       | 4369                                  | 4369 31562 3138    | 3138     | 3996                | 45      | 117     | 38846 | 19219  | 56501       | 18849  | 2642   | 2510                   | 3197     | 8349               | 9003    | 0      | 36202     | -20300  |
| 100% Dep. With G.W.    | 4941      | 22252       |                                       | 4369 31562         | 3996     | 3668                | 45      | 117     | 39717 | 19219  | 57376       | 18849  | 2642   | 3197                   | 3197     | 9036               | 9003    | 3866   | 40754     | -17719  |
|                        |           |             |                                       |                    |          |                     |         |         |       |        |             |        |        |                        |          |                    |         |        |           |         |

Table 4.12.1: Cauvery Basin-Sub-basinwise Annual Water Balance for 75%, 50%, 90% and 100% Water Year Dependable Flows, Without and with Ground Water (Upper Cauvery, Kabini, Shimsha and Arkavathi Sub-basins)

|                    | Annual                 | water<br>balance                      |                   | (23) | -274.4        | 188.3  | -551.9      | -1399  | 286.5  | 6.099     | -262.2 | -1935  | -267.8  | 459.9  | -862.8   | -1910    | 107.6   | 835.3    | -487.4                                | -1535    | 150.8   | 294.8  | 37.8   | -151.2 | 640.2   | 782.7   | 628.3  | 341.2     | -799.2    | -697.2  | -883.2 | -500.1    | -712.6  | 9'9'9- | -795.7 | 415.5    |
|--------------------|------------------------|---------------------------------------|-------------------|------|---------------|--------|-------------|--------|--------|-----------|--------|--------|---------|--------|----------|----------|---------|----------|---------------------------------------|----------|---------|--------|--------|--------|---------|---------|--------|-----------|-----------|---------|--------|-----------|---------|--------|--------|----------|
|                    | و ا                    | water                                 | available         | (22) | 6026.3        | 6950.7 | 5472.1      | 3782.1 | 6675.2 | 7511.3    | 6121   | 4431.0 | 4651.0  | 5386.0 | 4050.0   | 2992.0   | 5081.4  | 5816.4   | 4.480.4                               | 3422.4   | 3929.6  | 4073.6 | 3816.6 | 3627.6 | 4506.8  | 4650.8  | 4493.8 | 4204.8    | 1547.4    | 1649.4  | 1463.4 | 1383.4    | 1714.9  | 1752.9 | 1630.9 | 1550.9   |
|                    |                        | _                                     | yreids            | (21) | 0.0           | 0.0    | 0.0         | 0.0    | 578.5  | \$78.5    | 579    | 578.5  | 0.0     | 0.0    | 0.0      | 0.0      | 386.4   | 386.4    | 386.4                                 | 386.4    | 0.0     | 0.0    | 0.0    | 0.0    | 806.0   | 206.0   | 0.909  | 0.908     | 0.0       | 0.0     | 0.0    | 0.0       | 103.5   | 103.5  | 103.5  | 103.5    |
|                    | Surface.               |                                       | yeas              | (30) | 5394,2        | 6318.6 | 4840.0      | 3150.0 | 5394.2 | 6230.3    | 4840   | 3150.0 | 3641.0  | 4376.0 | 3040.0   | 1982.0   | 3641.0  | 4376.0   | 3040.0                                | 1982.0   | 0.619   | 763.0  | 506.0  | 317,0  | 0.619   | 763.0   | 506.0  | 317.0     | 287,0     | 389.0   | 203.0  | 123.0     | 287.0   | 389.0  | 203.0  | 123.0    |
| Water Availability |                        | Total                                 | <u> </u>          | (61) | 632.1         | 632.1  | 632.1       | 632.1  | 702.5  | 702.5     | 703    | 702.5  | 0.128   | 0.120  | 0.188    | 651.0    | 695.0   | 695.0    | 695.0                                 | 0.569    | 820.6   | 820.6  | 820.6  | 820.6  | 891.8   | 8.168   | 891.8  | 801.8     | 851.4     | 851.4   | 851.4  | 851.4     | 915.4   | 851.4  | 915.4  | 915.4    |
| Water A            | from us                | Indus-                                | trial             | (81) | 256.8         | 256.8  | 256.8       | 256.8  | 256.8  | 256.8     | 257    | 256.8  | 224.0   | 224.0  | 224.0    | 224.0    | 224.0   | 224.0    | 224.0                                 | 224.0    | 278.4   | 278.4  | 278.4  | 278.4  | 278.4   | 278.4   | 278.4  | 278.4     | 447.2     | 447.2   | 447.2  | 447.2     | 447.2   | 447.2  | 447,2  | 447.2    |
|                    | Regeneration from uses | ٨                                     | stic              | (11) | 186.4         | 186.4  | 186.4       | 186.4  | 256.8  | 256.8     | 757    | 256.8  | 180.0   | 0.081  | 180.0    | 180.0    | 224.0   | 224.0    | 224.0                                 | 224.0    | 207.2   | 207.2  | 207.2  | 207.2  | 278.4   | 278.4   | 278.4  | 278.4     | 383.2     | 383.2   | 383.2  | 383.2     | 447.2   | 383.2  | 447.2  | 447.2    |
|                    | Rege                   |                                       | tion              | (91) | 6.881         | 6'881  | 6.881       | 188.9  | 188.9  | 188.9     | 189    | 188.9  | 247.0   | 247.0  | 247.0    | 247.0    | 247.0   | 247.0    | 247.0                                 | 247.0    | 335.0   | 335.0  | 335.0  | 335.0  | 335.0   | 335.0   | 335.0  | 335.0     | 21.0      | 21.0    | 21.0   | 21.0      | 21.0    | 21.0   | 21.0   | 21.0     |
|                    |                        | Import                                |                   | ((3) | 0.0           | 0.0    | 0.0         | 0.0    | 0.0    | 0.0       | 0      | 0.0    | 1       | 359.0  | 359.0    | 359.0    | 359.0   | 359.0;   | 359.0                                 | 359.0    | 2490    | 2490   | 2490   | 2490   | 2490    | 2490    | 2490   | 2490      | 409.0     | 409.0   | 409.0  | 409.0     | 409.0   | 409.0  | 409.0  | 409.0    |
|                    |                        |                                       | E01               |      | 6300.8        | 6762.4 | 6024.0      | 5180.9 | 6388.8 | 6850.4    | 6112   | 5268.9 | 4918.8  | 4926.1 | 4912.8   | 4902.2   | 4973.8  | 4981.1   | 4967.8                                | 4957.2   | 3778.8  | 3778.8 | 3778.8 | 3778.8 | 3866.6  | 3868.1  | 3865.5 | 3863.6    | 2346.6    | 2346.6  | 2346.6 | 1883.5    | 2427.5  | 2429.5 | 2426.6 | 1966.4   |
|                    | i.uer                  | total                                 | utitisation       | (14) | 63            | . 67   | 09          | 51     | 63     | 89        |        | 52     | 40      | 49     | 49       | 46       | 49      | 49       | 46                                    | 49       | 37      | 37     | 37     | 37     | 38      | 38      | 38     | 38        | 23        | 23      | 23     | 8         | 24      | 24     | 24     | 16       |
|                    |                        | Export                                |                   | (13) | 2640          | 3092   | 2369        | 1543   | 2640   | 2640      | 2640   | 2640   | 1795    | 1795   | 1795     | 1795     | 1795    | 1795     | 1795                                  | 1795     | 14.9    | 14.9   | 14.9   | 14.9   | 14.9    | 14.9    | 14.9   | 14.9      | 810.3     | 810.3   | 810,3  | 347.2     | 810.3   | 810.3  | 810.3  | 347.2    |
|                    |                        | Total                                 |                   | (12) | 3660.8        | 3670.0 | 3655.2      | 3638.3 | 3748.8 | 3757.1    | 3743   | 3726.3 | 3123.7  | 3131.0 | 3117.7   | 3107.1   | 3178.7  | 3186.0   | 3172.7                                | 3162.1   | 3763.9  | 3763.9 | 3763.9 | 3763.9 | 3851.7  | 3853.2  | 3850.6 | 3848.7    | 1536.3    | 1536.3  | 1536.3 | 1536.3    | 1617.2  | 1619.2 | 1616.3 | 1619.2   |
|                    |                        | Enviorn-                              | menta             | (E)  | 53.9          | 63.2   | 48.4        | 31.5   | 53.9   | 62.3      | 40     | 31.5   | 36.4    | 43.8   | 30.4     | 8.61     | 36.4    | 43.8     | 30.4                                  | 8'61     | 6.2     | 0.0    | 0.0    | 0.0    | 6.2     | 0.0     | 0.0    | 0.0       | 2.9       | 2.0     | 2.0    | 2.0       | 2.9     | 2.0    | 2.0    | 2.0      |
| sation             |                        | Hydro- E                              | power             | (10) | 0.0           | 0.0    | 0.0         | 0.0    | 0.0    | 0.0       | 0      | 0.0    | 9.0     | 0.6    | 0.6      | 0.6      | 0.6     | 0.6      | 0.6                                   | 0.6      | 0.0     | 6.2    | 6.2    | 6.2    | 0.0     | 7.6     | 5.1    | 3.2       | 0.0       | 2.9     | 0.0    | 2.9       | 0.0     | 2.9    | 0.0    | 2.9      |
|                    | <u>د</u>               | -                                     | trial po          | (6)  | 321.0         | 321.0  | 321.0       | 321.0  | 321.0  | 321.0     | 321    | 321.0  | 280.0   | 280.0  | 280.0    | 280.0    | 280.0   | 280.0    | 280.0                                 | 280.0    | 348.0   | 348.0  | 348.0  | 348.0  | 348.0   | 348.0   | 348.0  | 348.0     | 559.0     | 559.0   | 559.0  | 559.0     | 559.0   | 559.0  | 559.0  | 559.0    |
| Water Util         | uirement               | ٨                                     | Stic              | (8)  | 233.0         | 233.0  | 233.0       | 233.0  | 321.0  | 321.0     | !      |        |         |        | 225.0 2  | 225.0 2  |         | 280.0    | 280.0 2                               | 280.0 2  | 259.0   | 259.0  | 259.0  |        | 348.0 3 |         | 348.0  | 348.0 3   | 479.0 5   | 479.0 5 |        | <u></u> i | 5 0.655 | 559.0  | ſI     | 559.0    |
|                    | Water requirements     |                                       | Total             | (3)  | 3052.8        | 3052.8 | 3052.8      | 3052.8 | 3052.8 | 3052.8    |        | 3052.8 |         | ٠      | 2573.3   | 2573.3   | 2573.3  |          | 2573.3                                | 2573.3   | 3150.7  |        | 3150.7 |        | 3149.5  |         | 3149.5 | 3149.5    | 496.3     | 496.3   | 496.3  |           | 496.3   | 496.3  |        | 496.3    |
|                    |                        | ion proje                             | Ongoing           | (9)  | 11011         | 1011   | 1101        | 1101   | 1101   | 1100.8    |        | 1100.8 |         |        | 872.0 2: | 872.0 2: | 872.0 2 | 872.0 2. | 872.0 2.                              | 872.0 2. | 1056 3  | 1056 3 | 1056 3 |        | 1056 3  |         | 1055.7 | 1055.7 31 | 121.7     | 121.7   | 121.7  |           | 121.6 4 |        |        | 121.6    |
|                    |                        | ler irrigat                           |                   |      | 1489.0        | 1489.0 | 1489.0      | 1489.0 |        | 1489.0 11 |        | 1489.0 |         |        |          | 666.2 8  | 666.2 8 | 666.2 8  | 666.2 8                               |          |         |        |        |        |         |         |        |           |           | _       | 181.1  | Щ         | L       |        |        | 181.1    |
|                    |                        | Utilisation under irrigation projects | Proposed Existing | (5)  |               |        |             | L      |        |           |        |        |         |        |          |          |         |          |                                       |          |         |        |        |        |         |         |        |           |           |         |        |           |         |        |        |          |
|                    |                        |                                       | Propose           | (4)  | 463.0         | 463.0  | 463.0       | 463.0  | 463.0  | 463.0     | 463    | 463.0  | 1035.1  | 1035.1 | 1035.1   | 1035.1   | 1035.1  | 1035.1   | 1.035.1                               | 1035.1   | 263.0   | 263.0  | 263.0  | 263.0  | 263.0   | 263.0   | 263.0  | 263.0     | 5'961     | 196.5   | 196.5  | 196.5     | \$'961  | 196.5  | 5'961  | 196.5    |
|                    |                        | \$ C                                  |                   | (3)  | _             | %05    | <b>%</b> 06 | 100%   | %SL    | 20%       | %06    | 100%   | 75%     | %0\$   | %06      | 100%     | 75%     | 20%      | %06                                   | 100%     | 75%     | 20%    | %06    | %001   | 75%     | 20%     | %06    | %001      | %\$4      | 20%     | %06    | %001      | %\$4    | %05    | %06    | %001     |
|                    | Ground                 | Water                                 |                   | (2)  | willout       | ground | 200         |        | with   | ground    | E FA   |        | without | ground |          |          | wìth    | STound   | S S S S S S S S S S S S S S S S S S S |          | without | ground | 3      | - 1    |         | ground  |        |           | mount     | ground  |        |           | with    | ground |        |          |
|                    | Name of                | Sub-basin                             |                   |      | Upper Cauvery |        |             |        |        |           |        |        |         |        |          |          |         |          |                                       |          | ha      |        |        |        |         |         |        |           |           |         |        |           |         |        |        |          |
| _                  | -                      |                                       |                   |      |               |        |             |        |        |           |        |        | Kabini  |        |          |          |         |          |                                       |          | Shimsha |        |        |        |         |         |        |           | Arkavathi | _       |        |           |         |        |        | $\dashv$ |
| _                  | -S.                    | ź                                     |                   | Ξ    | _             |        |             |        |        |           |        |        | 7       |        |          |          |         |          |                                       |          | 'n      |        |        |        |         | <b></b> |        |           | 4         |         |        |           |         |        |        |          |

Table 4.12.2: Cauvery Basin-Sub-basinwise Annual Water Balance for 75%, 50%, 90% and 100% Water Year Dependable Flows,

Without and with Ground Water (Middle Cauvery, Suvarnavathi, Palar and Chinnar Sub-basins)

| Hydro   Lydro   Lydr |                                                                |                                                                |                                                          |                                                    |                          |                    | i                  |            | Water Util | Tilisation |        |       |       |             |       |        |            | Water A  | Water Availability |        |        |          |                  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------|--------------------------|--------------------|--------------------|------------|------------|------------|--------|-------|-------|-------------|-------|--------|------------|----------|--------------------|--------|--------|----------|------------------|
| Environtation total         Export unitisation         Import inion         Import inion sic         Import inion         Import inion sic         Import inion sic <th>Name of Ground</th> <th>Ground</th> <th></th> <th></th> <th>Water requirements</th> <th>Water requirements</th> <th>Water requirements</th> <th>juirements</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>Gmes</th> <th></th> <th>Ŗ</th> <th>generation</th> <th>n from u</th> <th></th> <th></th> <th>Ground</th> <th>Gross</th> <th>Annual</th>                                                                                                                                                                                                           | Name of Ground                                                 | Ground                                                         |                                                          |                                                    | Water requirements       | Water requirements | Water requirements | juirements |            |            |        |       |       | Gmes        |       | Ŗ      | generation | n from u |                    |        | Ground | Gross    | Annual           |
| The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The color   The  | Water % Dep Utilisation under irrigation projects Dome- Indus- | Water % Dep Utilisation under irrigation projects Dome- Indus- | % Dep Utilisation under irrigation projects Dome- Indus- | Utilisation under irrigation projects Dome- Indus- | Dome- Indus-             | Dome- Indus-       | Dome- Indus-       | -snpuj     |            | dro        |        | Logar | Ехроп | letot       |       | Ітіда- | Dome-      | Indus-   |                    |        | -      | water    | water<br>balance |
| (11)         (12)         (13)         (14)         (15)         (14)         (14)         (15)         (14)         (14)         (15)         (14)         (14)         (15)         (14)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15)         (15) <th< th=""><th>Proposed Existing Ongoing Total stic trial p</th><th>Ongoing Total stic trial</th><th>Ongoing Total stic trial</th><th>Ongoing Total stic trial</th><th>Ongoing Total stic trial</th><th>Total stic trial</th><th>stic trial</th><th>trial</th><th>-</th><th>DWC</th><th>mental</th><th>0.00</th><th></th><th>ufilisation</th><th></th><th>tion</th><th></th><th>trial</th><th></th><th>yields</th><th></th><th>wailable</th><th></th></th<>                                                                                                                                                                                                                                                                                                                                                                                                                              | Proposed Existing Ongoing Total stic trial p                   | Ongoing Total stic trial                                       | Ongoing Total stic trial                                 | Ongoing Total stic trial                           | Ongoing Total stic trial | Total stic trial   | stic trial         | trial      | -          | DWC        | mental | 0.00  |       | ufilisation |       | tion   |            | trial    |                    | yields |        | wailable |                  |
| 3.30         1985.5         211.0         2196.3         1587         93.0         66.4         87.2         346.6         330.0         0.0           3.30         1985.5         220.7         2236.1         1587         193.0         66.4         87.2         346.6         330.0         0.0           2.75         1984.5         211.0         2221.4         1587         193.0         66.4         87.2         346.6         330.0         0.0           3.30         1985.5         211.0         2221.4         1587         193.0         66.4         87.2         346.5         330.0         0.0           2.75         2009.8         211.0         2221.4         1587         193.0         87.2         87.2         346.7         330.0         205.6           2.75         2009.8         211.0         2221.4         1587         193.0         87.2         87.2         367.4         189.0         205.6           2.75         2009.8         211.0         2221.4         1587         193.0         87.2         367.4         189.0         205.6           0.38         700.8         13.8         492.0         30.0         280.2         182.4         189.0<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | (2) (3) (4) (5) (6) (7) (8) (9)                                | (3) (4) (5) (6) (8)                                            | (4) (5) (6) (7) (8)                                      | (8) (2) (9) (5)                                    | (8) (7) (8)              | (4) (8)            | (8)                |            |            | (10)       | (11)   | (12)  |       | (14)        | (3)   | (16)   | (71)       | (81)     | (61)               | (50)   | (21)   | (22)     | (23)             |
| 330         19845         2204         2236,1         1587         193,0         664         872         3466         392,0         00           2.75         19849         211.0         2195,3         1587         193,0         664         872         3466         392,0         0.0           3.30         1985,3         211.0         2221,4         1587         193,0         872         872         3674         392,0         0.0           3.30         2010,4         211.0         2221,4         1587         193,0         872         872         3674         392,0         2056           3.30         2010,4         211.0         2221,4         1587         193,0         872         872         3674         189,0         2056           3.30         2010,4         211.0         2221,4         1587         193,0         872         872         3674         189,0         2056           3.30         2010,4         211.0         2221,4         1587         193,0         872         872         3674         189,0         0.0           0.38         738,81         0.00         738,81         492.0         50.0         280         411,0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 75% 205.00 790.48 794.71 1790.21                               | 75% 205.00 790.48 794.71 1790.2 83.00                          | 75% 205.00 790.48 794.71 1790.2 83.00                    | 790.48 794.71 1790.2 83.00                         | 794.71 1790.21 83.00     | 1790.2 83.00       | 83.00              |            | ~          |            |        |       |       | 2196.5      | 1587  | 193.0  |            | 87.2     | 346.6              | 330.0  | 0.0    | 2263.9   | 67.4             |
| 2.75         1984.9         211.0         2195.3         1587         93.0         66.4         87.2         346.6         273.0         0.0           3.30         1985.5         211.0         2196.3         1587         193.0         66.4         87.2         346.6         189.0         0.0           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         393.0         205.6           2.32         200.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         189.0         205.6           2.35         200.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         189.0         205.6           2.36         200.8         211.0         2221.4         158.7         193.0         87.2         87.2         367.4         393.0         205.6           2.38         193.0         87.2         87.2         87.2         87.2         189.0         0.0           0.38         73.8         492.0         50.0         28.0         128.4         495.0         0.0           0.38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 50% 205.00 790.48 794.71 1790.2 83.00                          | 50% 205.00 790.48 794.71 1790.2 83.00                          | 50% 205.00 790.48 794.71 1790.2 83.00                    | 790,48 794.71 1790.2 83.00                         | 794.71 1790.2 83.00      | 1790.2 83.00       | 83.00              |            | 0          |            |        |       |       | 2236.1      | 1587  | 193.0  |            | 87.2     | 346.6              | 392.0  | 0.0    | 2325.9   | 868              |
| 330         1985.5         211.0         2196.5         1887         193.0         66.4         87.2         346.6         189.0         00           330         2010.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         390.0         205.6           330         2010.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         392.0         205.6           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         392.0         205.6           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         87.4         397.0         205.0           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         87.4         397.0         205.0           0.38         2281.4         92.0         30.0         28.0         30.4         128.4         95.0         0.0           0.38         766.81         492.0         50.0         28.0         30.4         128.4         95.0         0.0           0.38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 794.71 1790.2 83.00                                            | 90% 205.00 790.48 794.71 1790.2 83.00                          | 205.00 790.48 794.71 1790.2 83.00                        | 790.48 794.71 1790.2 83.00                         | 794.71 1790.2 83.00      | 1790.2 83.00       | 83.00              |            | 8          |            |        |       |       | 2195.9      | 1587  | 193.0  |            | 87.2     | 346.6              | 275.0  | 0.0    | 2208.9   | 13.0             |
| 3.30         2010.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         390.0         205.6         2           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         867.2         367.4         392.0         205.6         2           2.75         2006.8         211.0         2221.4         1587         193.0         87.2         87.2         367.4         189.0         205.6         2           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         367.4         189.0         205.6         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 100% 205.00 790.48 794.71 1790.2 83.00 1                       | 205.00 790.48 794.71 1790.2 83.00                              | 205.00 790.48 794.71 1790.2 83.00                        | 790,48 794.71 1790.2 83.00                         | 794.71 1790.2 83.001     | 1790.2 83.00       | 83.00              |            | 8          | 109.0      |        |       | 211.0 | 2196.5      | 1587  | 193.0  | 66.4       | 87.2     | 346.6              | 0.681  | 0.0    | 2122.9   | -73.6            |
| 3.30         2010.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         392.0         205.6         2           2.75         2009.8         211.0         2221.4         1587         193.0         87.2         87.2         367.4         295.0         205.6         2           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         367.4         285.0         205.0         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2         2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 75% 205.00 790.48 793.59 1789.1 109.0                          | 75% 205.00 790.48 793.59 1789.1 109.0                          | 75% 205.00 790.48 793.59 1789.1 109.0                    | 790,48 793.59 1789.1 109.0                         | 793.59 1789.1 109.0      | 0.601 1.6871       | 109.0              |            | 0.601      |            |        |       |       | 2221.4      | 1587  | 193.0  |            | 87.2     | 367.4              | 330.0  | 205.6  | 2490.3   | 268.9            |
| 2.75         2609.8         211.0         2220.8         1587         193.0         87.2         87.2         367.4         205.0         205.6         2           3.30         2010.4         211.0         2221.4         1587         193.0         87.2         867.4         189.0         205.6         2           0.38         738.81         0.00         738.81         492.0         50.0         28.0         128.4         95.0         0.0           0.38         738.81         0.00         738.81         492.0         50.0         28.0         128.4         95.0         0.0           0.38         738.81         0.00         76.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         76.81         0.00         76.81         492.0         50.0         28.0         50.4         150.8         10.0         63.9           0.38         76.81         0.00         76.81         492.0         50.0         50.4         150.8         10.0         63.9           0.38         76.81         0.00         76.81         492.0         50.0         50.4         150.8         10.0         63.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 50% 205.00 790.48 793.59 1789.1 109.0                          | 50% 205.00 790.48 793.59 1789.1 109.0                          | 50% 205.00 790.48 793.59 1789.1 109.0                    | 790.48 793.59 1789.1 109.0                         | 793.59 1789.1 109.0      | 0.601 1.6871       | 0.601              |            | 0.601      |            |        |       |       | 2221.4      | 1587  | 193.0  |            | 87.2     | 367.4              | 392.0  | 205.6  | 2552.3   | 331.0            |
| 3.30         2010.4         211.0         2221.4         1587         193.0         87.2         87.2         367.4         189.0         205.6         2           0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         738.81         0.00         76.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         76.81         0.00         76.81         492.0         50.0         50.4         128.4         95.0         63.9           0.38         76.81         0.00         76.81         492.0         50.0         50.4         128.4         95.0         63.9           0.38         76.81         0.00         76.81         492.0         50.0         50.4         128.4         95.0         63.9           0.38         76.81         492.0         50.0         50.4         128.4         95.0         63.9           0.38                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 205.00 790.48 793.59 1789.1 109.0                              | 90% 205.00 790.48 793.59 1789.1 109.0                          | 205.00 790.48 793.59 1789.1 109.0                        | 790.48 793.59 1789.1 109.0                         | 793.59 1789.1 109.0      | 1789.1 109.0       | 109.0              |            | 109.0      |            |        | Ш     |       | 2220.8      | 1587  | 193.0  |            | 87.2     | 367.4              | 275.0  | 205.6  | 2435,3   | 214.5            |
| 0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         38.0         0.0           0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         128.4         95.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         128.4         95.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         28.0         128.4         95.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         128.4         95.0         63.9           1.05         3.23.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 790.48 793.59 1789.1 109.0                                     | 205.00 790.48 793.59 1789.1 109.0                              | 205.00 790.48 793.59 1789.1 109.0                        | 790.48 793.59 1789.1 109.0                         | 793.59 1789.1 109.0      | 1789.1 109.0       | 109.0              | 109.0      | 109.0      |            |        | _     | Ц     | 2221.4      | 1587  | 193 0  |            | 87.2     | 367.4              | 0.681  | 205.6  | 2349.3   | 128.0            |
| 0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         95.0         0.00           0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         738.81         0.00         766.81         492.0         50.0         28.0         50.4         150.8         38.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9 <th>75% 301.69 135.60 203.15 640.43 35.00</th> <th>without 75% 301.69 135.60 203.15 640.43 35.00</th> <th>75% 301.69 135.60 203.15 640.43 35.00</th> <th>135.60 203.15 640.43 35.00</th> <td>203.15 640.43 35.00</td> <td>640,43 35.00</td> <td>35.00</td> <td>35.00</td> <td>63.00</td> <td></td> <td></td> <td></td> <td>0.00</td> <td>738.81</td> <td>492.0</td> <td>50.0</td> <td></td> <td>50.4</td> <td>128.4</td> <td>38.0</td> <td>0.0</td> <td>658.4</td> <td>-80.4</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 75% 301.69 135.60 203.15 640.43 35.00                          | without 75% 301.69 135.60 203.15 640.43 35.00                  | 75% 301.69 135.60 203.15 640.43 35.00                    | 135.60 203.15 640.43 35.00                         | 203.15 640.43 35.00      | 640,43 35.00       | 35.00              | 35.00      | 63.00      |            |        |       | 0.00  | 738.81      | 492.0 | 50.0   |            | 50.4     | 128.4              | 38.0   | 0.0    | 658.4    | -80.4            |
| 0.38         738.81         0.00         738.81         492.0         50.0         28.0         59.4         128.4         10.0         0.0           0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         95.0         0.0           0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         150.8         38.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         13.0         35.2         57.0 <th>301.69 135.60 203.15 640.43</th> <th>50% 301.69 135.60 203.15 640.43</th> <th>50% 301.69 135.60 203.15 640.43</th> <th>135.60 203.15 640.43</th> <td>203.15 640.43</td> <td>640.43</td> <td></td> <td>35.00</td> <td>2</td> <td></td> <td></td> <td></td> <td>0.00</td> <td>738.81</td> <td>492.0</td> <td>50.0</td> <td></td> <td>50.4</td> <td>128.4</td> <td>98.0</td> <td>0.0</td> <td>715.4</td> <td>-23.4</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 301.69 135.60 203.15 640.43                                    | 50% 301.69 135.60 203.15 640.43                                | 50% 301.69 135.60 203.15 640.43                          | 135.60 203.15 640.43                               | 203.15 640.43            | 640.43             |                    | 35.00      | 2          |            |        |       | 0.00  | 738.81      | 492.0 | 50.0   |            | 50.4     | 128.4              | 98.0   | 0.0    | 715.4    | -23.4            |
| 0.38         738.81         0.00         738.81         492.0         50.0         28.0         50.4         128.4         0.0         0.0           0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         150.8         38.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         18.0         139.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 90% 301.69 135.60 203.15 640.43 35.00                          | 90% 301.69 135.60 203.15 640.43 35.00                          | 301.69 135.60 203.15 640.43 35.00                        | 135.60 203.15 640.43 35.00                         | 203.15 640.43 35.00      | 640.43 35.00       | 35.00              | 35.00      | 53.        |            |        |       | 00:00 | 738.81      | 492.0 | 50.0   |            | 50.4     | 128.4              | 10.0   | 0.0    | 630.4    | -108.4           |
| 0.38         766.81         0.00         766.81         492.0         50.0         50.4         50.4         150.8         38.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         150.8         10.0         63.9           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         139.7           1.05         325.48         0.0         13.0         13.0         8.8         35.2         57.0         171.0         139.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 100% 301,69 135,60 203.15 640.43 35.00 6                       | 301,69 135,60 203.15 640,43 35.00                              | 301,69 135,60 203.15 640,43 35.00                        | 135,60 203.15 640.43 35.00                         | 203.15 640.43 35.00      | 640,43 35.00       | 35.00              | 35.00      | 5          | 00.0 00.69 |        |       | 00.00 | 738.81      | 492.0 | 50.0   |            | 50.4     | 128.4              | 0.0    | 0.0    | 620.4    | -118.4           |
| 0.38         766.81         0.00         766.81         492.0         50.0         28.0         50.4         128.4         95.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         50.4         150.8         10.0         63.9           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         139.7           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         139.7           1.05         325.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 75% 301.69 135.60 203.15 640.43 63.00                          | 75% 301.69 135.60 203.15 640.43 63.00                          | 301.69 135.60 203.15 640.43 63.00                        | 135.60 203.15 640.43 63.00                         | 203.15 640,43 63.00      | 640,43 63.00       | 63.00              | 63.00      | 63.00      |            |        |       | 00.0  | 18092       | 492.0 | 50.0   |            | 50.4     | 150.8              | 38.0   | 63.9   | 744.7    | -22.1            |
| 0.38         766.81         0.00         766.81         492.0         50.4         50.4         150.8         10.0         63.9           0.38         766.81         0.00         766.81         492.0         50.0         50.4         160.8         10.0         63.9           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         105.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         170.0         0.0           1.05         325.48         0.0         13.0         35.2         35.2         170.0         139.7           1.05         325.48         0.0         13.0         13.0         8.8         35.2         37.0         171.0         139.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 50% 301.69 135.60 203.15 640.43 63.00                          | 50% 301.69 135.60 203.15 640.43 63.00                          | 301.69 135.60 203.15 640.43 63.00                        | 135,60 203.15 640.43 63.00                         | 203.15 640.43 63.00      | 640.43 63.00       | 63.00              |            | 63.00      |            |        |       | 00.00 | 766.81      | 492.0 | 50.0   |            | \$0.4    | 128.4              | 95.0   | 63.9   | 779.3    | 12.5             |
| 0.38         766.81         0.00         766.81         492.0         50.4         50.4         150.8         0.00         63.9           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0            1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         18.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         18.0         0.0           1.05         325.58         0.0         13.0         35.2         35.2         37.0         171.0         139.7           1.05         356.58         0.0         356.58         0.0         13.0         35.2         35.2         38.4         18.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 135.60 203.15 640.43 63.00                                     | 90% 301.69 135.60 203.15 640.43 63.00                          | 301.69 135.60 203.15 640.43 63.00                        | 135.60 203.15 640.43 63.00                         | 203.15 640.43 63.00      | 640.43 63.00       | 63.00              |            | 63.00      |            |        |       | 00'0  | 766.81      | 492.0 | 50.0   |            | 50.4     | 150.8              | 10.0   | 63.9   | 716,7    | -50.1            |
| 1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         105.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         355.48         0.0         323.48         0.0         13.0         8.8         35.2         57.0         170         0.0           1.05         356.58         0.00         356.58         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         356.58         0.0         13.0         8.8         35.2         87.0         171.0         139.7           1.05         356.58         0.0         13.0         8.8         35.2         83.4         172.0         139.7           1.05         356.58         0.0         13.0         35.2         35.2         83.4         18.0         139.7           1.05         356.58         0.0         13.0         35.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 100% 301.69 135.60 203.15 640.43 63.00                         | 301.69 135.60 203.15 640.43 63.00                              | 301.69 135.60 203.15 640.43 63.00                        | 135.60 203.15 640.43 63.00                         | 203.15 640.43 63.00      | 640.43 63.00       | 00.69              |            | 63.00      |            |        |       | 00.0  | 166.81      | 492.0 | 50.0   | 3          | 50.4     | 150.8              | 0.0    | 63.9   | 7.907    | -60.1            |
| 1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         0.0           1.05         325.48         0.00         355.38         0.0         13.0         8.8         35.2         57.0         180         0.0           1.05         356.38         0.00         356.38         0.0         13.0         8.8         35.2         57.0         180         0.0           1.05         323.48         0.0         13.0         8.8         35.2         57.0         180         0.0           1.05         323.48         0.0         13.0         8.8         35.2         83.4         105.0         139.7           1.05         332.48         0.0         13.0         8.8         35.2         83.4         171.0         139.7           1.05         356.58         0.0         13.0         35.2         35.2         83.4         18.0         139.7           3.12         896.10         12712         1368.8         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 75% 220.37 12.20 34.96 267.53 11.00                            | 75% 220.37 12.20 34.96 267.53 11.00                            | 75% 220.37 12.20 34.96 267.53 11.00                      | 12.20 34.96 267.53 11.00                           | 34.96 267.53 11.00       | 267.53 11.00       | 11.00              |            | 44.00      |            |        |       |       | 323.48      | 0.0   | 13.0   |            | 35.2     | 57.0               | 105.0  | 0.0    | 162.0    | -161.5           |
| 1.05         323.48         0.00         323.48         0.00         13.0         8.8         35.2         57.0         72.0         0.0           1.05         323.48         0.00         353.48         0.0         13.0         8.8         35.2         57.0         18.0         0.0           1.05         356.58         0.00         356.58         0.0         13.0         8.8         35.2         57.0         18.0         0.0           1.05         323.48         0.00         356.58         0.0         13.0         8.8         35.2         57.0         171.0         139.7           1.05         325.48         0.00         356.58         0.0         13.0         8.8         35.2         57.0         171.0         139.7           1.05         356.58         0.00         13.0         13.0         35.2         35.2         83.4         170.0         139.7           1.05         356.58         0.0         13.0         35.2         35.2         83.4         18.0         139.7           3.12         896.10         12712         1360.8         0.0         25.0         69.6         98.4         193.0         38.0         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 50% 220.37 12.20 34.96 267.53                                  | 50% 220.37 12.20 34.96 267.53                                  | 50% 220.37 12.20 34.96 267.53                            | 12.20 34.96 267.53                                 | 34.96 267.53             | 267.53             |                    | 11.00      | 44.00      |            |        |       |       | 323.48      | 0.0   | 13.0   |            | 35.2     | 57.0               | 171.0  | 0.0    | 228.0    | -95.5            |
| 1.05         323.48         0.0         13.348         0.0         13.0         8.8         35.2         57.0         18.0         0.0           1.05         356.58         0.00         356.58         0.0         13.0         8.8         35.2         83.4         105.0         139.7           1.05         323.48         0.0         13.0         8.8         35.2         57.0         171.0         139.7           1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         57.0         171.0         139.7           1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         83.4         72.0         139.7           3.12         896.10         12712         136.8         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         30.0     <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 12.20 34.96                                                    | 90% 220.37 12.20 34.96 267.53                                  | 220.37 12.20 34.96 267.53                                | 12.20 34.96 267.53                                 | 34.96 267.53             | 267.53             |                    | 11,00      |            |            |        | 1     |       | 323.48      | 0.0   | 13.0   |            | 35.2     | 57.0               | 72.0   | 0.0    | 129.0    | -194.5           |
| 1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         83.4         105.0         139.7           1.05         323.48         0.00         323.48         0.0         13.0         8.8         35.2         57.0         171.0         139.7           1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         57.0         171.0         139.7           1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         83.4         72.0         139.7           3.12         896.10         12712         136.8         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         232.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                | 220.37                                                         | 220.37                                                   | [ 12.20                                            | 34.96 267.53             | 267.53             |                    | 11.00      |            |            |        | _     |       | 323.48      | 0.0   | 13.0   |            | 35.2     | 57.0               | 18.0   | 0.0    | 75.0     | -248.5           |
| 1.05         323.48         0.00         13.0         8.8         35.2         57.0         171.0         139.7           1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         83.4         72.0         139.7           1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         83.4         72.0         139.7           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         332.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         89.0         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 75% 220.37 12.20 34.96 267.53                                  | 75% 220.37 12.20 34.96 267.53                                  | 220.37 12.20 34.96 267.53                                | 12,20 34.96 267,53                                 | 34.96 267,53             | 267,53             |                    | 44.00      |            |            |        |       |       | 356,58      | 0.0   | 13.0   | m          | 35.2     | 83.4               | 105.0  | 139.7  | 328.1    | -28.5            |
| 1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         35.2         35.2         35.2         35.2         35.2         35.2         35.2         35.2         130.7         139.7           1.05         356.58         0.00         136.38         0.0         13.2         35.2         35.2         83.4         180         139.7           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         232.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         89.0         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 220.37 12.20 34.96 267.53                                      | 50% 220.37 12.20 34.96 267.53                                  | 220.37 12.20 34.96 267.53                                | 12.20 34.96 267.53                                 | 34.96 267.53             | 267.53             |                    | 44.00      | #4.00      |            |        |       |       | 323.48      | 0.0   | 13.0   |            | 35.2     | 57.0               | 171.0  | 139.7  | 367.7    | 44.2             |
| 1.05         356.58         0.00         356.58         0.0         13.0         35.2         35.2         35.2         35.4         18.0         139.7           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         312.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         232.0         0.0           3.72         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         89.0         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 90% 220.37 12.20 34.96 267.53                                  | 90% 220.37 12.20 34.96 267.53                                  | 220.37 12.20 34.96 267.53                                | 12.20 34.96 267.53                                 | 34.96 267.53             | 267.53             |                    | 44.00      |            |            |        |       |       | 356.58      | 0.0   | 13.0   |            | 35.2     | 83.4               | 72.0   | 139.7  | 295.1    | 61.5             |
| 3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         312.0         0.0           3.12         896.10         12712         16542         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         232.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         232.0         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 220.37 12.20 34.96 267.53                                      | 220.37 12.20 34.96 267.53                                      | 220.37 12.20 34.96 267.53                                | 12.20 34.96 267.53                                 | 34.96 267.53             | 267.53             |                    | 44.00      | 44.00      |            |        |       |       | 356.58      | 0.0   | 13.0   |            | 35.2     | 83.4               | 18.0   | 139,7  | 241.1    | -115.5           |
| 3.12         896.10         12712         16542         0.0         25.0         69.6         98.4         193.0         384.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         232.0         0.0           3.12         896.10         12712         13608         0.0         25.0         69.6         98.4         193.0         89.0         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 75% 534.22 148.27 0.00 682.49                                  | 75% 534.22 148.27 0.00 682.49                                  | 534.22 148.27 0.00 682.49                                | 148.27 0.00 682.49                                 | 0.00 682.49              | 682.49             | Į i                | 87.00      | 123.0      |            |        | _     |       | 13608       | 0.0   | 25.0   |            | 98.4     | 193.0              | 312.0  | 0.0    | \$05.0   | -13103           |
| 3.12 896.10 12712 13608 0.0 25.0 69.6 98.4 193.0 232.0 0.0 3.13 896.10 12712 13608 0.0 25.0 69.6 98.4 193.0 89.0 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 50% 534.22 148.27 0.00 682.49                                  | 50% 534.22 148.27 0.00 682.49                                  | 534.22 148.27 0.00 682.49                                | 148.27 0.00 682.49                                 | 0.00 682.49              | 682.49             |                    | 87.00      | 123.0      |            |        |       |       | 16542       | 0.0   | 25.0   |            | 98,4     | 193.0              | 384.0  | 0.0    | 577.0    | -15965           |
| 3.12 896.10 12712 13608 0.0 25.0 69.6 98.4 193.0 89.0 0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Water 90% 534.22 148.27 0.00 682.49 87.00                      | 90% 534.22 148.27 0.00 682.49                                  | 534.22 148.27 0.00 682.49                                | 148.27 0.00 682.49                                 | 0.00 682.49              | 682.49             |                    | 87.00      | 123.0      |            |        |       | l.    | 13608       | 0.0   | 25.0   |            | 98.4     | 193.0              | 232.0  | 0.0    | 425.0    | -13183           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 100% 534.22 148.27 0.00 682.49 87.00                           | 534.22 148.27 0.00 682.49                                      | 534.22 148.27 0.00 682.49                                | 148.27 0.00 682.49                                 | 0.00 682.49              | 682.49             |                    | 87.00      | 123.0      |            |        | _     | 12712 | 13608       | 0.0   | 25.0   |            | 98.4     | 193.0              | 0.68   | 0.0    | 282.0    | -13326           |
| 0.00 3.12 931.61 12712 13644 0.0 25.0 98.4 98.4 221.8 312.0 177.6 711.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | with 75% 534.22 148.27 0.00 682.49 123.0                       | 75% 534,22 148.27 0.00 682.49                                  | 534,22 148,27 0.00 682,49                                | 148.27 0.00 682.49                                 | 0.00 682.49              | 682.49             |                    | 123.0      | 123.0      |            |        |       | 12712 | 13644       | 0.0   | 25.0   |            | 98.4     | 221.8              | 312.0  | 177.6  | 711.4    | -12932           |
| 12712 16577 0.0 25.0 69.6 98.4 193.0 384.0 177.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 50% 534.22 148.27 0.00 682.49                                  | 50% 534.22 148.27 0.00 682.49                                  | 534.22 148.27 0.00 682.49                                | 148.27 0.00 682.49                                 | 0.00 682.49              | 682.49             | ιı                 | 123.0      |            | •          |        |       |       | 16577       | 0.0   | 25.0   |            | 98.4     | 193.0              | 384.0  | 177.6  | 754.6    | -15823           |
| 3.12 931.61 12712 13644 0.0 25.0 98.4 98.4 221.8 232.0 177.6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 534.22   148.27   0.00   682.49                                | 90% 534.22 148.27 0.00 682.49                                  | 534.22   148.27   0.00   682.49                          | 148.27 0.00 682.49                                 | 0.00 682,49              | 682.49             |                    | 123.0      |            |            |        |       | 12712 | 13644       | 0.0   | 25.0   |            | 98.4     | 221.8              | 232.0  | 177.6  | 631.4    | -13012           |
| 0.00 3.12 931.61 12712 13644 0.0 25.0 98.4 98.4 221.8 89.0 177.6 488.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 100% 534.22 148.27 0.00 682.49 123.0                           | 534.22 148.27 0.00 682.49                                      | 534.22 148.27 0.00 682.49                                | 148.27 0.00 682.49                                 | 0.00 682.49              | 682.49             |                    | 123.0      | 123.0      |            |        |       | 12712 | 13644       | 0.0   | 25.0   |            | 98.4     | 221.8              | 0.68   | 177.6  | 488.4    | -13155           |

Table 4.12.3: Cauvery Basin-Sub-basinwise Annual Water Balance for 75%, 50%, 90% and 100% Water Year Dependable Flows,

Without and with Ground Water (Bhavani, Noyil, Amaravathi and Tirumanimuttar Sub-basins)

|                    | Americal | water                  | balance   |                        | (23)  | -424.9   | 6 101   | -829.1         | -1124    | -247.4  | 239.4    | -651.6  | -946.6  | -66.4   | -57.4   | -78.4   | -90.4   | -39.9   | -64.5  | -51.9   | -63.9   | -146.9     | -\$36.9 | -839.9      | -1004    | 453.6   | -303.6 | -546.6    | -710.6  | -225.5         | 233.4    | -250.5 | -309.5  | 100.6      | 465.2  | 75.6    | 16.6      |
|--------------------|----------|------------------------|-----------|------------------------|-------|----------|---------|----------------|----------|---------|----------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|------------|---------|-------------|----------|---------|--------|-----------|---------|----------------|----------|--------|---------|------------|--------|---------|-----------|
|                    |          | Gross                  | water     | available<br>available | (3)   | 2402.7   | 2929.6  | 9.8661         | 1703.6   | 2630.3  | 3117.1   | 2226.1  | 1931.1  | 1093.6  | 1102.6  | 1081.6  | 9'6901  | 1181.4  | 8.9511 | 1169.4  | 1157.4  | 1930.8     | 2140.8  | 1837.8      | 1673.8   | 2299.0  | 2449.0 | 2206.0    | 2042.0  | 3447.9         | 3906.9   | 3423.0 | 3364.0  | 3892.1     | 4256.7 | 3867.1  | 3808.1    |
|                    |          | Ground                 | water     | yıcımı                 | (2.1) | 0.0      | 0.0     | 0.0            | 0.0      | 187.7   | 187.7    | 187.7   | 187.7   | 0.0     | 0.0     | 0.0     | 0.0     | 54.2    | 54.2   | 54.2    | 54.2    | 0.0        | 0.0     | 0.0         | 0.0      | 308.0   | 308.0  | 308.0     | 308.0   | 0.0            | 0.0      | 0.0    | 0.0     | 350.1      | 350.1  | 350.1   | 350.1     |
|                    |          | Surface                |           | year                   | (20)  | 1917.2   | 2444.0  | 1513.0         | 1218.0   | 1917.2  | 2444.0   | 1513.0  | 1218.0  | 225.0   | 234.0   | 213.0   | 201.0   | 225.0   | 234.0  | 213.0   | 201.0   | 898.0      | 108.0   | 805.0       | 641.0    | 0.868   | 1108.0 | 805.0     | 641.0   | 649.0          | 1108.0   | 624.0  | 565.0   | 649.0      | 1108.0 | 624.0   | 565.0     |
| Water Availability | \<br> -  | T                      | Total     |                        | (6)   | 473.6    | 473.6   | 473.6          | 473.6    | 513.4   | 473.4    | 513.4   | \$13.4  | 422.6   | 422.6   | 422.6   | 422.6   | 456.2   | 422.6  | 456.2   | 456.2   | 557.8      | \$57.8  | \$57.8      | \$57.8   | 618.0   | 558.0  | 618.0     | 618.0   | 1030           | 1030     | 1030   | 1030    | 1124       | 1030   | 1124    | 1124      |
| Water A            |          | from US                | Indus-    | trai                   | (18)  | 183.2    | 183.2   | 183.2          | 183.2    | 183.2   | 183.2    | 183.2   | 183.2   | 9'102   | 201.6   | 9'102   | 201.6   | 201.6   | 201.6  | 201.6   | 201.6   | 244.0      | 244.0   | 244.0       | 244.0    | 244.0   | 244.0  | 244.0     | 244.0   | 424.0          | 424.0    | 424.0  | 424.0   | 424.0      | 424.0  | 424.0   | 424.0     |
|                    |          | Regeneration from uses | •         | stic                   | (17)  | 143.2    | 143.2   | 143.2          | 143.2    | 183.2   | 143.2    | 183.2   | 183.2   | 168.0   | 168.0   | 0.891   | 168.0   | 201.6   | 168.0  | 201.6   | 201.6   | 184.0      | 184.0   | 184.0       | 184.0    | 244.0   | 184.0  | 244.0     | 244.0   | 329.6          | 329.6    | 329.6  | 329.6   | 424.0      | 329.6  | 424.0   | 424.0     |
|                    | ١        | Reg                    | Irriga-   | non                    | (10)  | 147.2    | 147.2   | 147.2          | 147.2    | 147.0   | 147.0    | 147.0   | 147.0   | 53.0    | 53.0    | 53.0    | \$3.0   | 53.0    | 53.0   | 53.0    | 53.0    | 129.8      | 129.8   | 129.8       | 129.8    | 130.0   | 130.0  | 130.0     | 130.0   | 276.4          | 276.4    | 276.4  | 276.4   | 276.0      | 276.0  | 276.0   | 276.0     |
|                    |          |                        | Import    |                        | (13)  | 12.0     | 12.0    | 12.0           | 12.0     | 12.0    | 12.0     | 12.0    | 12.0    | 446.0   | 446.0   | 446.0   | 446.0   | 446.0   | 446.0  | 446.0   | 446.0   | 475.0      | 475.0   | 475.0       | 475.0    | 475.0   | 475.0  | 475.0     | 475.0   | 1769           | 1769     | 6921   | 6941    | 1769       | 1769   | 1769    | 69/1      |
|                    | +        | Gross                  |           | uninsanon              | (14)  | 2827.7   | 2827.7  | 2827.7         | 2827.7   | 2,77,7  | 2877.7   | 2877.7  | 2877.7  | 1160.0  | 0.0911  | 1160.0  | 1160.0  | 1221.3  | 1221.3 | 1221.3  | 1221.3  | 2677.6     | 2677.6  | 2677.6      | 2677.6   | 2752.6  | 2752.6 | 2752.6    | 2752.6  | 3673.5         | 3673.5   | 3673.5 | 3673.5  | 3791.5     | 3791.5 | 3791.5  | 3791.5    |
|                    | -        | -                      | Ехроп     |                        | (13)  | 1036.0   | 1036.0  | 1036.0         | 1036.0   | 1036.01 | 1036.0   | 036.0   | 1036.0  | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0    | 0.0     | 0.0     | 0.0        | 0.0     | 0.0         | 0.0      | 0.0     | 0.0    | 0.0       | 0.0     | 0.0            | 0.0      | 0.0    | 0.0     | 0.0        | 0.0    | 0.0     | 0.0       |
|                    | }        | 1                      | Total     | _                      | (12)  | 1791.7   | 791.7   | 1791.7         | 1791.7   | 1841.7  | 1841.7   | 1841.7  | 1841.7  | 1160.0  | 0.0911  | 0.091   | 0.0911  | 1221.3  | 221.3  | 1221.3  | 1221.3  | 2677.6     | 2677.6  | 2677.6      | 2677.6   | 2752.6  | 2752,6 | 2752.6    | 2752.6  | 3677.0         | 3677.0   | 3677.0 | 3677.0  | 3791.5     | 3791.5 | 3791.5  | 3791.5    |
|                    |          | -                      | _         | _                      | (11)  | 19.2     | 19.2    | 19.2           | 19.2     | 19.2    | 19.2     | 19.2    |         | 2.3     | 2.3     | 2.3     | 2.3     | 2.3     | 2.3    | 23      | 2.3     | 9.0        | 9.0     | 9.0         | 9.0      | 9.0     | 9.0    | 9.0       | 9.0     | 6.5 3          | 6.5      | 6.5    | 6.5 3   | 6.5 3      | 6.5 3  | 6.5 3   | 6.5 3     |
|                    |          | -                      | _         | _                      | (01)  | 35.0     | 35.0    | 35.0           | 35.0     | 35.0    | 35.0     | 35.0    | 35.0    | 0.0     | 0.0     | 0.0     | 0.0     | 0.0     | 0.0    | 0.0     | 0.0     | 1.0        | 1.0     | 1.0         | 1.0      | 0.1     | 1.0    | 0.1       | 0.1     | 0.0            | 0.0      | 0.0    | 0.0     | 0.0        | 0.0    | 0.0     | 0.0       |
| Utilisation        |          | }                      |           |                        |       | 229.0    | 229.0   | 29.0           | 229.0    | 229.0   | 0.62     | 0.62    | 29.0    | 52.0    | 52.0    | 52.0    | 52.0    | 52.0    | 52.0   | 0.29    | 252.0   | 0.50       | 0.50    | 305.0       | 305.0    | 305.0   | 305.0  | 305.0     | 305.0   | 530.0          | 530.0    | 530.0  | 0.0     | 530.0      | 530.0  | 530.0   | 530.0     |
| Water U            |          | urements               | ,         |                        | (8)   | 179.0 2  | 179.0 2 | 179.0 2        | 179.0 2  | 229.0 2 | 229.0 2  | 229.0 2 | 229.0 2 | 210.012 | 210.012 | 210.0 2 | 210.012 | 252.0 2 |        | 252.0 2 | 252.0 2 |            |         | 230.0 3     | 230.0 30 | 305.0   | 305.0  | 305.0     | 305.0   | 412.0 5        | 412.0 5. |        | 412.0 5 | 530.0 5    | 1      | 530.0 5 | \$30.0 5. |
|                    |          | Water requirements     | T         | -e                     | (7)   | 1329.5   | 1329.5  | 1329.5         | 1329.5   | 1329.5  | 1329.5   | 1329.5  |         | 715.1   | 715.1   | 715.1   | 1.517   | 715.1   | 715.1  | 715.1   | 715.1   | 2132.6     | 2132,6  | 2132.6      | 2132.6   | 2132.6  | 2132.6 | 2132.6    | 2132.6  | 2728.5         |          | 2728.5 | 2728.5  | <u>L</u> . |        | }       | 2725.0    |
|                    |          |                        | 91        | JE I                   | ) (9) | 125.9 1. | 125.9   | 125.9 1.       | 125.9 13 | 125.9   | 125.9 13 |         |         | 19.7    | 19.7    | 7.61    | 19.7    | 19.7    | 19.7   |         | 19.7    | 39.6 21    | _       | 39.6 21     | 39.6 21  | 39.6 21 |        | 39.6 21   | 39.6 21 | 0.0            | 0.0      | 0.0    | 0.0 27  | 0.0        | 0.0    | 0.0     | 0.0       |
|                    |          |                        | er imigat | - }                    |       | 1033.5   | 1033.5  | 1033.5         | 1033.5   | 1033.5  | 1033.5   | 1033.5  | 1033.5  | 546.9   | 546.9   | 546.9   | 546.9   | 546.9   | 546.9  | 546.9   | 546.9   | 1420.2     | 1420.2  | 1420.2      | 1420.2   | 1420.2  | 1420.2 | 1420.2    | 1420.2  | 2306.7         | 2306.7   | 2306.7 | 2306.7  | 2304.0     | 2304.0 | 2304.0  | 2304.0    |
|                    |          |                        | ation und | Exi                    | (5)   | _        |         |                |          |         | L        |         |         |         |         |         |         |         |        |         |         |            |         |             |          | ĺ       |        |           |         | L              |          | L      |         | <u> </u>   |        |         |           |
|                    |          | - ì                    | - 1       | Proposed               | €     | 170      | 170.1   | 170.1          | 170.1    | 170.1   | 170.1    | 170.1   | 170.1   | 148.5   | 148.5   | 148.5   | 148.5   | 148.5   | 148.5  | 148.5   | 148.5   | 675.9      | 672.9   | 672'9       | 675.9    | 675.9   | 672.9  | 672.9     | 6773.9  | 421.7          | 421.7    | 421.7  | 421.7   | 421.7      | 421.7  | 421.7   | 421.7     |
| <u> </u>           |          | , C                    |           |                        | (5)   | 3/5/     | 20%     | %<br>%         | %001     | 15%     | 80%      | %06     | 100%    | 75%     | 20%     | %06     | %001    | 75%     | \$(0%) | %06     | %001    | 75%        | %09     | <b>%</b> 06 | %001     | 75%     | 20%    | %06       | 100%    | 25%            | 50%      | %.06   | %001    | 75%        | %0\$   | %06     | 100%      |
|                    |          | Ground                 | Water     |                        | (2)   | without  | ground  | Waler<br>Waler |          | with    | ground   | waler   |         | without | ground  | water   | _       | with    | ground | water   |         | without    | ground  | March       |          | with    | ground | T Mail CI |         | without        | punoua   | water  |         | with       | ground | Walci   |           |
|                    |          | <b>Мате о</b>          | Sub-basin |                        |       | Bhavani  |         |                |          |         |          |         |         | Noyil   |         |         |         |         |        |         |         | Amaravathi |         |             | _        | ·       | _      | _         |         | Tirumanimuttar | _        |        |         |            |        |         |           |
|                    |          | Sr.                    | ż         |                        | (E)   | _        |         | _              |          |         |          |         | •       | ~       |         |         | _       |         |        |         |         | 3          | _       |             |          |         |        | _         |         | 4              |          |        |         |            |        | _       |           |

Table 4.12.4: Cauvery Basin-Sub-basinwise Annual Water Balance for 75%, 50%, 90% and 100% Water Year Dependable Flows, Without and with Ground Water (Ponnanai Ar, Upper Coleroon, Lower Coleroon and Cauvery Delta Sub-basins)

| Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Commany   Name of Co   |   |                         |           |             |             |            |              |          |           |             |          |      |             |        |         |            |           |             |        |        |          |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|-------------------------|-----------|-------------|-------------|------------|--------------|----------|-----------|-------------|----------|------|-------------|--------|---------|------------|-----------|-------------|--------|--------|----------|--------|
| Name of County   Marke of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Name of County   Nam   |   |                         |           | •••         |             |            |              |          | Water     | Utilisation |          |      |             |        |         |            | Water A   | vailability |        |        |          |        |
| Sub-base   Ware 7-76   Unitation under migration projects   Supera   Supera   Sub-base   Ware 7-76   Unitation under migration projects   Sub-base   Sub-base   Ware 7-76   Unitation under migration projects   Sub-base    | Š | Name of                 | Ground    |             |             |            |              | Water re | quirement |             |          |      | Gross       |        | Re      | generation | ı from us |             | _      | punon  |          | Annual |
| Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition   Proposition      | Š | Sub-basin               | Water     |             | Utilisation | n under im | gation pre   | 7        |           |             | <br>-    |      | lotal       | Import | Irriga- |            | Indus-    | _           |        | water  | water    | water  |
| Proposition   Control      |   |                         |           |             | Proposed E  |            | Ongoing      |          | _         | _           |          |      | utilisation |        | tion    |            | trial     | lotal       |        |        | vailable |        |
| Quency Dept. 378, 315.6 Geolgy 100, 919.21 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (200 1151) 100, 910.31 (2                        | Ξ |                         | (2)       | (6)         | (3)         | (5)        | (9)          | (i)      |           |             | (12)     | (13) | (14)        | (3)    | (91)    | (11)       | (81)      | (61)        | (30)   | (21)   | (22)     | (23)   |
| Water   Park   32.54   George   Georg   |   | <sup>2</sup> onnanai Ar | without   | 75%         | 32.56       | 92.099     | 00.00        | 693.32   |           |             |          |      | 976.51      |        | 80.0    | 100.8      | 124.0     | 304.8       | 0.161  | 0.0    | 962.8    | -13.7  |
| March   1976   31.5   666.05   0.00   693.2   156.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0   159.0    |   |                         | ground    | 50%         | 32.56       | 92.099     | 00.0         | 693.32   |           |             | _        |      | 976.51      |        |         | 100.8      | 124.0     | 304.8       | 241.0  | 0.0    | 1012.8   | 36.3   |
| with 100% 3.25 6.660 6 0.00 693.2 150 150 0.00 191 1002 0.00 103.2 4670 8.00 100 11.2 4570 8.00 100 11.2 4570 8.00 100 11.2 4570 8.00 100 11.2 4570 8.00 100 11.2 4570 8.00 10.0 11.2 4570 8.00 10.0 11.2 4570 8.00 10.0 11.2 4570 8.00 10.0 11.2 4570 8.00 10.0 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 4570 8.00 11.2 |   |                         | - A       | %06         | 32.56       | 92.099     | 00'0         | 693.32   |           |             | _        |      | 976.51      |        |         | 100.8      | 124.0     | 304.8       | 0.091  | 0.0    | 931.8    | 44.7   |
| With Each Classes         STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE STATE ST                                 |   |                         |           | 100%        | 32.56       | 92.099     | 0.00         | 693.32   |           |             | -        | _    | 976.51      |        |         | 100.8      | 124.0     | 304.8       | 64.0   | 0.0    | 835.8    | -140.7 |
| Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part      |   |                         | with      | 75%         | 32.56       | 92.099     | 0.00         | 693.32   |           |             |          |      | 1005.2      |        |         | 124.0      | 124.0     | 328.0       | 0.161  | 207.4  | 1193.4   | 188.2  |
| Walk Gold, 2016         Color (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)         3.24 (1907)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | _ |                         | ground    | 20%         | 32.56       | 92.099     | 00.00        | 693.32   | 1         |             | _        |      | 1005.2      |        |         | 100.8      | 124.0     | 304.8       | 241.0  | 207.4  | 1220.2   | 215.0  |
| 1004, 27.5   2.5 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   2.2 kg   |   |                         | ia)Ew     | %06         | 32.56       | 92.099     | $\mathbf{L}$ | 693.32   |           | П           | Ш        |      | 1005.2      |        |         | 124.0      | 124.0     | 328.0       | 0.091  | 207.4  | 1162.4   | 157.2  |
| Upper Columny Laborary         276 6.51         STD 6.51         STD 6.51         STD 6.51         STD 6.51         STD 6.51         STD 6.51         STD 6.51         STD 6.51         STD 6.51         STD 6.52         STD 7.52         STD 7.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |   |                         |           | %001        | 32.56       | 92.099     |              | 693.32   |           |             |          |      | 1005.2      |        | 80.0    | 124.0      | 124.0     | 328.0       | 0.40   | 207.4  | 1066.4   | 61.2   |
| Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part   Part      |   | Upper Coleroon          | luotiim r | 75%         | 276.65      | 822,00     | 00.00        | 1098.7   |           |             |          |      | 1348.6      |        | 0.69    | 88.0       | 107.2     | 264.2       | 589.0  | 0.0    | 1435.2   | 86.6   |
| Charact Color: Name   Copy   27.66   22.00   0.09   1992   1100   134   0.00   5.91   1346   0.00   1348   0.00   1348   0.82   0.90   0.98   1100   1340   1340   0.00   0.98   1340   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   1340   0.00   0.00   1340   0.00   0.00   1340   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00    |   |                         | ground    | ×05         | 276.65      | 822.00     | 00.00        | 1098.7   |           |             |          |      | 1348.6      |        | 0.69    | 0.88       | 107.2     | 264.2       | 739.0  | 0.0    | 1585.2   | 236.6  |
| 100%   27.656   82.200   0.00   1998   14.00   14.00   0.00   5.91   14.85   0.00   13.75   82.20   0.00   0.00   14.85   14.00   14.00   14.00   0.00   13.75   82.20   0.00   13.20   14.00   14.00   14.00   14.00   14.20   14.00   14.00   14.00   14.00   14.20   14.00   14.00   14.00   14.20   14.00   14.00   14.20   14.00   14.00   14.00   14.00   14.20   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.00   14.0   |   |                         | <u> </u>  | <b>%</b> 06 | 276.65      | 822.00     | 00.00        | 1098.7   |           |             | L.,      |      | 1348.6      |        | 0.69    | 88.0       | 107.2     | 264.2       | 474.0  | 0.0    | 1320.2   | -28.4  |
| with 55% 276 68 822.00 0.00 1098.7 134.0 134.0 0.00 5.91 1375 6 0.00 1372 6 97.0 107.2 107.2 283.4 589.0 222.6 107.0 1098.7 134.0 134.0 0.00 5.91 137.5 0.00 137.6 582.0 69.0 107.2 107.2 283.4 474.0 222.6 1570 0.00 1098.7 134.0 134.0 0.00 5.91 137.5 0.00 137.5 6 582.0 69.0 107.2 107.2 283.4 474.0 222.6 150.0 1098.7 134.0 134.0 0.00 5.91 137.5 0.00 137.5 6 582.0 69.0 107.2 107.2 283.4 474.0 222.6 150.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |   |                         |           | %001        | 276.65      | 822.00     | 00'0         | 1098.7   |           |             |          |      | 1348.6      |        |         | 88.0       | 107.2     | 264.2       | 0.061  | 0.0    | 1036.2   | -312.4 |
| Prove Colcinon   1962   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   13.0   | _ |                         | with      | 75%         | 276.65      | 822.00     | 0.00         | 1098.7   |           |             |          |      | 1372.6      |        |         |            | 107.2     | 283.4       | 589.0  | 252.6  | 1707.0   | 334.4  |
| March   100%   276.65   822.00   0.00   10.84   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   134.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   136.0   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0   |   |                         | punous    | 20%         | 276.65      | 822.00     | 0.00         | 1098.7   | ١         |             |          |      | 1372.6      |        |         | 107.2      | 107.2     | 283.4       | 739.0  | 252.6  | 1857.0   | 484.4  |
| 100%   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   116.0   |   |                         | 3         | %06         | 276.65      | 822.00     | 00.00        | 1098.7   |           |             |          |      | 1348.6      |        |         | 107.2      | 107.2     | 283.4       | 474.0  | 252.6  | 1592.0   | 243.4  |
| Lower Colcroin   Without   19%   Cauvery Delta   Without   19%   Cauvery   Cauvery Delta   Without   19%   Cauvery   Cauvery   Cauvery Delta   Without   19%   Cauvery   C   |   |                         |           | %001        | 276.65      | 822.00     | 0.00         | 1098.7   |           |             | <u> </u> |      | 1372.6      |        |         | 107.2      | 107.2     | 283.4       | 0.061  | 252.6  | 1308.0   | \$4.6  |
| Figure 30%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   | Lower Coleroor          | n without | 75%         | 0.00        | 1136.0     | 0.00         | 1136.0   | _         | П           |          |      | 1291.2      |        | 0.06    | 56.0       | 66.4      | 212.4       | 224.0  | 0.0    | 1513.4   | 222.2  |
| Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   Market   M   |   |                         | ground    | 20%         | 0.00        | 1136.0     | 00.0         | 1136.0   |           |             |          |      | 1292.8      |        | 0.06    | 26.0       | 66.4      | 212.4       | 381.0  | 0.0    | 1670.4   | 377.6  |
| 100%   1136,0   0.00   1136,0   0.00   1136,0   0.00   0.05   1136,0   0.00   0.05   1136,0   0.00   0.05   1136,0   0.00   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.05   0.   |   |                         |           | %06         | 00:00       | 1136.0     | 00.00        | 1136.0   |           | П           |          |      | 1290.7      |        | 0.06    |            | 66.4      | 212.4       | 0'891  | 0.0    | 1457.4   | 166.7  |
| with point 15%         0.00         1136.0         83.00         83.0         0.00         1304.2         0.00         1034.2         1037         90.0         66.4         66.4         222.8         224.0         120.6         1404.4           Water Products Point 136.0         1136.0         0.00         1136.0         83.00         0.00         1.86.1         1303.7         0.00         100.0         136.0         130.7         90.0         66.4         66.4         222.8         222.0         120.6         1791.0           Part Pool 200         1136.0         83.00         83.00         0.00         1.86.1         1303.7         1077         90.0         66.4         66.4         222.8         222.0         120.6         1791.0           Councery Delta Without 12%         0.00         1136.0         83.00         6.00         1.05.6         935.6         0.00         9975.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |   |                         |           | 100%        | 0.00        | 1136.0     | 00.0         | 1136.0   |           |             |          |      | 1289.7      |        | 0'06    |            | 66.4      | 212.4       | 65.0   | 0.0    | 1354.4   | 8,     |
| Fround Stoke 0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   1136.0   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00  |   |                         | HILM      | 75%         | 0.00        | 1136.0     | 00.00        | 1136.0   |           |             |          |      | 1304.2      |        | 0.06    | 66.4       | 66.4      | 222.8       | 224.0  | 1 20.6 | 1644.4   | 340.2  |
| Cauvery Delta   Without   75%   0.00   1136.0   83.00   83.00   0.00   10.68   1303.7   0.00   1302.7   1077   90.0   66.4   66.4   622.8   168.0   1206   1136.0   136.0   136.0   83.00   83.00   0.00   0.00   10.56   9935.6   0.00   9935.6   8684   724.0   311.2   368.8   1404   1632.0   0.00   1137.0   1136.0   10.50   9935.6   9935.6   8684   724.0   311.2   368.8   1404   1632.0   0.00   1137.0   1136.0   10.56   9935.6   0.00   9935.6   8684   724.0   311.2   368.8   1404   1632.0   0.00   1137.0   1137.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.0   1138.   |   |                         | ground    | %05         | 0.00        | 1136.0     | 0.00         | 1136.0   |           |             |          |      | 1305.8      |        | 0.06    | 56.0       | 66.4      | 212.4       | 381.0  | 9'021  | 0.1971   | 485.2  |
| Cauvery Delta         without 15%         0.00         1136.0         0.00         1136.0         0.00         0.05         136.0         0.00         1036.0         0.00         1036.0         0.00         1036.0         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0.00         993.6         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |   |                         | 1         | %06         | 00.0        | 1136.0     | 0.00         | 1136.0   |           |             |          |      | 1303.7      |        | 0.06    | 66.4       | 66.4      | 222.8       | 168.0  | 120.6  | 1588.4   | 284.7  |
| Cauvery Delta         without 55%         0.00         9075.0         389.0         461.0         0.00         10.56         9935.6         8.684         724.0         311.2         368.8         1404         1050.6         0.0         1139         1           water 90%         0.00         9075.0         0.00         9075.0         389.0         461.0         0.00         10.56         9935.6         0.00         9935.6         8684         724.0         311.2         368.8         1404         1632.0         0.0         11720         1           water 90%         0.00         9075.0         0.00         9075.0         461.0         0.00         10.56         9935.6         0.00         9935.6         8684         724.0         311.2         368.8         1404         193.0         0.0         10279           with 50%         0.00         9075.0         0.00         9075.0         461.0         0.00         10.56         9935.6         0.00         9035.6         1050.6         1050.8         368.4         724.0         311.2         368.8         1404         193.0         0.0         10279           with 55%         0.00         9075.0         461.0         461.0         0.00 </td <td></td> <td></td> <td></td> <td>100%</td> <td>0.00</td> <td>1136.0</td> <td>00.00</td> <td>1136.0</td> <td>_</td> <td></td> <td></td> <td></td> <td>1302.7</td> <td></td> <td>0.06</td> <td>66.4</td> <td>66.4</td> <td>222.8</td> <td>65.0</td> <td>120.6</td> <td>1485.4</td> <td>182.8</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |   |                         |           | 100%        | 0.00        | 1136.0     | 00.00        | 1136.0   | _         |             |          |      | 1302.7      |        | 0.06    | 66.4       | 66.4      | 222.8       | 65.0   | 120.6  | 1485.4   | 182.8  |
| 50%         0.00         9075.0         0.00         9075.0         461.0         0.00         10.56         9035.6         6.00         9935.6         8684         724.0         311.2         368.8         1404         1632.0         0.0         11720           90%         0.00         9075.0         389.0         461.0         0.00         10.56         9935.6         0.00         9935.6         8684         724.0         311.2         368.8         1404         163.0         0.0         10.57         9035.0         10.56         9935.6         0.00         9935.6         0.00         9035.6         10.56         9935.6         0.00         9935.6         140         368.8         1462         191.0         0.0         10.279         10.20         10.00         9035.0         10.56         9935.6         0.00         9935.6         10.00         8684         724.0         316.2         1462         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279         10.279                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |   | Cauvery Delta           | without   | 75%         | 00'0        | 9075.0     | 0.00         | 9075.0   |           |             |          |      | 9935.6      |        | 724.0   | 311.2      | 368.8     | 1404        | 1050.6 | 0.0    | 11139    | 1203.1 |
| 90%         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         0.00         9075.0         461.0         0.00         10.56         9035.6         0.00         9035.6         0.00         9075.0         11.21         368.8         174.0         311.2         368.8         1462         1050.6         1077.9           50%         0.00         9075.0         461.0         0.00         10.56         9935.6         0.0         100008         8684         724.0         368.8         1462         1050.6         224.6         11421         1           50%         0.00         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008         8684         724.0         368.8         1462         1630.6         224.6         11421         1           400%         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008 <td></td> <td></td> <td>Sround</td> <td>50%</td> <td>00'0</td> <td>9075.0</td> <td>0.00</td> <td>9075.0</td> <td></td> <td></td> <td></td> <td></td> <td>9935.6</td> <td></td> <td>724.0</td> <td>311.2</td> <td>368.8</td> <td>1404</td> <td>1632.0</td> <td>0.0</td> <td>11720</td> <td>1784.4</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |                         | Sround    | 50%         | 00'0        | 9075.0     | 0.00         | 9075.0   |           |             |          |      | 9935.6      |        | 724.0   | 311.2      | 368.8     | 1404        | 1632.0 | 0.0    | 11720    | 1784.4 |
| 100%         0.00         9075.0         0.00         9075.0         0.00         9075.0         461.0         0.00         10.56         9035.6         0.00         9035.6         10.00         9035.6         10.00         9035.6         10.00         9035.6         10.00         9035.6         0.00         9035.6         0.00         9035.6         0.00         9035.6         0.00         9035.6         0.00         9035.6         0.00         10.00         9035.6         0.00         10.00         9035.6         0.00         10.00         9035.6         0.00         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         9035.0         10.00         10.00         10.00         10.00 <th< td=""><td></td><td></td><td>1</td><td>%06</td><td>00.00</td><td>9075.0</td><td>00.00</td><td>9075.0</td><td></td><td></td><td></td><td></td><td>9935.6</td><td></td><td>724.0</td><td>311.2</td><td>368.8</td><td>1404</td><td>589.0</td><td>0.0</td><td>10677</td><td>7414</td></th<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |   |                         | 1         | %06         | 00.00       | 9075.0     | 00.00        | 9075.0   |           |             |          |      | 9935.6      |        | 724.0   | 311.2      | 368.8     | 1404        | 589.0  | 0.0    | 10677    | 7414   |
| 75%         0.00         9075.0         0.00         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008         8684         724.0         368.8         1462         1620.6         224.6         11421         1           50%         0.00         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008         8684         724.0         318.2         1588         1632.0         224.6         1121.8         2           90%         0.00         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008         8684         724.0         368.8         1462         589.00         224.60         1018         2           100%         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008         8684         724.0         368.8         1462         589.00         224.60         10959                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |   |                         |           | <b>%001</b> | 0.00        | 9075.0     | 00.00        | 9075.0   |           |             |          |      | 9935.6      |        | 724.0   | 311.2      | 368.8     | 1404        | 0.161  | 0.0    | 10279    | 343.4  |
| 50%         0.00         9075.0         0.00         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008         8684         724.0         311.2         368.8         158.8         158.8         153.0         224.6         12128         2           90%         0.00         9075.0         461.0         461.0         0.00         10.56         9935.6         0.0         10008         8684         724.0         368.8         1462         589.00         224.60         10959           100%         0.00         9075.0         461.0         461.0         0.00         10.36         10008         8684         724.0         368.8         1462         589.00         224.60         10959                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |   |                         | with      | 75%         | 0.00        | 9075.0     | 00.00        | 9075.0   |           |             |          |      | 10008       |        | 724.0   | 368.8      | 368.8     | 1462        | 1050.6 | 224.6  | 11421    | 1413.3 |
| 90% 0.00 9075.0 0.00 9075.0 461.0 461.0 0.00 10.56 10.008 0.0 10.008 8684 724.0 368.8 368.8 1462 589.00 224.60 10569 10561 10008 0.0 10008 8684 724.0 368.8 368.8 1462 589.00 224.60 10561                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |   |                         | ground    | 20%         | 0.00        | 9075.0     | 0.00         | 9075.0   | - 1       | ٠.          | _        |      | 10008       |        | 724.0   | 311.2      | 368.8     | 1588        | 1632.0 | 224.6  | 12128    | 2120.5 |
| 0.00 9075.0 0.00 9075.0 461.0 461.0 0.00 10.56 10008 0.0 10008 8684 724.0 368.8 368.8 1462 191.00 224.60 10361                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |   |                         |           | %06         | 00:00       | 9075.0     | 0.00         | 9075.0   | - 1       |             |          |      | 10008       |        | 724.0   | 368.8      | 368.8     | 1462        | 00'685 | 224.60 | 10959    | 951.6  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | _ |                         |           | %001        | 0.00        | 9075.0     | 0.00         | 9075.0   |           |             |          |      | 10008       |        | 1       | 368.8      | 368.8     | 1462        | 191.00 | 224.60 | 10201    | 553.6  |

Table 4.13.1: Cauvery River Basin-Monthly Water Balance (Surplus/Deficit) for 75%, 50%, 90% and 100% Water Year Dependable Flow

| Ground water % Dep.            | Jul Aug Sep                 | Oct        | Nov      | Dec           | Jan Feb          | Mar           | Apr      | May Annual                                       |
|--------------------------------|-----------------------------|------------|----------|---------------|------------------|---------------|----------|--------------------------------------------------|
| (4) (5) (6)                    | (7) (8)                     | (6)        | (10)     | (11)          | (12) (13)        | (14)          | (15)     | (16) (17)                                        |
| 75% -154.57 598.37             | 7 367.15 -290.37            | 37 -391.29 | -17.62   | -57.12   -93  | 23 -117          | .28  -117.71  |          | -                                                |
| 50% 68.81 565.98               | 3 -302.62 -338.79           |            | 101.27   | -80.90        | -107.76 -117.04  | 04 -63.26     | $\dashv$ | 309.11 188.30                                    |
| -60.12                         | -341.94                     |            |          | +             | <u>·</u>         |               | <u>~</u> | +                                                |
| -03.40                         | -370.60                     |            | +        |               | _ -              | - -           | 10.00    | +                                                |
| 50% -110.20 671                | 671 10 106 41 234 78        | 0C117- 00  | 107.57   | 20.14         | 70 30 -8 04      | 40.20         | 230.85   | 26.002 06.01                                     |
| -15.83                         | -235.73                     |            | +        | +             | <del> </del>     | +;            | +        | <del>                                     </del> |
| 100% -39.20                    | 9.02                        | 51 -268.12 |          |               | -89.39 -60.00    | 0 -106.17     | 66.49    | 152.23 -1935.29                                  |
| 75% 139.96 18                  | 181.53 192.31 -1.37         | 7 125.87   | 21.54    | -101.06  -20  | -202.50 -184.0   | 01.68-10      | -0.85    | 31.61 107.62                                     |
| 50% 133.63                     |                             |            |          |               |                  | $\vdash$      | -+       | $\dashv$                                         |
| 124.43                         |                             | 50 257.47  | -3.14    | -166.18 -26   |                  | $\dashv$      | 33.43    | _                                                |
| 6 10.28                        | -172.78   -170.23   -174.77 | 77 55.33   | 40.77    | -172.39  -26  | -261.15 -240.86  |               | 6.62     | 98.65 -1910.19                                   |
| 140.87                         | 182.46 193.24 -0.47         | 7 126.80   | 22.45    | -100.13   -20 | -201.57 -183.17  | 17 -88.77     | 0.05     |                                                  |
| 140.73                         | -176.39 218.82 322.76       | 6 208.88   | -21.48 - | -141.69 -21   | -218.06  -198.35 | 35 -108.52    | 4.42     |                                                  |
| ground water 90% 131.53 -46    | -46.74 -16.15 -108.12       | 2 262.58   | 13.94    | -131.55  -21  | -211.64  -193.00 | 00 -61,57     | 38.25    | 135.61 -487.37                                   |
| 17.38                          | .04 -103.01 -121.29         | 60.44      |          | -137.76 -21   | -210.57 -194.85  | \$5 -88.46    | 11.44    | 100.30   -1534.79                                |
| 75% -0.25 -35.47               | .47   -37.15   46.74        | 1   294.72 | 88.65    | -39.34 -68    | -68.87 -55.77    | 7   -35.21    | -16.19   | 8.86 150.81                                      |
| 50% 3.26 -33                   | -33.28 -34.37 66.99         | 367.44     | 117.53   | -35.69 -68    | -68.76 -55.75    | 5 -35.15      | -15.37   | 14.40 294.8                                      |
| -3.01                          | -37.19 -39.34 30.85         | 5 237.62   |          | -42.21 -68    | -68.96 -55.79    | 9 -35.26      | -16.85   | 4.51 37.79                                       |
| -7.62                          | 40.07   42.99   4.28        | 142.20     | 28.09    | 47.01 -69     | -69.10 -55.83    | 3   -35.33    | -17.93   | -2.75 -151.19                                    |
| 6.40                           | 16.71 21.55 91.07           | 7 299.95   | 124.89   | 28.56 21      | 21.55 15.39      | 9 2.42        | -2.49    | 14.17 640.15                                     |
| 50% 5.27                       | 2                           | 7 244.77   | 109.88   |               | 39.59 29.67      | 10.09         | -0.14    | $\dashv$                                         |
| ground water   90%   6.73   27 | 27.11 32.77 85.83           | 3 246.28   | 111.35   | 40.92 41      | 41.11 31.03      | 3   11.61     | 1.32     | 12.72 646.06                                     |
| 100% -0.89                     | 12.16 15.78 49.04           | 148.99     | 64.95    | 20.97 21      | 21.32   15.33    | 3 2.31        | 4.21     | 2.68 341.17                                      |
| 75% -37.40 -3                  | -35.73 48.70 -205.15        | -187.09    | 60'06-   | -46.48 -36    | -36.57   -28.21  | 1 -25.94      | -24.56   | -33.27 -799.19                                   |
| 50% -43.95 -41                 | 40.58 -57.64 -269.59        | -245.56    | -114.03  | -52.95 -39    | -39.11 -29.87    | 7 -27.18      | -26.38   | -38.33 -697.19                                   |
| 90% -32.01 -31                 | -31.73 41.34 -152.09        | -138.94    | -70.38   | 41.15 -34     | -34.47 -26.85    | 5 -24.91      | -23.06   | -29.11 -883.19                                   |
| 100% -26.88 -2                 | -27.92 -34.32 -101.55       | -93.08     | -51.60   | -36.06 -32    | -32.46 -25.55    | 5 -23.93      | $\vdash$ | -25.14 -500.11                                   |
| 75% -35.91 -3                  | -30.33 41.07 -196.97        | -181.73    | -83.01   | -31.44 -19    | -19.69 -17.63    | 3 -19.91      | -22.29   | -32.59 -712.56                                   |
|                                |                             | 48.79      |          | -126.25 -14   | -147.76 -99.77   | 7 -69.26      | -39.10   | -+                                               |
| -38.84                         | 45                          | -207.88    | -93.71   | -34.33 -20    | -20.82 -18.38    | <del>  </del> | ┝┤       |                                                  |
| $\dashv$                       | -22.69 -26.85 -93.54        | 4 -87.89   | -44.69   | -21.19 -15    | -15.75   -15.14  | 4 -18.07      | -19.53   | -24.62 -415.48                                   |

Table 4.13.2: Cauvery River Basin-Monthly Water Balance (Surplus/Deficit) for 75%, 50%, 90% and 100% Water Year Dependable Flow

|   | Mar Apr May Annual |       | (14) (15) (16) (17) | -3.31 -3.10 -2.86 67.42 | -3.17 -3.03 -2.78 89.78 | -3.43 -3.15 -2.94 12.98 | -3.63   -3.24   -3.06   -73.57 | 12.42   2.11   -2.27   268.94 | 2.17        | 12.30 2.05 -2.34 214.50 | 12.11 1.97 -2.47 127.95 | -8.19 -2.88 -0.55 -80.41 | -8.02 -2.16 1.90 -23.41 | -8.27 -3.23 -1.75 -108.41 | -8.30 -3.36 -2.18 -118.41 | -4.31 -2.20 -0.70 -22.11 | -6.05 -3.32 -0.15 12.48 | -4.39 -2.55 -1.90 -50.11 | -4.42 -2.68 -2.33 -60.11 | -16.19 -5.45 -0.59 -161.49 | -15.20 -5.34 0.54 -95.48 | -16.68 -5.50 -1.15 -194.49 | -17.48 -5.59 -2.07 -248.48 |                 | -5.98 -2.75 1.32 44.22 | -8.02 -3.45 -0.92 -61.49 | -8.82 -3.54 -1.84 -115.48 | -222.45  -168.36  -386.71  -13103.1 | -252.72 -190.83 -460.45 -15964.6 | -188.67 -143.32 -304.84 -13183.1 | -128.66 -98.81 -158.19 -13326.1 | -199.32 -150.67 -370.12 -12932.2 | -229.05 -172.61 -443.31 -15787.0 | 2 5 5 5 6 5 6 5 6 5 6 5 6 5 6 5 6 6 6 6 |
|---|--------------------|-------|---------------------|-------------------------|-------------------------|-------------------------|--------------------------------|-------------------------------|-------------|-------------------------|-------------------------|--------------------------|-------------------------|---------------------------|---------------------------|--------------------------|-------------------------|--------------------------|--------------------------|----------------------------|--------------------------|----------------------------|----------------------------|-----------------|------------------------|--------------------------|---------------------------|-------------------------------------|----------------------------------|----------------------------------|---------------------------------|----------------------------------|----------------------------------|-----------------------------------------|
|   | Jan   Feb          | +     | (12) (13)           | -1.63   -2.41           | -1.08   -2.09           | -2.11 -2.68             | -2.89 -3.13                    | 23.62 20.48                   | 24.17 20.80 | 23.14 20.20             | 22.37   19.75           | -14.51 -12.85            | -14.42 -12.55           | -14.55 -13.00             | -14.57 -13.05             | -6.52   -5.71            | -8.33   -7.12           | -6.56 -5.86              | -6.58   -5.91            | -24.76 -27.33              | -22.95 -26.24            | -25.67   -27.87            | -27.15 -28.76              | -10.67   -12.35 | -8.32 -10.77           | -11.58 -12.89            | -13.06 -13.78             | -219.08 -196.32                     | -260.82 -224.29                  | -172.58 -165.32                  | -89.92 -109.68                  | -210.32 -177.42                  | -251.46 -204.90                  | -163.82 -146.42                         |
|   | Dec                | ( )   | (11)                | 3.54                    | 5.02                    | 2.27                    | 0.18                           | 21.09                         | 22.58       | 19.82                   | 17.73                   | - 68.6-                  | -9.11                   | -10.27                    | -10.41                    | -4.64                    | -5.76                   | -5.02                    | -5.16                    | -19.12                     | -16.69                   | -20.33                     | -22.32                     | -7.59           | -4.62                  | -8.80                    | -10.79                    | -656.16                             | -790.52                          | -506.72                          | -240.05                         | -637.78                          | -771.57                          | -488.35                                 |
| - | Oct Nov            |       | (6)                 |                         | 27.02 26.44             | 17.85 17.39             | 10.90 10.52                    | 24.24 29.87                   | 29.17 34.73 | 20.00 25.68             | 13.04 18.81             | 6.52 3.83                | 20.77 18.26             | -0.48 -3.26               | -2.98 -5.79               | 6.84 6.05                | 19.19 18.64             | -0.16 -1.04              | -2.66 -3.57              | 1.84 -13.70                | 6.49 -13.55              | -0.49 -13.78               | 4.29   -13.91              | 3.78 -7.08      | 8.99 -6.39             | 1.45 -7.16               | -2.35 -7.29               | 4322.6   -2940.8                    | -5307.5 -3604.8                  | -3228.5 -2203.2                  | -1272.3   -884.5                | 4309.6 -2925.3                   | -5293.9 -3588.7                  | -3215.5 -2187.7                         |
|   | Sep                | +     | (8)                 |                         | 29.68 2.                | .1 98.61                | 11.54                          | 52.48 24                      | _           | 47.70 20                | 39.88                   | -5.90                    | 8.47 2(                 | -12.96 -(                 | -15.48 -2                 | 2.67 6                   | 15.20 19                | -4.39                    | 7- 16.9-                 | 10.00                      | 8.05 6                   | -19.02                     | -33.79                     | 10.05           | 28.64 8                | 1.03                     | -13.74 -2                 | -3203.5 43                          | -3927.6 -5                       | -2399.1 -32                      | 71- 8.096-                      | -3187.5 -4:                      | -3911.0 -52                      | -2383.0   -32                           |
|   | Ang                |       | (7)                 |                         | 3 14.33                 | 8.51                    | -                              | -                             |             |                         |                         | 11 -16.92                |                         |                           | 9 -18.59                  |                          | 9   -5.70               |                          | -                        | 5   -21.45                 | A.                       | _                          | 4 -43.02                   |                 | 20.31                  | 8 -4.78                  | 5 -18.17                  | 75 -170.13                          | 19 -204.52                       | 16 -131.97                       | 4 -63.62                        | 13 -166.01                       | 29 -199.80                       | 85 -127.85                              |
|   | Jun Jul            | +     | -                   | -2.92 1.08              | -2.85 2.28              | -2.97 0.05              | -3.07 -1.64                    | -1.28 39.58                   | -1.21 40.78 | -1.33 38.54             | -1.43 36.85             | 1.08 -17.01              | 1.25 -12.39             | -2.22 -19.28              | -2.63   -20.09            | -0.89   -5.41            | -0.41 -2.69             | -2.02 -7.68              | -2.44 -8.49              | 6.00 -30.75                | 12.20 -17.70             | 2.90 -37.27                | -2.17 -47.94               |                 | 21.39 9.92             | 3.93 -10.18              | -1.14 -20.85              | 460.17 -156.75                      | -554,46 -186.19                  | -355,25 -124.16                  | -168.06 -65.74                  | -447.75 -150.43                  | -541.49 -179.29                  | -342.83 -117.85                         |
|   |                    | Sec   | (4)                 |                         | - %09                   | - %06                   | 100%                           | 75% -                         |             |                         |                         | 75% -                    |                         | - %06                     | 100%                      | 75%                      | 20%                     |                          | - %001                   | 75% (                      | 50% 1                    | %06                        |                            | 75%             |                        |                          |                           | 75% -4                              | 20% 5                            | 90% -3                           | 100%                            | 75% -4                           | 50%5                             | 80%                                     |
|   | Ground water       |       | (3)                 |                         | Without                 | ground water            |                                |                               | With        | ground water            |                         |                          | Without                 | ground water              |                           |                          | With                    | ground water             |                          |                            | Without                  | ground water               |                            |                 | With                   | ground water             |                           |                                     | Without                          | ground water                     |                                 |                                  | With                             | ground water                            |
|   | Nan                | basın | (2)                 | Middle Cauvery          |                         |                         |                                |                               |             |                         |                         | Suvamavathi              |                         |                           |                           | ,                        |                         |                          |                          | Palar                      |                          |                            |                            |                 |                        |                          |                           | Chinnar                             |                                  |                                  |                                 |                                  |                                  |                                         |
| Ì | SI.No.             |       | Ξ                   | _                       |                         |                         |                                |                               |             | _                       |                         | 2                        |                         |                           |                           |                          | •                       |                          |                          | 3                          |                          |                            |                            |                 |                        |                          |                           | 4                                   |                                  |                                  |                                 |                                  |                                  |                                         |

Table 4.13.3: Cauvery River Basin-Monthly Water Balance (Surplus/Deficit) for 75%, 50%, 90% and 100% Water Year Dependable Flow

| (6) (7) (8)  -8.84 -61.01 -20.44 -112.51 -89.26 25.06 -179.61 -91.56 -33.01 -148.77 -171.34 -54.01 -21.80 -33.18 -8.51 -85.26 -64.83 33.70 -148.96 -63.72 -21.08 -30.70 -26.54 -11.19 -30.76 -26.54 -11.19 -30.76 -26.54 -11.82 -29.78 -26.70 -12.75 -27.03 -23.84 -10.54 -27.03 -23.84 -10.86 -192.25 -154.17 -40.31 -249.64 -185.27 132.30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (9) (9) (9) (44.94 (91) (91) (92.94 (92.94 (92.94 (92.94 (92.94 (92.94 (92.94 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                |                                                                               | (6)                                                                                                                                                                     | 1                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                             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-61.01<br>-89.26<br>-91.56<br>-171.34<br>-64.83<br>-64.83<br>-63.72<br>-143.51<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54 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                                               | 98.80                                          |                                                                               | [7]                                                                                                                                                                     | (3)                                                                                                                                                                                                                        | (14)                                                                                                                                                                                                                                                                              | (3)                                                                                                                                                                                                                                                                                                                                       | (91)                                                                                                                                                                                                                                                                                                                                                                                              | (71)                                                                                                                                                                                                                                                                                                                                                                                                                                                 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| -89.26<br>-91.56<br>-171.34<br>-54.83<br>-64.83<br>-63.72<br>-143.51<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54 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                                               | 77.21                                          | 35.44                                                                         |                                                                                                                                                                         | -139.19                                                                                                                                                                                                                    | -164.53                                                                                                                                                                                                                                                                           | -54.69                                                                                                                                                                                                                                                                                                                                    | -22.55                                                                                                                                                                                                                                                                                                                                                                                            | -424.92                                                                                                                                                                                                                                                                                                                                                                                                                                              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| -91.56<br>-171.34<br>-53.18<br>-64.83<br>-63.72<br>-143.51<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.34<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36<br>-26.36 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                                               |                                                | 34.52                                                                         | -67.10                                                                                                                                                                  | 16.66-                                                                                                                                                                                                                     | -78.08                                                                                                                                                                                                                                                                            | -27.08                                                                                                                                                                                                                                                                                                                                    | 40.53                                                                                                                                                                                                                                                                                                                                                                                             | 101.90                                                                                                                                                                                                                                                                                                                                                                                                                                               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| -171.34<br>-64.83<br>-63.72<br>-143.51<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27. 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                                                                                                                                                                                                            | -48.21                                                                                                                                                                                                                                                                                                                                    | -3.63                                                                                                                                                                                                                                                                                                                                                                                             | -829.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| -33.18<br>-64.83<br>-63.72<br>-143.51<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-26.56<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-26.57<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.84<br>-27.8 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                                                                                                                                                                                                            | 13.97                                                                                                                                                                                                                                                                                                                                     | -27.18                                                                                                                                                                                                                                                                                                                                                                                            | -1124.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| -64.83<br>-63.72<br>-143.51<br>-26.54<br>-26.54<br>-26.54<br>-26.54<br>-23.84<br>-23.84<br>-23.84<br>-23.84<br>-23.84<br>-154.17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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              | 39.41                                                                         | -64.87                                                                                                                                                                  | -115.71                                                                                                                                                                                                                    | -138.23                                                                                                                                                                                                                                                                           | 45.64                                                                                                                                                                                                                                                                                                                                     | -16.76                                                                                                                                                                                                                                                                                                                                                                                            | -247.39                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| -63.72<br>-143.51<br>-26.54<br>-26.54<br>-26.54<br>-25.84<br>-23.84<br>-23.84<br>-23.84<br>-154.17                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     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| -145.23 -113.44 -19.87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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              | 36.43                                                                         | -37.17                                                                                                                                                                  | -102.99                                                                                                                                                                                                                    | -147.29                                                                                                                                                                                                                                                                           | -82.74                                                                                                                                                                                                                                                                                                                                    | -62.52                                                                                                                                                                                                                                                                                                                                                                                            | -309.51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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              | 79.67                                                                         | -18.26                                                                                                                                                                  | -50.19                                                                                                                                                                                                                     | -71.71                                                                                                                                                                                                                                                                            | -40.37                                                                                                                                                                                                                                                                                                                                    | -30.56                                                                                                                                                                                                                                                                                                                                                                                            | 218.64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| -39.86                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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              | 148.53                                                                        | -26.28                                                                                                                                                                  | -57.43                                                                                                                                                                                                                     | -79.73                                                                                                                                                                                                                                                                            | -48.13                                                                                                                                                                                                                                                                                                                                    | -38.58                                                                                                                                                                                                                                                                                                                                                                                            | 583.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| -41.87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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              | 65.47                                                                         | -28.28                                                                                                                                                                  | -59.24                                                                                                                                                                                                                     | -81.73                                                                                                                                                                                                                                                                            | -50.07                                                                                                                                                                                                                                                                                                                                    | 40.59                                                                                                                                                                                                                                                                                                                                                                                             | 75.64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| -41.87                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 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              | 55.59                                                                         | -28.28                                                                                                                                                                  | -59.24                                                                                                                                                                                                                     | -81.73                                                                                                                                                                                                                                                                            | -50.07                                                                                                                                                                                                                                                                                                                                    | 40.59                                                                                                                                                                                                                                                                                                                                                                                             | 16.64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| -41.29<br>-18.37<br>-24.05<br>-28.52<br>-28.82                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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-63.04<br>-21.08<br>-16.81<br>-31.43<br>-32.98 | -63.04 223.93   -21.08 301.08   -16.81 531.10   -31.43 278.11   -32.98 247.51 | -63.04     223.93     84.11       -21.08     301.08     144.94       -16.81     531.10     266.11       -31.43     278.11     128.23       -32.98     247.51     111.65 | -63.04     223.93     84.11     36.43       -21.08     301.08     144.94     79.67       -16.81     531.10     266.11     148.53       -31.43     278.11     128.23     65.47       -32.98     247.51     111.65     55.59 | -63.04     223.93     84.11     36.43     -37.17       -21.08     301.08     144.94     79.67     -18.26       -16.81     531.10     266.11     148.53     -26.28       -31.43     278.11     128.23     65.47     -28.28       -32.98     247.51     111.65     55.59     -28.28 | -63.04     223.93     84.11     36.43     -37.17     -102.99       -21.08     301.08     144.94     79.67     -18.26     -50.19       -16.81     531.10     266.11     148.53     -26.28     -57.43       -31.43     278.11     128.23     65.47     -28.28     -59.24       -32.98     247.51     111.65     55.59     -28.28     -59.24 | -63.04     223.93     84.11     36.43     -37.17     -102.99     -147.29       -21.08     301.08     144.94     79.67     -18.26     -50.19     -71.71       -16.81     531.10     266.11     148.53     -26.28     -57.43     -79.73       -31.43     278.11     128.23     65.47     -28.28     -59.24     -81.73       -32.98     247.51     111.65     55.59     -28.28     -59.24     -81.73 | -63.04       223.93       84.11       36.43       -37.17       -102.99       -147.29       -82.74         -21.08       301.08       144.94       79.67       -18.26       -50.19       -71.71       -40.37         -16.81       531.10       266.11       148.53       -26.28       -57.43       -79.73       -48.13         -31.43       278.11       128.23       65.47       -28.28       -59.24       -81.73       -50.07         -32.98       247.51       111.65       55.59       -28.28       -59.24       -81.73       -50.07 |

Table 4.13.4: Cauvery River Basin-Monthly Water Balance (Surplus/Deficit) for 75%, 50%, 90% and 100% Water Year Dependable Flow

| Commant Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ON IV | Name of Sub-   | Ground water | %    | Jun     | Int    | Aug    | Sep    | Oct    | Nov    | Dec    | Jan    | Feb    | Mar    | Apr    | Mav    | Annual  |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------------|--------------|------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Pommani Ar Without                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                |              | Dep. |         |        | 0      |        |        |        |        |        |        |        |        | }      |         |
| Pounmai Ar         Without Styles         12/13         11.213         11.84         11.11         8.90         9.78         4.128         1.15         9.00         9.78         4.128         1.15         9.00         9.78         4.128         1.15         9.00         9.78         4.12         9.72         4.12         9.00         9.78         1.15         9.00         9.78         4.12         9.75         4.12         6.00         9.78         1.15         9.75         9.80         9.78         4.15         9.75         4.15         9.70         9.81         9.70         9.81         9.70         9.81         9.80         9.70         9.82         9.90         9.90         9.70         9.82         1.10         6.00         6.00         6.00         9.70         9.82         1.10         6.00         9.70         9.82         1.10         6.00         9.70         9.83         1.20         9.70         9.83         1.10         9.70         9.83         1.10         9.70         9.83         1.10         9.70         9.83         1.10         9.70         9.83         1.10         9.70         9.83         1.10         9.70         9.83         1.10         9.80         9.70         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Ξ     | (2)            | (3)          | (4)  | (5)     | (9)    | (7)    | (8)    | (6)    | (10)   | (11)   | (12)   | (13)   | (14)   | (15)   | (16)   | (11)    |
| Without Signs         1909.         -12.12         -18.24         -1.20.0         14.75         19.05         -1.20.0         -1.20.0         14.75         19.05         -1.20.0         -1.20.0         14.75         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.0         -1.20.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -     | Ponnani Ar     |              | 75%  | 1-12.73 | -18.84 | -11.51 | 8.90   | 9.78   | 43.78  | -1.59  | -13.73 | 0.19   | -7.17  | -8.83  | -1.99  | -13.74  |
| ground water         99%         -13.10         -19.21         -12.0         5.28         4.01         33.06         -5.87         -15.33         -11.00         -6.83         -15.10         -5.88         -12.01         -5.88         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01         -12.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                |              | %05  | -12.12  | -18.24 | -10.70 | 14.75  | 19.08  | 90.19  | 5.32   | -11.30 | 2.42   | -5.72  | -8.22  | -0.08  | 36.26   |
| With the column water   100%   14.27   20.38   4.156   5.95   1.18   5   0.12   19.14   19.89   5.48   1.087   1.040   6.48   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087   1.087  |       |                | -            | %06  | -13.10  | -19.21 | -12.01 | 5.28   | 4.01   | 33.06  | -5.87  | -15.23 | -1.19  | -8.07  | -9.21  | -3.17  | -44.71  |
| With proof of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of the control of                      |       |                |              | %001 | -14.27  | -20.38 | -13.56 | -5.95  | -13.85 | -0.12  | -19.14 | -19.89 | -5.48  | -10.87 | -10.40 | -6.83  | -140.74 |
| Toward Watch   50%   2.58   4.89   3.15   56.87   4.82   85.08   17.80   13.73   56.61   9.96   3.96   3.66   1.05   1.06   1.06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                |              | 75%  | 3.88    | 6.25   | 4.31   | 22.94  | 40.94  | 69.70  | 32.86  | 13.90  | 7.55   | 5.98   | 2.34   | 6.24   | 216.89  |
| ground water glow, without Coleroon         115         348         1.34         1.70         32.73         56.61         2.6.1         9.6.6         3.96         2.6.3         -0.41         2.6.0           Upper Coleroon         Without Store and without Coleroon         Without Without Without Coleroon         1.00%         -0.34         -5.92         -6.16         -17.49         9.50         6.63         174.75         9.04         15.21         -0.46         -1.07         -2.38         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.86         -1.87         9.90         -6.64         -1.87         -1.87         -1.87         -1.87         9.90         -6.63         -1.87         -1.87         -1.87         -1.86         -1.87         -1.87         -1.88         -1.87         -1.87         -1.88         -1.87         -1.87         -1.89         -1.88         -1.87         -1.87         -1.89         -1.88         -1.89         -1.89         -1.89         -1.89         -1.89         -1.89         -1.89         -1.89         -1.89         -1.89         -1.89                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       | -              | ď            | %09  | 2.58    | 4.89   | 3.15   | 26.87  | 48.28  | 85.08  | 37.80  | 14.35  | 8.00   | 5.46   | 1.05   | 6.18   | 243.69  |
| Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   Mithou   M |       |                |              | %06  | 1.15    | 3.48   | 1.34   | 17.00  | 32.73  | 56.61  | 26.14  | 96.6   | 3.96   | 2.63   | -0.41  | 2.60   | 157.17  |
| Without Olercoon         York Colercoon         Without Store Colercoon         128%         -2.80         -66.16         -17.49         45.70         13.26         9.70         -3.83         -13.49         -3.86         4.80           Without Store Colercoon         10.70         -3.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.71         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72         -8.72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                |              | 100% | -0.02   | 2.31   | -0.21  | 5.77   | 14.87  | 23.43  | 12.87  | 5.30   | -0.33  | -0.17  | -1.60  | -1.06  | 61.17   |
| Without varied by Mithout Average (100%)         1.094         -9.994         -9.992         48.15         9.046         15.21         -0.46         10.77         2.38         7.38           ground water ground water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided water provided w                                                                                                                                          | 2     | Upper Coleroon |              | 75%  | -2.80   | -69.07 | 91.19- | -17.49 | 45.70  | 132.50 | 66.63  | 9.70   | -3.83  | -13.49 | -3.86  | 4.80   | 86.64   |
| ground water         90%         4.23         7.6.14         7.120         -35.69         9.96         48.24         5.45         -6.44         -15.60         -5.00         2.81           With With Out York Coleroon         With With Without Sound water         100%         -7.74         -93.44         -95.77         -80.26         -10.02         20.03         3.21         -4.96         -12.81         -2.07         -7.78         -2.07         -7.74         -93.44         -95.77         -80.26         -10.02         20.03         3.21         -4.96         -12.81         -2.07         -7.78         -2.07         -7.74         -2.07         -7.74         -95.77         -80.26         -10.02         20.03         3.50         -2.06         -2.07         -7.78         -2.07         -7.74         -2.07         -7.74         -5.73         -8.98         104.41         -8.18         25.21         48.96         11.13         -2.19         -2.19         -2.19         -2.19         -2.18         -2.17         -2.18         -2.13         -2.18         -2.13         -2.18         -2.19         -2.19         -2.19         -2.19         -2.19         -2.19         -2.19         -2.19         -2.19         -2.19         -2.19         -2.19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | ·<br>·         |              | 20%  | -0.94   | -59.92 | -48.15 | 60.9   | 66.63  | 174.75 | 90.46  | 15.21  | -0.46  | -10.77 | -2.38  | 7.38   | 236.64  |
| With Vithout Colored         774         93.44         95.77         86.26         10.02         20.03         3.21         4.96         1.281         20.75         7.78         2.07           With With Vithout Colored         With With Sov. 4.74         3.713         1.16         6.59         86.04         117.13         8.0.58         15.09         -0.61         0.86         7.04           Lower Coleron         Without Sov. 7.67         1.0.73         1.16         6.59         86.04         117.13         8.0.13         1.21         2.0.7         -0.28         7.04           Lower Coleron         Without Sov. 7.67         2.96         6.138         2.13         7.36         35.28         15.13         -1.10         -5.73         -9.90         -5.03         -1.87           Lower Coleron         Without Sov. 7.67         2.96         61.98         74.92         56.65         48.04         51.38         17.56         7.91         -9.90         -5.03         -6.84         -6.19         7.11         2.10         2.12         -1.10         -5.73         -9.90         -5.03         -6.84         -6.19         -1.11         -5.11         -5.73         -9.90         -5.03         -1.87         -1.87         -1.10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                |              | %06  | 4.23    | -76.14 | -71.20 | -35.69 | 29.54  | 06.66  | 48.24  | 5.45   | -6.44  | -15.60 | -5.00  | 2.81   | -28.36  |
| With ground water Power Coleroon         With with with water Power A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |       |                |              | 100% | -7.74   | -93.44 | -95.77 | -80.26 | -10.02 | 20.03  | 3.21   | -4.96  | -12.81 | -20.75 | -7.78  | -2.07  | -312.36 |
| With ground water         90% GO/A (17.1)         1.157 (11.1)         1.16 (6.99)         86.04 (10.1)         101.08 (11.1)         101.11         8.47 (2.12)         2.13 (2.02)         9.60 (11.1)         101.11         8.47 (2.12)         2.13 (2.02)         9.60 (11.1)         101.11         5.11 (2.1)         5.11 (2.1)         5.11 (2.1)         5.02 (2.1)         5.02 (2.1)         1.87 (2.1)         1.87 (2.1)         4.50 (2.1)         5.20 (2.1)         1.87 (2.1)         4.50 (2.1)         5.20 (2.1)         1.87 (2.1)         4.50 (2.1)         5.20 (2.1)         4.50 (2.1)         5.20 (2.1)         4.50 (2.1)         5.20 (2.1)         4.50 (2.1)         5.20 (2.1)         4.50 (2.1)         3.83 (2.1)         4.15 (2.1)         4.50 (2.1)         5.20 (2.1)         4.50 (2.1)         3.83 (2.1)         4.15 (2.1)         4.50 (2.1)         3.83 (2.1)         4.15 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)         4.20 (2.1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                |              | 75%  | 2.17    | -10.73 | 1.16   | 43.41  | 65.12  | 149.73 | 80.58  | 15.60  | 5.09   | -0.61  | 98.0   | 7.04   | 358.44  |
| Cower Coleroon         Without vater         90%         0.74         -17.80         -8.88         25.21         48.96         117.13         62.19         11.35         2.48         2.72         -0.28         5.05           Lower Coleroon         Without         75%         3.64         19.41         38.44         46.01         38.28         15.13         -1.10         -5.73         -9.90         -5.03         -1.87           Lower Coleroon         Without         75%         3.64         19.41         38.44         46.01         38.13         48.06         3.123         9.47         3.85         4.15         7.99         -5.03         -1.87           Cound water         90%         2.16         15.52         29.77         35.36         24.47         20.61         2.28         6.49         2.49         2.49         2.49         1.43           With         50%         8.62         14.49         16.61         9.22         7.61         8.89         1.12         1.24         0.08         0.33         0.22         1.00           Awith         50%         8.22         55.93         89.85         102.17         64.04         54.44         28.6         18.39         10.12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                |              | 20%  | 4.03    | -1.57  | 14.16  | 66.99  | 86.04  | 191.98 | 104.41 | 21.11  | 8.47   | 2.12   | 2.33   | 9.62   | 508.44  |
| Lower Coleroon         Without Style         3.64         19.41         38.44         46.01         33.13         28.00         31.23         9.47         3.85         4.15         4.50         5.03         -1.87           Lower Coleroon         Without Style         3.64         19.41         38.44         46.01         33.13         28.00         31.23         9.47         3.88         4.75         3.88         4.15         4.52         2.80           ground water Style         20%         2.16         8.68         14.92         56.65         48.04         3.88         17.56         7.59         4.19         6.61         9.47         2.80         3.58         1.75         7.59         4.75         3.53         4.47         2.61         2.28         6.49         2.49         2.79         3.56         2.47         2.44         2.66         3.28         1.65         3.28         1.61         9.20         2.76         2.80         1.43         1.66         9.47         1.64         3.54         4.61         3.52         3.64         1.84         3.66         1.24         0.68         1.94         1.66         9.14         3.66         1.89         1.24         3.66         1.89         1.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |                |              | %06  | 0.74    | -17.80 | -8.88  | 25.21  | 48.96  | 117.13 | 62.19  | 11.35  | 2.48   | -2.72  | -0.28  | 5.05   | 243.44  |
| Lower Coleroon         Without vater         59%         3.64         19.41         38.44         46.01         33.13         28.00         31.23         9.47         3.85         4.15         4.15         2.80           ground water         90%         7.67         29.96         61.98         74.92         56.65         48.04         53.88         17.56         7.91         9.19         6.54           ground water         90%         2.16         15.52         29.77         35.36         24.47         20.61         22.88         6.49         2.49         2.76         2.80         1.43           With         100%         -0.46         8.68         14.49         16.61         9.22         7.61         8.19         1.24         0.08         0.33         0.22         -1.00           With         50%         8.25         5.593         89.85         102.17         64.04         5.85         8.31         1.28         9.67         3.08         1.50         1.50         1.50         1.50         1.50         1.50         1.50         1.50         1.61         1.24         0.06         1.28         1.60         1.50         1.50         1.74         1.74         1.81                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                |              | 100% | -4.74   | -37.13 | -35.48 | -21.33 | 7.36   | 35.28  | 15.13  | -1.10  | -5.73  | -96.6- | -5.03  | -1.87  | -64.56  |
| Without ground water of the water of the water of the without awarer being without water being water are without water being water are without water being water being being water being without awarer being without a warer being without a                       | 3     | Lower Coleroon |              | 75%  | 3.64    | 19.41  | 38.44  | 46.01  | 33.13  | 28.00  | 31.23  | 9.47   | 3.85   | 4.15   | 4.52   | 2.80   | 222.16  |
| ground water         90%         2.16         15.52         29.77         35.36         24.47         20.61         22.88         6.49         2.49         2.76         2.80         1.43           With ground water of ground water of ground water a product water of ground water of ground water a product water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground water of ground ground ground ground ground ground ground ground ground ground ground ground ground ground                                                                                                                                                                                  |       |                | П            | 20%  | 7.67    | 29.96  | 86.19  | 74.92  | 56.65  | 48.04  | 53.88  | 17.56  | 7.56   | 7.91   | 9.19   | 6.54   | 377.59  |
| With Out with Out water Delta         5.05         46.26         67.19         74.12         41.40         35.25         36.89         11.29         7.21         9.30         5.81         2.87           With Out water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta with Out water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta water Delta with Delta water Delta with Delta water Delta with Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water Delta water                                                                                                                                                            |       |                |              | %06  | 2.16    | 15.52  | 29.77  | 35.36  | 24.47  | 20.61  | 22.88  | 6.49   | 2.49   | 2.76   | 2.80   | 1.43   | 166.72  |
| With out of the water of the with out of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the water of the wa                      |       |                | 1            | 100% | -0.46   | 89.8   | 14.49  | 16.61  | 9.22   | 7.61   | 8.19   | 1.24   | 0.08   | 0.33   | -0.22  | -1.00  | 64.75   |
| With ground water ground water by the strong water being water by the water being ground water by the strong water by the without water by the water being water by the water being water by the water by the water by the water by the water by the water by the water being water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by the water by th                      |       |                |              | 75%  | 5.05    | 46.26  | 61.19  | 74.12  | 41.40  | 35.25  | 36.89  | 11.29  | 7.21   | 9.30   | 5.81   | 2.87   | 340.16  |
| ground water Delta         90%         3.56         42.37         58.52         63.47         32.74         27.87         28.54         8.31         5.85         7.92         4.09         1.50           Cauvery Delta         100%         0.95         35.53         43.25         44.72         17.48         14.87         13.85         3.06         3.44         5.48         1.07         -0.93           Cauvery Delta         Without         50%         16.48         129.89         221.85         256.38         165.12         139.55         153.12         44.39         20.67         24.69         20.46         10.45           ground water Power With Water Power Book         4.68         98.94         152.79         171.57         96.14         80.77         86.25         20.63         9.79         13.63         6.74         -0.51           With Sow Sow Sow Sow Sow Sow Sow Sow Sow Sow                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                |              | %05  | 8.22    | 55.93  | 89.85  | 102.17 | 64.04  | 54.44  | 58.66  | 18.49  | 10.12  | 12.18  | 9.62   | 5.72   | 485.19  |
| Cauvery Delta         Without         75%         16.48         12.24         17.48         14.87         13.85         3.06         3.44         5.48         1.07         -0.93           Cauvery Delta         Without         50%         16.48         129.89         221.85         256.38         165.12         139.55         153.12         44.39         20.67         24.69         20.46         10.45           ground water         90%         4.68         98.94         152.79         171.57         96.14         80.77         86.25         20.63         9.79         13.63         6.74         -0.51           with         50%         4.68         98.94         152.79         171.57         96.14         80.77         86.25         20.63         9.79         13.63         6.74         -0.51           mond water         90%         -5.42         72.45         93.70         99.00         34.12         30.47         29.02         0.30         0.47         4.17         4.96         -9.90           with         50%         30.90         254.39         400.76         453.12         274.61         232.94         251.13         75.10         40.90         50.69         36.86 <td< th=""><th></th><td></td><td></td><td>%06</td><td>3.56</td><td>42.37</td><td>58.52</td><td>63.47</td><td>32.74</td><td>27.87</td><td>28.54</td><td>8.31</td><td>5.85</td><td>7.92</td><td>4.09</td><td>1.50</td><td>284.72</td></td<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |       |                |              | %06  | 3.56    | 42.37  | 58.52  | 63.47  | 32.74  | 27.87  | 28.54  | 8.31   | 5.85   | 7.92   | 4.09   | 1.50   | 284.72  |
| Cauvery Delta         Without water         75%         16.48         129.89         221.85         256.38         165.12         139.55         153.12         44.39         20.67         24.69         20.46         10.45           Without stound water         90%         4.68         98.94         152.79         171.57         96.14         80.77         86.25         20.63         9.79         13.63         6.74         -0.51           With stound water         90%         -5.42         72.45         93.70         99.00         34.12         30.47         29.02         0.30         0.47         4.17         -4.96         -9.90           With stound water         90%         5.54.29         179.10         274.59         307.95         179.71         152.28         46.96         26.19         33.48         22.07         9.70           With stound water         90%         6.51         148.15         205.53         223.14         110.73         93.50         95.98         23.20         15.31         22.42         8.35         -1.19           100%         -3.59         121.66         146.44         150.57         48.71         43.20         38.75         2.87         5.99         12.19 <t< th=""><th></th><td></td><td></td><td>%001</td><td>0.95</td><td>35.53</td><td>43.25</td><td>44.72</td><td>17.48</td><td>14.87</td><td>13.85</td><td>3.06</td><td>3.44</td><td>5.48</td><td>1.07</td><td>-0.93</td><td>182.75</td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                |              | %001 | 0.95    | 35.53  | 43.25  | 44.72  | 17.48  | 14.87  | 13.85  | 3.06   | 3.44   | 5.48   | 1.07   | -0.93  | 182.75  |
| 50%31.34168.88308.83363.19252.00213.58237.3474.3234.3838.6237.7124.2690%4.6898.94152.79171.5796.1480.7786.2520.639.7913.636.74-0.51100%-5.4272.4593.7034.1230.4729.020.300.474.17-4.96-9.9075%18.31179.10274.59179.71152.28162.8546.9626.1933.4822.079.7750%30.90254.39400.76453.12274.61232.94251.1375.1040.9050.6936.8619.1490%6.51148.15205.53223.14110.7393.5095.9823.2015.3122.428.35-1.19100%-3.59121.66146.44150.5748.7143.2038.752.875.9912.96-3.35-10.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 4     | Cauvery Delta  |              | 75%  | 16.48   |        | 221.85 | 256.38 | 165.12 | 139.55 | 153.12 | 44.39  | 20.67  | 24.69  | 20.46  | 10.45  | 1203.06 |
| 90%4.6898.94152.79171.5796.1480.7786.2520.639.7913.636.74-0.51100%-5.4272.4593.7099.0034.1230.4729.020.300.474.17-4.96-9.9075%18.31179.10274.59307.95179.71152.28162.8546.9626.1933.4822.079.7750%30.90254.39400.76453.12274.61232.94251.1375.1040.9050.6936.8619.1490%6.51148.15205.53223.14110.7393.5095.9823.2015.3122.428.35-1.19100%-3.59121.66146.44150.5748.7143.2038.752.875.9912.96-3.35-10.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |       |                |              | %05  | 31.34   |        | 308.83 | 363.19 | 252.00 | 213.58 | 237.34 | 74.32  | 34.38  | 38.62  | 37.71  | 24.26  | 1784.43 |
| 100%         -5.42         72.45         93.70         99.00         34.12         30.47         29.02         0.30         0.47         4.17         -4.96         -9.90           75%         18.31         179.10         274.59         307.95         179.71         152.28         162.85         46.96         26.19         33.48         22.07         9.77           50%         30.90         254.39         400.76         453.12         274.61         232.94         251.13         75.10         40.90         50.69         36.86         19.14           90%         6.51         148.15         205.53         223.14         110.73         93.50         95.98         23.20         15.31         22.42         8.35         -1.19           100%         -3.59         121.66         146.44         150.57         48.71         43.20         38.75         2.87         5.99         12.96         -3.35         -10.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                |              | %06  | 4.68    |        | 152.79 | 171.57 | 96.14  | 80.77  | 86.25  | 20.63  | 9.79   | 13.63  | 6.74   | -0.51  | 741.43  |
| 75%18.31179.10274.59307.95-179.71152.28162.8546.9626.1933.4822.079.7750%30.90254.39400.76453.12274.61232.94251.1375.1040.9050.6936.8619.1490%6.51148.15205.53223.14110.7393.5095.9823.2015.3122.428.35-1.19100%-3.59121.66146.44150.5748.7143.2038.752.875.9912.96-3.35-10.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                |              | 100% | -5.42   | 72.45  | 93.70  | 99.00  | 34.12  | 30.47  | 29.02  | 0.30   | 0.47   | 4.17   | -4.96  | -9.90  | 343.43  |
| 50%30.90254.39400.76453.12274.61232.94251.1375.1040.9050.6936.8619.1490%6.51148.15205.53223.14110.7393.5095.9823.2015.3122.428.35-1.19100%-3.59121.66146.44150.5748.7143.2038.752.875.9912.96-3.35-10.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                |              | 75%  | 18.31   | 179.10 | 274.59 | 307.95 | 179.71 | 152.28 | 162.85 | 46.96  | 26.19  | 33.48  | 22.07  | 6.77   | 1413.26 |
| 90%6.51148.15205.53223.14110.7393.5095.9823.2015.3122.428.35-1.19100%-3.59121.66146.44150.5748.7143.2038.752.875.9912.96-3.35-10.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                |              | %05  | 30.90   | 254.39 | 97.    | 453.12 | 274.61 | 232.94 | 251.13 | 75.10  | 40.90  | 50.69  | 36.86  | 19.14  | 2120.53 |
| -3.59   121.66   146.44   150.57   48.71   43.20   38.75   2.87   5.99   12.96   -3.35   -10.58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                |              | %06  | 6.51    | 148.15 | .53    | 223.14 | 110.73 | 93.50  | 95.98  | 23.20  | 15.31  | 22.42  | 8.35   | -1.19  | 951.63  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | _     |                |              | 100% | -3.59   | 121.66 | 146.44 | 150.57 | 48.71  | 43.20  | 38.75  | 2.87   | 5.99   | 12.96  | -3.35  | -10.58 | 553.63  |

Table 4.14.1: Upper Cauvery Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|        |                |                |                |          |                      |                |          |             | ٦        | Doer C    | Upcer Cauvery Sub-basin | rb-basin |          |          |          |                   |             |            |               |          |     |
|--------|----------------|----------------|----------------|----------|----------------------|----------------|----------|-------------|----------|-----------|-------------------------|----------|----------|----------|----------|-------------------|-------------|------------|---------------|----------|-----|
|        |                |                |                | Witho    | Without ground water | water          |          |             |          |           |                         |          |          |          | *        | With ground water | water       |            |               |          |     |
|        | 75%            |                |                | 20%      |                      | %06            |          |             | %001     |           |                         | 75%      |          | 20%      |          |                   | %06         |            | _             | %00I     |     |
| Month  | Month Quantity | %              | Month          | Quantity | % Mo                 | Month Quantity | itity %  | Month Quant | Quantity | %         | Month                   | Quantity | %        | Month Qu | Quantity | % Month           | th Ouantity | %<br>/\tau | Month         | Quantity | 8   |
| Oct    | -391           | -8 Sep         | ècp            | -339     | -7 Aug               |                | -342 -7  | -7 Aug      | -397     | -8<br>Oct | Jet                     | 703.58   | 14 Sep   | -        | -233     | 4 Aug             |             | -234       | 4 Aug         | -289     | ئ   |
| Sep    | -290           | -6 Aug         | \ug            | -303     | -6 Sep               |                | -255     | -5 Oct      | -382     | -8 Sep    | Sep                     | 473.36   | 10 Aug   | D.f.     | -195     | -4 Sep            |             |            | -3 Oct        | -267     | λ   |
| Jun    | -155           | -3 Feb         | q <sub>2</sub> | -117     | -2 Oct               |                | -171 -3  | -3 Sep      | -277     | -6 J      | Jun                     | 16.50    | 0 Fcb    | -        | -92.1    | -2 Mar            |             | <u>후</u>   | -2 Sep        | .171     | ن.  |
| Mar    | -118           | -2 Jan         | u              | -108     | -2 Mar               |                | -1283    | -3 Mar      | -129     | -3        | Mar                     | -11.32   | 0 Jan    |          | -87.9    | -2 Feb            | 8           | 97.2       | -2 Mar        | -105     | ,   |
| Fcb    | -117           | -2 Oct         | Sct.           | -102     | -2 Feb               |                | -122 -2  | -2 Jan      | -108     | -2 F      | Feb                     | -16.11   | 0 Dec    | U        | \$       | - J Jan           | 1-          | -74.7      | 1 Jan         | 6.78-    | ;   |
| Jan    | -93.2          | -2 Dec         | çç             | 80.9     | -2 Jan               |                | -94.5 -2 | -2 Jul      | -95.8    | -2 Jan    | an                      | 41.75    | - Mar    |          | -39.1    | ŏ                 | Ş.          |            | 33 <u>0</u> - | 9/-      | 7   |
| Dec    | -57.1          | -l Mar         | Лаг            | -63.3    | -l Jun               | -              | -60.1    | -1 Dec      | -92.9    | -2 Dec    | ၁ခင                     | -74.86   | -2 Oct   |          | 13.59    | 0<br>Dec          | -2          |            | -1 Feb        | -58.7    | 7   |
| Apr    | -18.8          | -0.4 Jun       | חח             | 68.81    | l Dec                |                | 45.2     | -l Feb      | -83.6    | -2 Apr    | Apr                     | -93.64   | -1.9 Nov | ^        | 601      | 2 Jun             | -           | L          | -0.3 Jun      | -37.8    | _   |
| Nov    | .17.6          | -17.6 -0.4 Nov | Jov            | 101.3    | 2 Jul                |                | -40.1    | -1 Jun      | -83.5    | -2 Nov    | 202                     | -95.09   | -1.9 Jun |          | 114.5    | 2 Jul             | 99          | 66.65      | 1 Jul         | 10.93    | 0.2 |
| May    | <b>%</b> I     | 0.4 Apr        | \pr            | 255.1    | 5 Nov                |                | 166 3    | 3 Nov       | 33.12,   | -         | May                     | -110.28  | -2.2 Apr |          | 259.2    | 5 Nov             | 1           | 173.7      | 3 Nov         | 40.86    | i – |
| Aug    | 367.2          |                | / May          | 309.1    | 6 Apr                |                | 229.6 5  | 5 Apr       | 63.81    | 1 4       | Aug                     | -186.36  | 4 May    | S.       | 309.1    | 6 Apr             | 23          |            | 4 Apr         | 67.94    | _   |
| Jul    | 598.4          | 12 74          | -5             | 995      | 11 May               | _              | 311.3 6  | 6 May       | 153.7    | 3 J       | Jul                     | -277.58  | -6 Jul   |          | 672.7    | 13 May            | 3           | 311.3      | 6 May         | 153.7    | m   |
| Annual | -274           |                | -6 Annual      | 188.3    | 4 Annual             |                | -552 -11 | -II Annual  | -1399    | -28 A     | -28 Annual              | 286.45   | 6 Annual | nual     | 1132     | 21 Annual         |             | -245       | -5 Annual     | 8161-    | -36 |

Table 4.14.2: Kabini Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|        |                |               |            |             |                      |          |                 |                  | Kab       | Kabini Sub-basin | asin     |            |          |                   |            |            |          |          |      |
|--------|----------------|---------------|------------|-------------|----------------------|----------|-----------------|------------------|-----------|------------------|----------|------------|----------|-------------------|------------|------------|----------|----------|------|
| -      |                |               | Wit        | hout grou   | Without ground water | :        |                 |                  |           |                  |          |            |          | With ground water | ter        |            |          |          |      |
|        | 75%            |               | %0S        | i           |                      | %06      |                 | 100%             |           |                  | 75%      |            | 20%      |                   | <b>%06</b> |            |          | %001     |      |
| Month  | Month Quantity | % Month       | h Quantity | %           | Month                | Quantity | % Month         | ountity Quantity | %         | Month            | Quantity | % Month    | Quantity | % Month           | Ouantity   | %          | Month    | Ouantity | %    |
| Jan    | -253           | -5 Jan        | -269       | -5.5 Jan    | an                   | -262     | -5 Jan          | -261             | -5        | Jan              | -201.57  | 4 Jan      | -217     | 4 Jan             | -2111      | 4 Jan      | _        | -210     | 4    |
| Feb    | -230           | -5 Jul        | -245       | -5 Feb      | eb                   | -239     | -5 Feb          | -241             |           | -5 Feb           | -183.17  | 4 Feb      | 861.     | 4 Feb             | -192       | 4 Feb      | ما       | 31-      |      |
| ညီ     | -136           | -3 Feb        | -244       | -5 Dec      | )ec                  | 991-     | -3 Sep          | -175             |           | 4 Dec            | .100.13  | -2 Jul     | -175     | 4 Dec             | .131       | -3 Dec     | 2        | -137     |      |
| Mar    | -113           | -2 Dec        | 9/1-       | -3.6 Sep    | ep                   | -162     | -3 Jul          | -173             | 4         | Mar              | -88.767  | -2 Dec     | -141     | -3 Sep            | -101       | -2 Sep     | 9        | -120     |      |
| Sep    | -54.9          | -l Mar        | -132       | -2.7 Jul    | n]                   | -115     | -2 Dec          | -172             |           | 4 Sep            | -0.4705  | -0 Mar     | -108     | -2 Mar            | 9'09-      | <u>-</u>   |          | -103     |      |
| Apr    | -5.67          | -O Nov        | -38.6      | -0.8 Mar    | far i                | -85      | -2 Aug          | -170             |           | -3 Apr           | 0.0525   | 0 Nov      | -20.6    | -0.4 Jul          | 45.8       | -1 Aug     | ă        | -102     |      |
| Nov    | 4.459          | 0.1 Apr       | -0.41      | -0.01 Aug   | lug.                 | -83.4    | -2 Mar          | -112             |           | -2 Nov           |          | 0.5 Apr    | 5.32     | 0.1 Aug           | -15.2      | -0 Mar     | l la     | -87.5    |      |
| May    | 29.36          | 0.6 Jun       | 133.6      | 2,73 Nov    | lov                  | -3.14    | -0 Apr          | 6,617            | 0.1       | May              | 32.543   | 0.7 Jun    | 141.6    | 1                 | 14.85      | 0.3 Apr    | <u> </u> | 12.34    |      |
| Juľ    | 112.8          | 12.8 2.3 Aug  | 151.6      | 3.09 Apr    | \pr                  | 33.43    | 0.7 Jun         | 10.28            | 8 0.2 Oct | Ö                | 126.8    | 2.6 Oct    | 209.8    | 4 Apr             | 39.15      | 0.8 Jun    | _        | 18.29    |      |
| Š      | 120.8          | 120.8 2.5 Oct | 203.8      | 4.16 Jun    | าน                   | 124.4    | 2.5 Nov         | 40.77            | 7 0.8 Jun | Jun              | 140.87   | 2.8 Aug    | 219.8    | 4                 | 132.4      | 2.7 Nov    | 3        | 58.76    |      |
| Aug    | 125.1          | 2.6 Sep       | 269.3      | 5.49 May    | Aay                  | 134      | 2.7 Oct         | 55.33            | -         | Jul              | 182.46   | 3.7 Sep    | 323.7    | 7 May             | 136.5      | 2.8 Oct    | H        | 61.37    |      |
| Jun    | 132.9          | 2.7 May       | 444.3      | 9.06 Oct    | )ct                  | 257.5    | 5.3 May         | 98.65            | 2         | Aug              | 193.24   | 3.9 May    | 446.9    | 9 Oct             | 263.5      | 5.4 May    | aş.      | 101.2    |      |
| Annual | -268           | -5 Annual     | 459.9      | 9.38 Annual | ในมหา                | -863     | -863 -18 Annual | al -1910         |           | -39 Annual       | 118.62   | 2,4 Annual | 846.3    | 17 Annual         | 476        | -10 Annual | ากบลใ    | -1524    | <br> |

Table 4.14.3: Shimsha Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|       |                |           |        |          |                      |          |          |                 |          | Shim     | Shimsha Sub-basin | asin     |             |     |            |                   |          | •           |             |         |
|-------|----------------|-----------|--------|----------|----------------------|----------|----------|-----------------|----------|----------|-------------------|----------|-------------|-----|------------|-------------------|----------|-------------|-------------|---------|
| į     |                |           |        | With     | Without ground water | nd water |          |                 |          |          |                   |          |             |     | W          | With ground water | ater     |             |             | į       |
|       | 75%            |           |        | 50%      |                      | 5        | %06      |                 | %001     |          |                   | 75%      |             | 50% | اء         |                   | %06      |             | %001        |         |
| Month | Month Quantity | %         | Month  | Quantity | × %                  | Month (  | Quantity | % Month Quantil | Quantity | %        | Month             | Quantity | % Month     | -   | Quantity 9 | % Month           | Quantity | % Month     | th Quantity | %       |
| Jan   | -689           | -2 Jan    | an     | -68.8    | -2 Jan               | u        | 69-      | -2 Jan          | 1.69-    | -2 Apr   | Apr               | -1.03    | 0.0 Apr     |     | -0.21      | 0.0 Apr           | 1.318    | 0.0 Apr     | -2.74       | -0      |
| Feb   | -55.8          | 7         | Feb    | -55.7    | -1 Feb               | q.       | -55.8    | -I Feb          | -55.8    | -1       | l Mar             | 3.936    | 0.1 Mar     |     | 3.992      | 0.1 Jun           | 6.734    | 0.2 Jun     | 0.575       | .5 0.   |
| ಜ್ಞ   | -39.3          | -<br>-    | သူ     | -35.7    | -1 Dec               | 33       | 42.2     | -1 Dec          | -47      | -1       | Jun               | 7.866    | 0.2 Jun     |     | 11.34      | 0.3 Mar           | 11.61    | 0.3 Mar     | 3.82        | 2 0     |
| Aug   | -37.2          | -I Mar    | Mar    | -35.2    | -I Aug               | ng.      | -39.3    | -l Aug          | 43       | 7        | May               | 15.69    | 0.4 Feb     |     | 16.78      | 0.4 May           | 12.72    | 0.3 May     | 4.193       | .0      |
| 13    | -35.5          | -I Aug    | \$ug   | -34.4    | -1 Jul               |          | -37.2    | -1 Jul          | -40.1    | -1 F     | Feb               | 16.75    | 0.4 Jul     |     | 20.39      | 0.5 Jul           | 27.11    | 0.7 Jul     | 13.67       | 0.      |
| Mar   | -35.2          | 1-<br>In( | [B]    | -33.3    | -I Mar               | ar       | -35.3    | -1 Mar          | -35.3    | -1       | Inf.              | 18.22    | 0.5 May     |     | 21.17      | 0.5 Fcb           | 31.03    | 0.8 Fcb     | 16.69       | 0.4     |
| Apr   | -16.2          | -0.4 Apr  | \$pr   | -15.4    | -0.4 Apr             | ).<br>10 | -16.8    | -0.4 Apr        | 6.71-    | -0.5 Aug | Aug               | 23.06    | 0.6 Jan     |     | 23.18      | 0.6 Aug           | 32.77    | 0.8 Aug     | 17.29       | 0 6     |
| un,   | -0.25          | 0.0 Jun   | "m     | 3,262    | 0.1 Jun              | n        | -3.01    | -0.1 Jun        | -7.62    | -0.2 Jan | lan               | 23.07    | 0.6 Aug     |     | 25.82      | 0.7 Dcc           | 40.92    | 1.1 Dec     | 22.48       | 9.0     |
| May   | 8.863          | 0.2 May   | Vay    | 14.4     | 0.4 May              | ay       | 4.511    | 0.1 May         | -2.75    | -0.1 Dec | Dec               | 30.07    | 0.8 Dec     |     | 33.69      | 0.9 Jan           | 41.11    | 1.1 Jan     | 22.83       | 3 0.6   |
| ş     | 46.74          |           | Sep    | 66.99    | 2 Sep                | d        | 30.85    | 1 Sep           | 4.277    | 0.1 S    | 1 Sep             | 92.53    | 2.4 Sep     |     | 112.6      | 2.9 Sep           | 85.83    | 2.2 Sep     | 50.5        | .5      |
| No.   | 88.65          |           | 2 Nov  | 117.5    | 3 Nov                | ΛC       | 65.98    | 2 Nov           | 28.09    | 1 1      | Nov               | 126.4    | 3.3 Nov     |     | 154.9      | 4.0 Nov           | 111.3    | 2.9 Nov     | 66.41       | 1<br>E  |
| ŏ     | 294.7          |           | 8 Oct  | 367.4    | 10 Oct               | 5t       | 237.6    | 6 Oct           | 142.2    | 4 (      | Oct               | 301.5    | 7.8 Oct     |     | 373.4      | 9.7 Oct           | 246.3    | 6.4 Oct     | 150.5       | .5 3.   |
| Annua | 150.8          | 4         | Annual | 294.8    |                      | 8 Annual | 37.79    | I Annual        | -151     | 4        | 4 Annual          | 658      | 17.0 Annual |     | 800.5 2    | 800.5 20.7 Annual | 646.1    | 16.7 Annual |             | 359 9.3 |
|       |                |           |        |          |                      |          |          |                 |          |          |                   |          |             |     |            |                   |          |             |             |         |

Table 4.14.4: Arkavathi Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|                     | -                    |      | %                | ဆု             | -7             | <u>-</u> - | 4        | 4        | -3       | ÷.       | Ę-       | -2       | -7       | -2       | 1-        | 44                |
|---------------------|----------------------|------|------------------|----------------|----------------|------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-------------------|
|                     |                      | %001 | Quantity         | 151-           | -136           | -102       | -78.8    | 17-      | -65.7    | -64.4    | -51.7    | 7.14     | -34.8    | -33.4    | -29       | 098-              |
|                     |                      |      | Month            | -7.6 Jan       | -6.8 Dec       | -5.2 Feb   | -3.8 Aug | -3.6 Mar | -3.2 Nov | -2.8 Jul | -2.1 Sep | -1.6 Apr | -1.4 Oct | -1.2 Jun | -0.5 May  | -39.7 Annual      |
|                     |                      | %06  | Quantity %       | -150           | -133 +         | - 101-     |          | -70.5    | -62.3    |          | 40.9     | l        | -26.9    | -24      | )-  89.6- | -780 -3           |
|                     | With ground water    |      | Month            | -7.5 Jan       | -6.4 Dec       | 1 Feb      | -3.5 Aug | -3.4 Mar | -2.9 Jul | -2.0 Nov | -1.6 Apr | -1.2 Jun | 1 May    | 2.1 Scp  | 2.5 Oct   | -594 -30.2 Annual |
|                     | With                 |      | % '              |                |                | 8 -5.1     |          |          |          |          |          |          | -1.1     |          |           | 4 30.             |
|                     |                      | 20%  | Quantity         | -148           | -126           | 8.66-      | -69.3    | 99-      | -57.5    | -39.1    | -31.4    | -24      | -21.8    | 40.45    | 48.79     | -59               |
|                     |                      |      | Month            | -7.6 Jan       | -6.6 Dec       | -5.1 Feb   | -3.6 Mar | -3.6 Aug | ıl Jul   | -2.3 Apr | -2.0 Nov | -1.4 Jun | -1.3 May | 0.3 Sep  | 0.9 Oct   | -696 -35.4 Annual |
|                     |                      |      | %                |                |                |            | - 1      |          | 1 -3.1   |          |          | l i      |          | !        |           | 6 -35             |
| b-basin             |                      | 75%  | Quantity         | -149           | -130           | -101       | -70.9    | 6.69-    | -60.1    | 44.5     | 40.1     | -27.6    | -24.6    | 5.113    | 16.73     | 69-               |
| Arkavathi Sub-basin | I                    |      | Month            | Jan            | Dec            | Feb        | Aug      | Mar      | Jul      | Nov      | Apr      | Jun      | May      | Scp      | Oct       | Annual            |
| Arka                |                      |      | %                | -5.4           | 4.9            | -2.7       | -1.9     | -i.8     | -1.7     | -1.5     | -1.4     | -1.4 Jun | -1.3     | -1.3     | -1.1      | 26.5              |
|                     |                      | 100% | Quantity         | -102           | -93.1          | -51.6      | -36.1    | -34.3    | -32.5    | -27.9    | -26.9    | -25.6    | -25.1    | -23.9    | -21.6     | -500              |
|                     |                      |      | % Month Quantity | -8.1 Sep       | -7.4 Oct       | -3.7 Nov   | -2.2 Dec | -2.2 Aug | -1.8 Jan | -1.7 Jui | -1.7 Jun | -1.5 Feb | -1.4 May | -1.3 Mar | -1.2 Apr  | -883 -46.9 Annual |
|                     | ı,                   | %06  | Quantity         | -152           | -139           | -70.4      | 41.3     | 41.2     | -34.5    | -32      | -31.7    | -29.1    | -26.8    | -24.9    | -23.1     | -883              |
|                     | Without ground water |      | Month            | 3 Sep          | )<br>Oct       | -6.1 Nov   | -3.1 Aug | -2.8 Dec | -2.3 Jan | -2.2 Jun | -2.1 Jul | -2.0 May | -1.6 Feb | -1.4 Mar | -1.4 Apr  | -697 -37.0 Annual |
|                     | thout g              |      | %                | -270 -14.3 Sep | -246 -13.0 Oct |            |          |          |          |          |          |          | '        |          |           | -37.0             |
|                     | Wit                  | 20%  | Month Quantity   | -270           | -246           | -114       | -57.6    | -52.9    | 43.9     | -40.6    | 39.1     | -38.3    | -29.9    | -27.2    | -26.4     | 169-              |
|                     |                      |      |                  | -205 -10.9 Sep | -9.9 Oct       | 4.8 Nov    | -2.6 Aug | -2.5 Dec | -2.0 Jun | -1.9]Jul | -1.9 Jan | -1.8 May | -1.5 Feb | -1.4 Mar | -1.3/Apr  | -799 -42.4 Annual |
|                     |                      |      | %                | 5 -10.         |                | L.         |          |          |          | Į.       |          | F        |          |          | - T       | 1 -42             |
|                     |                      | 75%  | Quantity         | -205           | -187           | -90.1      | 48.7     | 46.5     | -37.4    | -36.6    | -35.7    | -33.3    | -28.2    | -25.9    | -24.6     | _                 |
|                     |                      |      | Month            | Sep            | 50             | Nov        | Aug      | <u>0</u> | Jun      | Jan      | Jul      | May      | Feb      | Mar      | Apr       | Annua             |

Table 4.14.5: Middle Cauvery Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water

|            |                |                |                      |                 |            | Mi       | Middle Cauvery Sub-basin | Sub-basin |                 |          |                   |          |            |          |       |
|------------|----------------|----------------|----------------------|-----------------|------------|----------|--------------------------|-----------|-----------------|----------|-------------------|----------|------------|----------|-------|
|            |                | With           | Without ground water | vater           |            |          |                          |           |                 |          | With ground water | er       |            |          |       |
|            |                | 20%            |                      | %06             |            | 100%     |                          | 75%       |                 | 20%      |                   | %06      | <u>-</u>   | %001     |       |
| Quantity % | _              | Month Quantity | % Month              | th Quantity %   | Month      | Quantity | % Month                  | Quantity  | % Month         | Quantity | % Month           | Quantity | % Month    | Quantity | %     |
| [2]        | -3.31 -0.2 Mar | -3.17          | -0.1 Mar             | -3.43 -0.2 Mar  | .2 Mar     | -3.63    | -0.2 May                 | -1.83     | -0.1 May        | -1.74    | -0.1 May          | 06:1-    | -0.1 May   | -2.02    | Ģ     |
| <u></u>    | -3.10 -0.1 Apr | -3.03          | -0.1 Apr             | -3.15 -0.1 Apr  | .1 Apr     | -3.24    | -0.1 Jun                 | -0.85     | 0.0 Jun         | -0.79    | 0.0 Jun           | 16'0-    | 0.0 Jun    | 00.1-    | 0.0   |
| 0          | l Jun          | -2.85          | -0.1 Jun             | 2.97 -0.1       | . I Feb    | -3.13    | -0.1 Apr                 | 2.54      | 0.1 Apr         | 2.60     | 0.1 Apr           | 2.48     | 0.1 Apr    | 2.39     | 0.1   |
| -0.1       | i May          | -2.78          | -0.1 May             | -2.94 -0.1 Jun  | .1 Jun     | -3.07    | -0.1 Mar                 | 12.86     | 0.6 Mar         | 13.00    | 0.6 Mar           | 12.74    | 0.6 Mar    | 12.55    | 9.0   |
| 0.1        | l Feb          | -2.09          | -0.1 Feb             | -2.68 -0.1      | .1 May     | -3.06    | -0.1 Feb                 | 20.88     | 0.9 Fcb         | 21.20    | 1.0 Dec           | 20.22    | 0.9 Oct    | 13.49    | 9.0   |
| Ç          | -1.63 -0.1 Jan | -1.08          | 0.0 Jan              | -2.11] -0.1 Jan | .i Jan     | -2.89    | -0.1 Dec                 | 21.54     | 1.0 Dec         | 23.02    | 1.0 Oct           | 20.32    | 0.9 Dec    | 18.17    | 0.8   |
| 0.0        | 1.08 0.0 Jul   | 2.28           | 0.1 Jul              | 0.05 0.         | 0.0 Jul    | - 25.    | -0.1 Jan                 | 24.06     | 1.1 Jan         | 24.61    | 1,1 Feb           | 20.59    | 0.9 Nov    | 19.24    | 6.0   |
| 0.2        | 3.54 0.2 Dec   | 5.02           | 0.2 Dec              | 2.27 0.         | 0.1 Dec    | 0.18     | 0.0 Oct                  | 24.69     | 1.1 Oct         | 29.61    | 1.3 Jan           | 23.57    | 1.1 Feb    | 20.15    | 6.0   |
| 0.5        | 0.5 Aug        | 14.33          | 0.7 Aug              | 8.51 0.         | 0.4 Aug    | 4.10     | 0.2 Nov                  | 30.29     | 1.4 Nov         | 35.15    | 1.6 Nov           | 25.98    | 1.2 Jan    | 22.81    | 0     |
| 21.58 1.0  | Nov            | 26.44          | 1.2 Nov              | 17.39 0.        | 0.8 Nov    | 10.52    | 0.5 Jul                  | 40.02     | 1.8 Juk         | 41.22    | 1.9 Jul           | 38.96    | 1.8.1      | 37.29    | 1.7   |
| -          | .0 Oct         | 27.02          | 1.2 Oct              | 17.85 0         | 0.8 Oct    | 10.90    | 0.5 Aug                  | 47.03     | 2.1 Aug         | 50.16    | 2.3 Aug           | 44.26    | 2.0 Aug    | 39.92    |       |
| =          | 1.1 Sep        | 29.68          | 1.4 Sep              | 19,36 0.        | 0.9 Sep    | 11.54    | 0.5 Sep                  | \$2.90    | 2.4 Sep         | 58.45    | 2.6 Sep           | 47.99    | 2.2 Sep    | 40.31    | <br>œ |
| 3.1        | 3.1 Annual     | 86.8           | 4.1 Annual           | 13.0            | 0.6 Annual | -73.6    | -3.3 Annual              | 274       | 274 12.3 Annual | 336      | 336 15.1 Annual   | 516      | 9.9 Annual | 133      | 0.9   |
|            |                |                |                      |                 |            |          |                          |           |                 |          |                   |          |            |          |       |

Table 4.14.6: Savarnavathi Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

| %         Without ground water         100%         75%         75%         Amonth Soft         100%         75%         Amonth Soft         100%         75%         Month Soft         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%         100%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | 11 Poly of C | מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים וות מייים ות מייים וות 1110            |                   |                 |                |          | |
|---|---|---|---|---|---|---|---|---|
| %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity         %         Month         Quantity<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 77              |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                 | With ground water | vater           |                |          |
| Quantity %   Month Quantity %   Month Quantity %   Month Quantity %   Month Quantity %   Month Quantity %   Month Quantity %   Month Quantity %   Month Quantity %   Month   -19.28   -3 Jul   -20.09   -3 Jan   -6.05   -0.8 Jan   -16.92   -2 Aug   -14.51   -2 Aug   -18.59   -3 Aug   -5.28   -0.7 Mar   -12.55   -2 Jan   -12.55   -2 Jan   -14.51   -2 Feb   -12.55   -2 Jan   -14.57   -2 Jul   -12.39   -2 Feb   -12.55   -2 Jan   -14.57   -2 Jul   -2.09   -3 Aug   -5.28   -0.7 Mar   -9.89   -1 Dec   -9.11   -1 Sep   -12.96   -2 Feb   -13.05   -2 Dec   -4.16   -0.5 Aug   -6.0 Dec   -9.81   -1 Mar   -8.02   -1 Dec   -10.27   -1 Dec   -10.41   -1 Mar   -3.84   -0.5 Aug   -5.90   -1 Mar   -8.27   -1 Mar   -8.30   -1 Mar   -8.30   -1 Mar   -8.30   -1 Mar   -2.18   -0 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.43   -0.1 Jun   -0.45   -0.1 Jun | %06             | 100%         | 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | %5              | 20%               | %06             | %00 <b>1</b>   |          |
| -17.01         -2 Jan         -14.42         -2 Jul         -19.28         -3 Jul         -20.09         -3 Jan         -6.05           -16.92         -2 Aug         -14.42         -2 Aug         -18.15         -2 Aug         -18.59         -3 Aug         -5.83           -14.51         -2 Feb         -12.55         -2 Jan         -14.55         -2 Sep         -15.48         -2 Feb         -5.83           -12.85         -2 Jul         -12.59         -2 Feb         -13.00         -2 Jan         -14.57         -2 Jul         -5.81           -9.89         -1 Dec         -9.11         -1 Sep         -12.96         -2 Feb         -13.05         -3 Dec         -4.94           -8.19         -1 Mar         -8.02         -1 Dec         -10.27         -1 Dec         -13.05         -3 Dec         -4.14           -8.19         -1 Mar         -2.16         -0 Mar         -8.27         -1 Mar         -3.26         -0 Nov         -5.79         -1 Jul         -0.43           -1.08         -0 May         1.90         0.3 Apr         -3.25         -0 Nov         -5.79         -1 Jul         -0.43           -0.55         -0 Sep         -0 Sep         -1 Jul         -2.22 <t< th=""><th>Quantity %</th><th>Quantity</th><th>Month Q</th><th>%</th><th>Quantity % Month</th><th>1 Quantity %</th><th>Month Quantity</th><th>% /</th></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Quantity %      | Quantity     | Month Q                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | %               | Quantity % Month  | 1 Quantity %    | Month Quantity | % /      |
| 16.92         -2 Aug         -18.15         -2 Aug         -18.59         -3 Aug         -5.83           -14.51         -2 Feb         -12.55         -2 Jan         -14.55         -2 Sep         -15.48         -2 Feb         -5.28           -12.85         -2 Jul         -12.55         -2 Jan         -14.57         -2 Jul         -5.28           -12.85         -2 Jul         -12.39         -2 Feb         -13.00         -2 Jan         -14.57         -2 Jul         -4.94           -9.89         -1 Dec         -9.11         -1 Sep         -12.96         -2 Feb         -13.05         -3 Dec         -4.16           -8.19         -1 Mar         -8.02         -1 Dec         -10.27         -1 Dec         -10.41         -1 Mar         -3.84           -5.90         -1 Apr         -2.16         -0 Mar         -8.27         -1 Mar         -8.30         -1 Apr         -1.74           -2.88         -0 Jun         -1.25         0.2 Nov         -3.26         -0 Nov         -5.79         -1 Jun         -0.43           -1.08         -0 May         1.90         0.3 Apr         -3.25         -0 Oct         -2.98         -0 Sep         -3.13           -0.55         -0 So                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | 60           | Jan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | -5.96 -0.8 Jul    | 1.7.21 -0.9 Jul | ıı •8.02       | 1.0      |
| -14.51         -2 Feb         -12.55         -2 Jan         -14.55         -2 Sep         -15.48         -2 Feb         -5.28           -12.85         -2 Jul         -12.39         -2 Feb         -13.00         -2 Jan         -14.57         -2 Jul         -4.94           -9.89         -1 Dec         -9.11         -1 Sep         -12.96         -2 Feb         -13.05         -2 Dec         -4.16           -8.19         -1 Mar         -8.02         -1 Dec         -10.27         -1 Dec         -10.41         -1 Mar         -3.84           -5.90         -1 Apr         -2.16         -0 Mar         -8.27         -1 Mar         -8.30         -1 Apr         -1.74           -2.88         -0 Jun         1.25         0.2 Nov         -3.26         -0 Nov         -5.79         -1 Jun         -0.43           -1.08         -0 May         1.90         0.3 Apr         -3.25         -0 Oct         -5.79         -1 Jun         -0.22           -0.55         -0 Sep         8.47         1.1 Jun         -2.22         -0 Oct         -2.98         -0 Sep         3.13           -0.50         -0 Oct         -0 Oct         -2.93         -0 Nov         -0.53         -0 Nov         -0.53 </td <td></td> <td>59 -3</td> <td>Aug</td> <td></td> <td>4.98 -0.6 Aug</td> <td>-7.06 -0.9 Aug</td> <td>ug -7.50</td> <td>0.1-</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                 | 59 -3        | Aug                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | 4.98 -0.6 Aug     | -7.06 -0.9 Aug  | ug -7.50       | 0.1-     |
| -12.85         -2 Jul         -12.39         -2 Feb         -13.00         -2 Jan         -14.57         -2 Jul         -494           -9.89         -1 Dec         -9.11         -1 Sep         -12.96         -2 Feb         -13.05         -2 Dec         -4.16           -8.19         -1 Mar         -8.02         -1 Dec         -10.27         -1 Dec         -10.41         -1 Mar         -3.84           -5.90         -1 Apr         -2.16         -0 Mar         -8.27         -1 Mar         -8.30         -1 Apr         -1.74           -2.88         -0 Jun         1.25         0.2 Nov         -3.26         -0 Nov         -5.79         -1 Jun         -0.43           -1.08         -0 May         1.90         0.3 Apr         -3.25         -0 Apr         -3.36         -0 May         -0.22           -0.55         -0 Sep         8.47         1.1 Jun         -2.22         -0 Oct         -2.98         -0 Sep         3.13           3.83         0.5 Nov         18.26         2.5 May         -1.75         -0 Jun         -2.63         -0 Nov         6.51           6.52         0.9 Oct         20.77         2.8 Oct         -0.48         -0 May         -2.18         -0 Oct                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                 | 48 -2        | Feb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | -3.67 -0.5 Jan    | -6.09 -0.8 Sep  | .6.45          | 15, -0.8 |
| -9.89         -1 Dec         -9.11         -1 Sep         -12.96         -2 Feb         -13.05         -2 Dec         -4.16           -8.19         -1 Mar         -8.02         -1 Dec         -10.27         -1 Dec         -10.41         -1 Mar         -3.84           -5.90         -1 Apr         -2.16         -0 Mar         -8.27         -1 Mar         -8.30         -1 Apr         -1.74           -2.88         -0 Jun         1.25         0.2 Nov         -3.26         -0 Nov         -5.79         -1 Jun         -0.43           -1.08         -0 May         1.90         0.3 Apr         -3.23         -0 Apr         -3.36         -0 May         -0.22           -0.55         -0 Sep         8.47         1.1 Jun         -2.22         -0 Oct         -2.38         -0 Sep         3.13           3.83         0.5 Nov         18.26         2.5 May         -1.75         -0 Jun         -2.63         -0 Nov         6.51           6.52         0.9 Oct         2.077         2.8 Oct         -0.48         -0 May         -2.18         -0 Oct         7.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                 | 57 -2        | Jui                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | -3.38 -0.4 Feb    | -5.43 -0.7 Jan  | n -6.11        | -0.8     |
| -8.19         -1         Mar         -8.02         -1         Dec         -10.41         -1         Mar         -3.84           -5.90         -1         Apr         -2.16         -0         Mar         -8.27         -1         Mar         -8.30         -1         Apr         -1.74           -2.88         -0         Jun         1.25         0.2         Nov         -3.26         -0         Nov         -5.79         -1         Jun         -0.43           -0.55         -0         May         1.90         0.3         Apr         -3.23         -0         Apr         -3.36         -0         May         -0.22           -0.55         -0         Sep         8.47         1.1         Jun         -2.22         -0         Oct         -2.98         -0         Sep         3.13           3.83         0.5         Nov         18.26         2.5         May         -1.75         -0         Jun         -2.63         -0         Nov         6.51           6.52         0.9         Oct         20.77         2.8         Oct         -0.48         -0         May         -2.18         -0         Oct         7.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 | 5            | Dec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | -3.33 -0.4 Dec    | 4.54 -0.6 Feb   | cb -5.48       | 18 -0.7  |
| -5.90         -1 Apr         -2.16         -0 Mar         -8.27         -1 Mar         -8.30         -1 Apr         -1.74         -0.2           -2.88         -0 Jun         1.25         0.2 Nov         -3.26         -0 Nov         -5.79         -1 Jun         -0.43         -0.1           -0.55         -0 May         1.90         0.3 Apr         -3.23         -0 Apr         -3.36         -0 May         -0.22         0.0           -0.55         -0 Sep         8.47         1.1 Jun         -2.22         -0 Apr         -3.36         -0 May         -0.22         0.0           3.83         0.5 Nov         18.26         2.5 May         -1.75         -0 Iun         -2.63         -0 Nov         6.51         0.8           6.52         0.9 Oct         20.77         2.8 Oct         -0.48         -0 May         -2.18         -0 Oct         7.32         1.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                 | -            | Mar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | -1.02 -0.1 Sep    | -3.93 -0.5 Dec  | cc 4.68        | 9.0- 89  |
| -2.88         -0 Jun         1.25         0.2 Nov         -3.26         -0 Nov         -5.79         -1 Jun         -0.43         -0 Iun           -1.08         -0 May         1.90         0.3 Apr         -3.23         -0 Apr         -3.36         -0 May         -0.22         0.0           -0.55         -0 Sep         8.47         1.1 Jun         -2.22         -0 Oct         -2.98         -0 Sep         3.13         0.4           3.83         0.5 Nov         18.26         2.5 May         -1.75         -0 Iun         -2.63         -0 Nov         6.51         0.8           6.52         0.9 Oct         20.77         2.8 Oct         -0.48         -0 May         -2.13         -0 Oct         7.21         0 Oct                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                 | 30           | Apr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | -0.32 -0 Mar      | -3.92 -0.5 Mar  | ar -3.95       | 5 -0.5   |
| -1.08         -0 May         1.90         0.3 Apr         -3.23         -0 Apr         -3.36         -0 May         -0.22         0.0           -0.55         -0 Sep         8.47         1.1 Jun         -2.22         -0 Oct         -2.98         -0 Sep         3.13         0.4           3.83         0.5 Nov         18.26         2.5 May         -1.75         -0 Jun         -2.63         -0 Nov         6.51         0.8           6.52         0.9 Oct         20.77         2.8 Oct         -0.48         -0 May         -2.18         -0 Oct         7.32         1.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                 | -            | Jun                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Ģ               | 1.89 0.2 Apr      | -2.09 -0.3 Nov  | ov -3.11       |          |
| -0.55         -0 Sep         8.47         1.1 Jun         -2.22         -0 Oct         -2.98         -0 Sep         3.13           3.83         0.5 Nov         18.26         2.5 May         -1.75         -0 Jun         -2.63         -0 Nov         6.51           6.52         0.9 Oct         20.77         2.8 Oct         -0.48         -0 May         -2.18         -0 Oct         7.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                 | 9            | May                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0               | 2.22 0.3 Jun      | -1.57 -0.2 Apr  | pr -2.22       | 22 -0.3  |
| 3.83 0.5 Nov 18.26 2.5 May .1.75 -0 Jun -2.63 -0 Nov 6.51<br>6.52 0.9 Oct 20.77 2.8 Oct -0.48 -0 May -2.18 -0 Oct 7.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                 | 98           | Sep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | 17.50 2.3 May     | -1.42 -0.2 Oct  | ct -2.18       | 8 -0.3   |
| 6.52 0.9 Oct 20.77 2.8 Oct -0.48 -0 May .2.18 -0 Oct 7.32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Т               | 53           | Nov                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 | 20.94 2.7 Nov     | -0.58 -0.1 Jun  | -1.98          | <u> </u> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |              | Oct                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Ĺ               | 21.57 2.8 Oct     | 0.32 0.0 May    | lay -1.85      | 35 -0.2  |
| -118 -16 Annual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -108 -15 Annual | -118 -16     | Annual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | -17 -2.1 Annual | 40 5.3 Annual     | -45 -5.8 Annual |                | -55 -7.1 |

Table 4.14.7: Palar Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|        |                   |            |          |                      |          |          |                 |                | l'ara        | Patar Sub-basin | SILL     |             |              |            |                   |                   |              |          |        |
|--------|-------------------|------------|----------|----------------------|----------|----------|-----------------|----------------|--------------|-----------------|----------|-------------|--------------|------------|-------------------|-------------------|--------------|----------|--------|
|        |                   |            | With     | Without ground water | nd water |          |                 |                |              |                 |          |             |              | With       | With ground water | כו                |              |          |        |
|        | 75%               |            | 50%      | -                    | 5        | %06      |                 | 100%           |              |                 | 75%      |             | 20%          |            |                   | %06               |              | 100%     |        |
| Month  | Month Quantity %  | Month      | Quantity | %                    | Month (  | Quantity | % Month         | Month Quantity | %            | Month           | Quantity | % Month     | nth Quantity | %<br>K1    | Month             | Quantity          | % Month      | Quantity | %      |
| <br>   | -30.75 -9.5 Feb   | 5 Feb      | -26.24   | -8. t Jul            |          | -37.27   | -12 Jul         | 47.94          | -14.8 Feb    | eb              | -11.86   | -3.3 Feb    | -10.77       | $\vdash$   | -3.0 Feb          | -12.40            | -3.5 Jul     | -20.31   |        |
| Feb    | -27.33 -8.5 Jan   | 5 Jan      | -22.95   | -7.1 Aug             | ğt       | -29.63   | -29.63 -9.2 Aug | 43.02          | -13.3 Jan    | an              | -10.13   | -2,8 Jan    | œ,           | -8.32 -2.3 | -2.3 Jan          | ₽0.15-            | -3.1 Aug     | -17.63   | 4      |
| an l   | -24.76 -7.7 Jul   | 7 Jul      | -17.70   | -5.5 Feb             | p        | -27.87   | -27.87 -8.6 Sep | -33.79         | -10.5 Dec    | ၁၃              | -7.05    | -2.0 Nov    | .9-          | 6.39       | -1.8 Jul          | -9.64             | -2.7 Feb     | -13.29   | Ġ.     |
| Aug    | -21.45 -6.6 Dec   | 6 Dec      | -16.69   | -5.2 Jan             | L        | -25.67   | -25.67 -7.9 Feb | -28.76         | -8.9 Mar     | Aar             | 96'9-    | -2.0 Mar    | -5.          | -5.98 -1.7 | -1.7 Dec          | -8.26             | -2.3 Sep     | -13.20   | -3.7   |
| ည      | -19.12   -5.9 Mar | 9 Mar      | -15.20   | 4.7 Dec              | ပ္သ      | -20.33   | -20.33 -6.3 Jan | -27.15         | -8.4 Nov     | Jov             | -6.55    | -1.8 Dec    | 4            | 4.62 -1.3  | -1.3 Mar          | -7.45             | -2.1 Jan     | -12.52   | -3.5   |
| Mar    | -16.19 -5.0 Nov   | O Nov      | -13.55   | -4.2 Sep             | b        | -19.02   | -19.02 -5.9 Dec | -22.32         | laf 6.9-     | n n             | -3.12    | -0.9 Apr    | -2.          | -2.75 -0.8 | -0.8 Nov          | £9'9 <del>-</del> | -1.9 Dec     | -10.25   | -2.9   |
| AOZ.   | -13.70 4.2 Apr    | 2 Apr      | -5.34    | -1.7 Mar             | ar       | -16.68   | -16.68 -5.2 Mar | -17.48         | -5.4 A       | Apr             | -2.86    | -0.8 May    |              | 1.32 0.4   | 0.4 Aug           | 4.24              | -1.2 Mar     | -8.25    | -2.3   |
| Sep    | -10.00 -3.1 Aug   | 1 Aug      | -5.09    | -1.6 Nov             | λ(       | -13.78   | -13.78 4.3 Nov  | -13.91         | 4.3          | May             | 61.0     | 0.1 Oct     | 80           | 8.99 2.5   | 2.5 Apr           | 16.2-             | -0.8 Nov     | 91.9-    | -1.9   |
| Apr    | -5.45 -1.7 May    | 7 May      | 0.54     | 0.2 Apr              | Jr.      | -5.50    | -5.50 -1.7 Apr  | -5.59          | -I.7 Aug     | Jug<br>Jug      | 3.94     | 1.1 Jul     | .6           | 9.92 2.8   | 2.8 May           | -0.37             | -0.1 Apr     | -3.00    | -0.8   |
| Мау    | -0.59 -0.2 Oct    | 2 Oct      | 6.49     | 2.0 May              | ay       | -1.15    | -1,15 -0.4 Oct  | 4.29           | -1.3 Oct     | )ct             | 4.34     | 1.2 Aug     | 20.31        |            | 5.7 Sep           | 1.57              | 0.4 Oct      | 62.1-    | 7 -0.5 |
| Sci    | 1.84 0.6 Sep      | 6 Sep      | 8.05     | 2.5 Oct              | 1,4      | -0.49    | -0.49 -0.2 Jun  | -2.17          | -0 7 Jun     | un              | 7.57     | 2.1 Jun     | 21.39        |            | 6.0 Oct           | 2.01              | 0.6 May      | -1.29    | -0.4   |
| E      | 6.00 1.9 Jun      | o Jun      | 12.20    | 3.8 Jun              | u        | 2.90     | 2.90 0.9 May    | -2.07          | -0.6 Sep     | do              | 10.59    | 3.0 Sep     | 28.64        |            | 8.0 Jun           | 4.47              | 1.3 Jun      | -0.60    | -0.2   |
| Annual | -161 -5           | -50 Annual | -95      | -30 Annual           | mual     | -194     | -60 Annual      | -248           | -76.9 Annual | Innual          | -22      | -6 1 Annual |              | 44 12.4    | 44 12.4 Annual    | 55-               | -15 3 Annual | 81-      | -30.5  |

Table 4.14.8: Chinnar Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|                   |                      |             | %              | -9.2             | -6.9              | -6,4              | 9.1-            | -1.1        | -            | -0.8         | -0.7         | 9.0-         | 9.0-             | -0.4             | -0.4         | 7     |
|-------------------|----------------------|-------------|----------------|------------------|-------------------|-------------------|-----------------|-------------|--------------|--------------|--------------|--------------|------------------|------------------|--------------|-------|
|                   |                      | 100%        | Quantity       | -1258.7          | -944.2            | -868.4            | -221.09         | -155.09     | -141.05      | -104.99      | -90.29       | -80.59       | -80.57           | -58.90           | -58.84       | 07161 |
|                   |                      |             | Month          | Oct              | Sep               | Nov               | 2               | Jun         | May          | Mar          | Feb          | Apr          | Jan              | Aug              | Ju!          |       |
|                   |                      |             | %              | -24              | -13               | -16               | -3.6            | -2.5        | -2.1         | -1.2         | -1.2         | -1.1         | -0.9             | 6.0              | 6.0-         | 2     |
|                   | cr                   | <b>%</b> 06 | Quantity       | -3214.9          | -2382.5           | -2187.1           | -487.77         | -342.28     | -287.70      | -165.00      | -163.23      | -145.93      | -127.25          | -125.10          | -117.26      | 2000  |
|                   | With ground water    |             | Month          | Oct              | Sep               | Nov               | Dec             | Jun         | May          | Mar          | Jan          | Feb          | Aug              | Apr              | Jul          |       |
|                   | With                 |             | %              | -39              | -29               | -26               | -5.7            | 4           | -3.2         | 8.1.         | -1.7         | -1.5         | -1.5             | -1.3             | 1.3          |       |
|                   |                      | 20%         | Quantity       | -5293.9          | -3911.0           | -3588.7           | -771.57         | -541.49     | 443.31       | -251.46      | -229.05      | -204.9       | -199.8           | -179.29          | -172.61      |       |
|                   |                      |             | Month          | Oct              | Sep               | Nov               | Dec             | Jun         | May          | Jan          | Mar          | Feb          | Aug              | Jul              | Apr          |       |
|                   |                      |             | %              | -32              | -23               | -21               | ٠5              | -3          | -3           | -2           | -            | 1-           | -1               |                  | -            | ١     |
| basin             |                      | 75%         | Quantity       | 4309.1           | -3186.9           | -2924 7           | -637.21         | 447.21      | -369.57      | -209.73      | -198.78      | -176.93      | -165.41          | -150.14          | -149.85      |       |
| Chinnar Sub-basin |                      |             | Month          | Oct              | Sep               | Nov               | Dec             | unf.        | May          | Jan          | Mar          | Feb          | Aug              | Apr              | Jul          | -     |
| Chi               |                      |             | %              | -9.3             |                   |                   |                 |             |              |              |              |              |                  |                  |              |       |
|                   |                      | %00I        | Quantity       | -1272            | 96.096-           | -884.49           | -240.05         | -168.06     | -158.19      | -128.66      | -109.68      | -98.81       | -89.92           | -65.74           | -63.62       | 200   |
|                   |                      |             | Month          | -24 Oct          | Sep               | Nov.              | Dec             | Jun         | May          | Mar          | Feb          | Apr          | Jan              | Juf              | Aug          | -     |
|                   |                      |             | % k            | -24              |                   |                   | _               | _           |              | -            |              |              |                  | _                |              | -     |
|                   | 3.                   | %06         | Quantity       | -3228.5          | -2399.1           | -2203.2           | -506.72         | -355.25     | -304.84      | -188.67      | -172.58      | -165.32      | -143.32          | -131.97          | -124.16      |       |
|                   | Without ground water |             | Month          | Oct              | Scp               | Nov               | Dec             | Jun         | May          | Mar          | Jan          | Feb          | Apr              | Aug              | Jul          |       |
|                   | hout g               |             | %              | 66               |                   |                   |                 |             |              |              |              |              |                  |                  |              |       |
|                   | Wit                  | 20%         | Month Quantity | -5307.5 -39      | -3927.6           | -3604.8           | -790.52         | -554.46     | 460.45       | -260.82      | -252.72      | -224.29      | -204.52          | -190.83          | -186.19      |       |
|                   |                      |             | _              | ö                | Sep               | Nov.              | ည်              | Jun         | May          | Jan          | Mar          | Feb          | Aug              | Apr              | Jul          | 27030 |
|                   |                      |             | % ′            | -31.8            | -23.5             | -21.6             | 4<br>%          | 3.4         | -2.8         | -1.6         | -1.6         | -1.4         | •13              | -1.2             | -1.2         | 5     |
|                   |                      | 75%         | Month Quantity | 4322.6 -31.8 Oct | -3203.5 -23.5 Sep | -2940.8 -21.6 Nov | -656.16 4.8 Dec | 460.17 -3.4 | -386.71 -2.8 | -222.45 -1.6 | -219.08 -1.6 | -196.32 -1.4 | -170.13 -1.3 Aug | -168.36 -1.2 Apr | -156.75 -1.2 |       |
|                   |                      |             | Month          | ö                | Şc                | λôχ               | <u>ي</u>        | Jun         | May          | Mar          | Jan          | Feb          | Aug              | Apr              | Jul          | _     |

Table 4.14.9: Bhavani Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|        |                |                  |       |          |          |                      |          |                     |              |              | Bhavani Sub-basin | ub-basin       |               |       |          |          |                   |          |              |                                              |          |       |
|--------|----------------|------------------|-------|----------|----------|----------------------|----------|---------------------|--------------|--------------|-------------------|----------------|---------------|-------|----------|----------|-------------------|----------|--------------|----------------------------------------------|----------|-------|
|        |                |                  |       | With     | hout g   | Without ground water | <u>_</u> |                     |              |              |                   |                |               |       |          | With g   | With ground water | ינ       |              |                                              |          |       |
|        | 75%            | -                |       | 50%      |          |                      | %06      | -                   | 100          | %00          |                   | 75%            |               |       | 20%      |          |                   | %06      |              |                                              | %00      |       |
| Month  | Month Quantity | %                | Month | Quantity | %        | Month                | Quantity | × ×                 | Month Quanti | Σ            | % Month           | ith   Quantity | %             | Month | Quantity | %        | Month             | Quantity | W %          | Month                                        | Quantity | %     |
| Σ<br>E | -164.53        | 164.53 -5.8 Jul  |       | -112.5   | 4.0      | 4.0 Jul              | 9.621-   | -6.4 Aug            |              | 71.34        | -6.1 Mar          | -137.4         | 4 4.8 Jul     | 18    | -81.01   | -2.8 Jul | در                | -148     | -5.1 Aug     |                                              | -142.7   | -5.0  |
| Feb    | -139.19        | -139.19 4.9 Fcb  | به    | 16'66-   | -3.5     | -3.5 Mar             | -172.4   | -6.1 Mar            |              | 57.30        | -5.9 Feb          | -114.9         | 9 4.0 Feb     | qa    | -75.66   | -2.6 Mar | Mar               | -145     | -5.0 Mar     |                                              | -140.2   | 4     |
| Jun    | -84.52         | -84.52 -3.0 Aug  | 25    | -89.26   | -3.2     | -3.2 Jun             | -111.5   | -3.9 Jul            |              | -148.77 -5.3 | -5.3 Jan          | -64.03         | 3 -2.2 Aug    | 卸     | -60.58   | -2.1.Jun | 'n                | 1.88-    | -3.1 Feb     |                                              | -118.0   | 4,    |
| Jan    | -80.60         | -80.60 -2.8 Mar  | e.    | -78.08   |          | -2.8 Feb             | -95.23   | -3.4 Feb            |              | 12.24        | -5.0 Jun          | -61.12         | 2 -2.1 Mar    | far   | -50.93   | -1.8 Feb | ę                 | -71.0    | -2.5 Jul     |                                              | -117.3   | 4     |
| Aug    | -61.01         | 61.01 -2.2 Jan   | C.    | -67.10   | L        | -2.4 Aug             | -91.56   | -3.2 Jun            |              | -120.69      | 4.3 Apr           | 45             | 5 -1.6 Jan    | 3.0   | -50.53   | -1.8 Aug | Aug               | -62.9    | -2.2 Jun     |                                              | -97.29   | -3.4  |
| Apr    | -54.69         | .54.69 -1.9 Jun  | L L   | 43.69    | -1.5 Apr | Apr                  | 48.21    | -1.7 Jan            |              | _            | -3.3 Aug          | -32.33         | 3f -1.f Jun   | =     | -20.29   | -0.7 Apr | \pr               | -38.3    | -1.3 Jan     |                                              | -75.46   | -2.6  |
| May    | -22.55         | -22.55 -0.8 Apr  | ٦     | -27.08   |          | -1.0 Sep             | -33.0    | -1.2 Sep            |              | L            | -1.9 May          | -15.91         | 1 -0.6 Apr    | pr    | -17.20   | -0.6 Sep | Sep               | -20.3    | -0.7 Sep     | <u>                                     </u> | 41.25    | •     |
| Sep    | -20.4          | -20.4 -0.7 Sep   | ۽     | 25.1     | 0.0      | 0.9 Jan              | -9.54    | -0.3 May            |              | -27.18       | -1.0 Sep          | -7.69          | 9 -0.3 Sep    | cb    | 37.81    | 1.3 May  | vlay              | 3.02     | 0.1 May      | y                                            | -20.53   | -0.7  |
| E      | 8.84           | -8.84 -0.3 Dec   | ပ္က   | 34.52    |          | 1.2 May              | -3.63    | -0.1 Nov            | A            |              | 0.2 Jul           | 22.65          | 5 0.8 Dec     | O O   | 39.34    | 1.4 Jan  | la,               | 7.03     | 0.2 Nov      | ,                                            | 7.03     | •     |
| ဦ      | 35.44          | 1.3 May          | ay    | 40.53    |          | 1.4 Nov              | 44.0     | 1.6 Apr             |              | 13.97        | 0.5 Dec           | 40.26          | 6 1.4 May     | fay   | 47.18    | 1.6 Nov  | Nov               | 44.89    | 1.6 Apr      |                                              | 23.85    | 0     |
| Oct    | 75.0           | 2.7 Nov          | >     | 77.2     |          | 2.7 Oct              | 44.9     | 1.6 Oct             |              | 54.3         | 1.9 Oct           | 75.95          | 5 2.6 Nov     | ٥٨    | 78.13    | 2.7 Oct  | )ct               | 45.93    | 1.6 Oct      |                                              | 55.27    | -     |
| Nov    | 8.86           | 3.5 Oct          | ភ     | 159.9    |          | 5.7 Dec              | 45.14    | 1.6 Dec             | -            | 19.71        | 2.8 Nov           | 99.72          | 2 3.5 Oct     | ट्र   | 18091    | 5.6 Dec  | )ec               | 49.95    | 1.7 Dec      |                                              | 84.52    | 7     |
| Annual | 424.9          | 424.9 -15 Annual | lanur | 101.9    |          | 3.6 Annual           | -829.1   | -829.1 -29.3 Annual | inual -112   | =            | -39.7 Annual      | al -237.39     | 9 -8.2 Annual | nnual | 289.43   |          | 10.1 Annual       | 9 1+9    | -22.3 Annual | nal                                          | -936.6   | -32.5 |
|        |                |                  |       |          |          |                      |          |                     |              | -            |                   |                |               |       |          |          |                   |          |              | l                                            |          |       |

Table 4.14.10: Noyil Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|        |                  |                     |        | With     | out gro  | Without ground water | <u></u>            |                 |              |        |          |             |          |                    |       |          | With gro    | With ground water |          |             |          |          |
|--------|------------------|---------------------|--------|----------|----------|----------------------|--------------------|-----------------|--------------|--------|----------|-------------|----------|--------------------|-------|----------|-------------|-------------------|----------|-------------|----------|----------|
|        | 75%              |                     |        | 50%      |          |                      | %06                |                 |              | %00    |          |             | 75%      | -                  |       | 20%      |             |                   | %06      |             | %001     |          |
| Month  | Month Quantity % | %                   | Month  | Quantity | %        | Month                | Quantity           | %               | Month Quanti | ≥      | %        | Month       | Quantity | %                  | Month | Quantity | %           | Month             | Quantity | % Month     | Quantity | %        |
| unſ    | 49.75            | 49.75 4.3 Jun       | Jun    | 49.74    | -4.3 Jun | Tun'                 | -49.77 -4.3 Jun    | 4.3 Ju          | un           | 49.79  | 4.3.     | Jun         | 41.33    | -3.4 Jun           | E.    | 41.31    | -3.4 Jun    |                   | 41.3     | -3.4 Jun    | -41.37   | -3.4     |
| May    | 42.0]            | 42.01 -3.6 May      | May    | 42.01    | -3.6 May | May                  | -42.01 -3.6 May    | -3.6 N          | fay          | 42.01  | -3.6 May | May         | -37.71   | -3.1 May           | [ay   | -37.71   | -3.1 May    | ay                | -37.7    | -3.1 May    | -37.71   | ů,       |
| Jul    | -30.70           | -30.70 -2.6 Jul     | Jul    | -30.66   | -2.6 Jul | la/                  | -30,76             | -30,76 -2,7 Jul | -            | -30.82 | -2.7 J   | Jul         | -26.26   | -2.2 Jul           | _     | -26.21   | -2.1 Jul    |                   | -26.3    | -2.2 Jul    | -26.38   | -2       |
| Aug    | -26.54           | .26.54 -2.3 Aug     | Aug    | -26.54   | -2.3 Aug | Aug                  | -26.54             | 26.54 -2.3 Aug  | Sn.          | -26.54 | -2.3 /   | Aug         | -23.13   | -1.9 Aug           | gn    | -23.13   | -1.9 Aug    | SE SE             | -23.1    | -1.9 Aug    | -23,13   | -        |
| Mar    | -25.34           | .25.34   -2.2   Mar | Mar    | -25.34   | -2.2 Mar | Mar                  | -25.34             | -25.34 -2.2 Mar |              | -25.34 | -2.2     | Mar         | -22.00   | -1.8 Mar           | Į,    | -22.00   | -1.8 Mar    | थ                 | -22.0    | -1.8 Mar    | -22.00   | 7        |
| Feb    | -22.89           | .22.89 -2.0 Feb     | Feb    | -22,89   | -2.0 Feb | Feb                  | -22.89 -2.0 Feb    | -2.0 F          |              | -22.89 | -2.0 Feb | ceb         | -19.87   | -1.6 Feb           | S.    | -19.87   | -1.6 Feb    | ą                 | 661-     | -1.6 Feb    | 19.87    | 7        |
| Apr    | -20.90           | .20.90 -1.8 Apr     | Apr    | -20.90   | -1.8 Apr | Apr                  | -20.90 -1.8 Apr    | -1.8 A          | PT           | -20.90 | -1.8     | Apr         | -18.36   | -1.5 Apr           | 10    | -18.36   | -1.5 Apr    | 100               | -18.4    | -1.5 Apr    | -18.36   | <b>-</b> |
| Jan    | -20.10           | -20.10 -1.7 Jan     | lan    | 20.10    | -1.7 Fan | Fan                  | -20.10 -1.7 Jan    | -1.7 18         | S            | -20.10 | -1.7 J   | Jan         | -17.78   | -1.5 Jan           | =     | -17.78   | -1.5 Jan    | _                 | 8.71-    | -1.5 Jan    | -17.78   | -        |
| Sep    | 111.19           | -11.19 -1.0 Sep     | Sep    | 96.01-   | -0.9 Sep | Sep                  | -11.50 -1.0 Scp    | -1.0 \$         | do           | -11.82 | -1.0 Sep | Sep         | -9.54    | -0.8 Scp           | d     | -9.30    | -0.8 Scp    | ç,                | 8.6-     | -0.8 Scp    | -10.17   | -0.8     |
| Dec    | 23.26            | 2.0 Dec             | Dec    | 24.77    | 2.1 Dec  | Dec                  | 21.25              | 1.8 Dec         | cc           | 19.24  | 1.7      | .7 Dec      | 24.17    | 2.0 Dec            | S     | 25.68    | 2.1 Dec     | 25                | 22.2     | 1.8 Dec     | 20.15    |          |
| Nov    | 53,38            | 4.6 Nov             | Nov    | 16.55    | 4.8 Nov  | No.                  | 50.01              | 4.3 Nov         | vo.          | 46.64  | 4.0 Nov  | 207         | 53.67    | 4.4 Nov            | 00    | 56.20    | 4.6 Nov     | ΛC                | 50.3     | 4.1 Nov     | 46.93    | 3        |
| Oct    | 106.39           | 9.2 Oct             | Oct    | 111.1    | 9.6 Oct  | Oct                  | 100.2              | 8.6 Oct         | lct<br>lct   | 93.94  | 8.1 Oct  | )<br>Set    | 9.901    | 8.7 Oct            | Ç     | 111.3    | 9.1 Oct     | ,,                | 100.4    | 8.2 Oct     | 94.17    | 7.       |
| Annual | -66.40           | 66.40 -5.7 Annual   | Annual | -57.40   | 4.9      | 4.9 Annual           | -78.40 -6.8 Annual | -6.8 A          | nnual        | -90.40 | -7.8     | -7.8 Annual | -31.52   | -31.52 -2.6 Annual | nunal | -22.52   | -1.8 Annual | unual             | 43.5     | -3.6 Annual | -55.5    | 4        |

Table 4.14.11: Amaravathi Sub-basin-Monthiy Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|                                                  |                            |                      | i                |          |            |                 |          | Amara        | Amaravathi Sub-basin | -basin   |                    |          |                   |              |              |            |       |
|--------------------------------------------------|----------------------------|----------------------|------------------|----------|------------|-----------------|----------|--------------|----------------------|----------|--------------------|----------|-------------------|--------------|--------------|------------|-------|
| Without ground water                             | Without ground water       | Without ground water | out ground water | er       |            |                 |          |              |                      |          |                    |          | With ground water | water        |              |            |       |
| 75% 50% 90%                                      |                            |                      | %06              | %06      |            |                 | %001     |              |                      | 75%      |                    | 50%      |                   | %06          |              | %001       |       |
| Month Quantity % Month Quantity % Month Quantity | Month Quantity % Month     | % Month              | Month            | Quantify |            | % Month Quantit | Quantity | %            | Month                | Quantity | Month %            | Quantity | % Month           | h   Quantity | % Month      | h Quantity | %     |
| -207.3 -7.7 Jul -249.6 -9.3 Jul -208.3           | -249.6 -9.3 Jul            | -9.3 Ju!             |                  | -208.3   |            | -7.8 Jul        | -184.4   | -6.9 Mar     | Mar                  | -170.7   | -6.2 Jul           | -201.3   | -7.3 Mar          | -168.4       | -6.1 Jun     | -190.2     | 6.9   |
| -205.0 -7.7 Aug -185.3 -6.9 Mar -205.1           | -185.3 -6.9 Mar            | -6.9 Mar             |                  | -205.1   |            | -7.7 Mar        | -178.7   | -6.7 Jun     | lun.                 | -168.7   | -6.1 Feb           | -147.4   | -5.4 Jul          | -160.0       | -5.8 Jul     | -185.9     | 9.9   |
| -192.3 -7.2 Feb -179.3 -6.7 Feb -178.9           | -179.3 -6.7 Feb            | -6.7 Feb             |                  | 6'8'1-   |            | -6.7 Feb        | -176.2   | -6.6 Jul     | lu]                  | -144.0   | -5.2 Aug           | -143.3   | -5.2 Feb          | -147.0       | -5.3 Mar     | -166.5     | -6.0  |
| -168.6 -6.3 Jun -174.0 -6.5 Jun -157.5           | -174.0 -6.5 Jun -157.5     | -6.5 Jun -157.5      | -157.5           |          |            | -5.9 Jun        | -166.4   | -6.2 Feb     | eb                   | -136.8   | -5.0 Jun           | -137.8   | -5.0 Jun          | -121.2       | 4.4 Feb      | -117.8     | 4.3   |
| -154.2 -5.8 Mar -168.5 -6.3 Aug -148.9 -5        | -168.5 -6.3 Aug -148.9     | -6.3 Aug -148.9      | -148.9           |          | <b>'</b> ٠ | -5.6 Aug        | -144.3   | -5.4 Aug     | Aug                  | -112.2   | -4.1 Mar           | -131.9   | -4.8 Aug          | -106.9       | -3.9 Aug     | -107.7     | -3.9  |
| -98.93 -3.7 Apr -33.5 -1.3 Jan -79.57 -3.        | -33.5 -1.3 Jan -79.57      | -1.3 Jan -79.57      | -79.57           |          | Ċ,         | -3.0 Jan        | -93.39   | -3.5 Jan     | an                   | -77.5    | -2.8 Apr           | -20.2    | -0.7 Jan          | -58.13       | -2.1 Jan     | -56.20     | -2.0  |
| -77.85 -2.9 Jan -26.92 -1.0 Apr -49.03 -1        | -26.92 -1.0 Apr -49.03     | -1.0 Apr -49.03      | -49.03           | '        | 7          | -1.8 Sep        | -59.49   | -2.2 Apr     | γbr                  | -64.5    | •2.3 Jan           | -5.5     | -0.2 Apr          | -35.68       | -1.3 Apr     | -36.81     | -1.3  |
| -58.30 -2.2 Dec -9.43 -0.4 Sep -34.98 -1         | -9.43 -0.4 Sep -34.98      | -0.4 Sep -34.98      | -34.98           |          | -          | -1.3 May        | -36.90   | -1.4 May     | May                  | -45.1    | -1.6 Dec           | 06:0-    | 0.0 Sep           | -13.31       | -0.5 Dec     | 11.16      | 9.0-  |
| -40.31 -1.5 May 16.95 0.6 Dec 11.47 (            | 16.95 0.6 Dec 11.47        | 0.6 Dec 11.47        | 11.47            |          |            | 0.4 Dec         | -7.95    | -0.3 Sep     | Sep                  | -18.6    | -0.7 May           | 30.14    | i.l Dec           | 20.00        | 0.7 Sep      | -10.26     | -0.4  |
| 124.3 4.6 Sep 132.3 4.9 May 22.68                | 132.3 4.9 May 22.68        | 4.9 May 22.68        | 22.68            |          |            | 0.8 Apr         | -1.63    | -0.1 Oct     | Oct                  | 126.6    | 4.6 Oct            | 143.0    | 5.2 May           | 35.87        | 1.3 May      | 11.65      | 0.4   |
| 141.4 5.3 Oct 140.7 5.3 Oct 41.00                | 140.71 5.3 Oct             | 5.3 Oct              |                  | 41.00    |            | 1.5 Nov         | 12.73    | 0.5 Dec      | Sec                  | 150.0    | 5.4 Sep            | 154.0    | 5.6 Oct           | 43.29        | 1.6 Nov      | 38.29      | 1.4   |
| 189.8 7.1 Nov 199.9 7.5 Nov 147.3                | 199.9 7.5 Nov              | 7.5 Nov              |                  | 147.3    | 1          | 5.5 Oct         | 33.15    | 1.2 Nov      | Nov                  | 191.4    | 7.0 Nov            | 201.5    | 7.3 Nov           | 148.9        | 5.4 Oct      | 48.74      | 1.8   |
| -746.9 -27.9 Annual -536.9 -20.0 Annual -839.9   | -536.9 -20.0 Annual -839.9 | 6.658-               | 6.658-           |          |            | -31.4 Annual    | -1003.9  | -37.5 Annual | Annual               | 438.6    | 438.6 -15.9 Annual | -228.6   | -8.3 Annual       | -531.63      | -19.3 Annual | 695.63     | -25.3 |
| -000 -000 -000 -000 -000 -000 -000 -00           | -20.0 - Francisco          | 2.7.00               | 2.7.00           |          | 1          |                 | 7        |              | 7                    | 12000    | 10.0 ( 10.000      |          | 2000              |              |              | -          | 3     |

Table 4.14.12: Tirumanimuttar Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water

|              |                |                     |            |                      |                 |                     | ï.       | umani    | Tirumanimuttar Sub-basin | ıb-basin |            |            |          |          |                   |          |            |            |        |
|--------------|----------------|---------------------|------------|----------------------|-----------------|---------------------|----------|----------|--------------------------|----------|------------|------------|----------|----------|-------------------|----------|------------|------------|--------|
| <u> </u><br> |                |                     | With       | Without ground water | icr             |                     |          |          |                          |          |            |            | 2        | Vilh gr  | With ground water | L.       |            |            |        |
|              | 75%            | _                   | 20%        |                      | %06             |                     | 100%     |          |                          | 75%      | -          | 5          | 20%      |          |                   | %06      |            | 100%       |        |
| Month        | Month Quantity | / % Month           | h Quantity | % Month              | Quantity        | % Month Quantit     | Quantity | %        | Month                    | Quantity | N %        | Month Q    | Quantity | %        | Month             | Quantity | % Month    | 1 Quantity | %      |
| Mar          | -147.3         | -147.3 4.0 Mar      | -147.3     | 4.0 Mar              | -147,3 4.0 Mar  | 4.0 Mar             | -147.3   | -4.0 N   | Mar                      | -79.73   | -2.1 Mar   | ar.        | -79.73   | -2.1 Mar | far               | -79.73   | -2.1 Mar   | -79.73     | -2.1   |
| Feb          | -103.0         | -103.0 -2.8 Feb     | -103.0     | -2.8 Feb             | -103.0 -2.8 Feb | 2.8 Feb             | -103.0   | -2.8 Feb | qə.                      | -57.43   | -1.5 Feb   | p          | -57.43   | -1.5 Feb | qə                | -57.43   | -1.5 Fcb   | -57.43     | -1.5   |
| Apr          | -82.74         | -82.74 -2.3 Apr     | -82.74     | -2.3 Apr             | -82.74 -2.3 Apr | 2.3 Apr             | -82.74   | -2.3 A   | Apr                      | -48.13   | -1.3 Apr   | ),r        | -48.13   | -1.3 Apr | \pr               | -48.13   | -1.3 Apr   | 48.13      | -1.3   |
| Aug          | -65.16         | -65.16 -1.8 Aug     | -65.16     | -1.8 Aug             | -65.16          | -65.16 -1.8 Aug     | -65.16   | -1.8 Aug | Aug                      | -39.86   | -1.1 Aug   | 81         | -39.86   | -1.1 Aug | 301               | -39.86   | -1.1 Aug   | -39.86     | i -1.1 |
| May          | -62.52         | -62.52 -1.7 May     | -62.52     | -1.7 May             | -62.52 -1.7 Sep | 1.7 Sep             | -63.04   | -1.7 N   | May                      | -38.58   | -1.0 May   | ay         | -38.58   | -1.0 May | <b>1</b> ay       | -38.58   | -1.0 May   | -38.58     | 0.1-   |
| Sep          | -60.84         | -60.84 -1.7 Jun     | -\$0.85    | -1.4 Scp             | -61.49          | -61.49 -1.7 May     | -62.52   | -1.7     | Jun                      | -32.47   | -0.9 Jun   | U          | -31.69   | -0.8 Jun | นท                | -32.51   | -0.9 Jun   | -32.61     | -0.9   |
| Jun          | -51.62         | -51.62 -1.4 Sep     | -48.81     | -1.3 Jun             | -51.66 -1.4 Jun | 1.4 Jun             | -51.76   | -1.4 Sep | day                      | -28.84   | -0.8 Jan   | ı,         | -26.28   | -0.7 Sep | eb                | -29.49   | -0.8 Sep   | -31.04     | 8.0-   |
| Jar.         | -40.86         | 40.86 -1.1 Jul      | -38.52     | -1.0 Jul             | -40.99 -1.1 Jul | 1.1 Jul             | 41.29    | -1.1 Jul | 5                        | -26.39   | -0.7 Jul   |            | -24.05   | -0.6 Jul | - F               | -26.52   | -0.7 Jul   | -26.82     | -0.7   |
| Jan          | -37.17         | -37.17 -1.0 Jan     | -37.17     | -1.0 Jan             | -37.17 -1.0 Jan | 1.0 Jan             | -37.17   | -1.0 Jan | an                       | -26.28   | -0.7 Sep   | d          | -16.81   | -0.4 Jan | an                | -26.28   | -0.7 Jan   | -26.28     | 1 -0.7 |
| 30           | 50.49          | 1.4 Dec             | 127.4      | 3.5 Dec              | 46.31           | 1.3 Dec             | 36.43    | 1.0 Dec  | 360                      | 71.65    | 1.9 Dec    | 3;         | 148.5    | 3.9 Dec  | ာမင               | 67.47    | 1.8 Dec    | 57.59      | 1.5    |
| Nov          | 107.7          | 2.9 Nov             | 236.6      | 6.4 Nov              | 100.7           | 2.7 Nov             | 84.11    | 2.3 Nov  | vov                      | 137.2    | 3.6 Nov    | ١٨٠.       | 266.1    | 7.0 Nov  | {ov               | 130.2    | 3.4 Nov    | 113.6      | 3.0    |
| Öct          | 267.5          | 7.3 Oct             | 505.5      | 13.8 Oct             | 254.5           | 6.9 Oct             | 223.9    | 6.1      | Oct                      | 293.1    | 7.7 Oct    | <b>,</b> , | 531.1    | 14 Oct   | ct                | 280.1    | 7.4 Oct    | 249.5      | 9.9    |
| Annual       | -225.54        | -225.54 -6.1 Annual | 233.44     | 6.4 Annual           | -250.50         | -250.50 -6.8 Annual | -309.51  | -8.4     | -8.4 Annual              | 124.24   | 3,3 Annuai | inuai      | 583.24   | 15 A     | 15 Annual         | 99.24    | 2.6 Annual | 40.24      | =      |

Table 4.14.13: Ponnanai Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|                    |                      |            | %                | 수<br>-          | -<br>-          | 0.0             | 00              | 0              | 9              | 0              | 9.0            | 9.0            | 1.3              | 1.5          | 2.4           | 9.9                 |
|--------------------|----------------------|------------|------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|----------------|----------------|------------------|--------------|---------------|---------------------|
|                    |                      | %001       | Quantity         | -1.14           | -0.57           | 0.10            | 0.29            | 0.31           | 0.43           | 2.74           | 5.77           | 6.18           | 13.34            | 15.34        | 23.89         | 69:99               |
|                    |                      | _<br> <br> | Month            | 0.0 Apr         | 0.2 May         | 0.2 Feb         | 0.3 Aug         | 0.3 Mar        | Jun            | Jul            | 1.0 Jan        | 1.7 Sep        | 2.6 Dcc          | 3.3 Oct      | 5.7 Nov       | 16.2 Annual         |
|                    |                      |            | %                | 0.0             | 0.7             | 0.7             | 0.3             | 0.3            | 0.4            | 4.0            | 1.0            | 1.7            | 2.6              | 3.3          | 5.7           | 16.2                |
|                    | )<br>                | %06        | Quantity         | 0.05            | 09'1            | 1.84            | 3.09            | 3.11           | 3.91           | 4.39           | 10.43          | 17.41          | 19.97            | 33.20        | 57.07         | 162.7               |
|                    | With ground water    |            | % Month          | 0.1 Apr         | 0.3 Jun         | 0.3 Aug         | 0.5 May         | 0.5 Mar        | 0.6 Jul        | 0.8 Feb        | 1.4 Jan        | 2.7 Sep        | 3.8 Dec          | 4.8 Oct      | 8.5 Nov       | .2 Annual           |
|                    | Wil                  | 20%        | Quantity   %     | 1.05            | 2.58 0          | 3.15 0          | 4.89            | 5.46 0         | 6.18           | 8.00           | 14.35          | 26.87          | 37.80            | 48.28 4      | 85.08         | 243.69  24.2 Annual |
|                    |                      |            | % Month          | 0.04 Apr        | 0.20 Jun        | 0.23 Aug        | 0.40 Jul        | 0.43 Mar       | 0.43 May       | 0.57 Feb       | 1.19 Jan       | 2.09 Sep       | 3.07 Dec         | 3.88 Oct     | 6.75 Nov      | 93.69 19.27 Annual  |
| -basin             |                      | 75%        | Quantity         | 0               | 1.97            | 2.34            | 4.01            | 4.27           | 4.28           | 5.77           | 11.93          | 21.03          | 30.89            | 38.97        | 67.79         | 193.69              |
| Ponnanai Sub-basin | -                    |            | % Month          | -2.1 Apr        | -2.0 Jun        | -2.0 Aug        | -1.5 Mar        | -1.4 May       | -1.4 Jul       | -1.1 Fcb       | -1.1 Jan       | -0.7 Sep       | -0.6 Dec         | -0.6 Oct     | 0.0 Nov       | -14.4 Annual        |
|                    |                      | %00        | Month   Quantity | L               | -19.89          | -19.14          | -14.27          | -13.85         | -13.56         | -10.87         | -10,40         | -6.83          | -5.95            | 1            | -0.12         | -140.74 -1          |
|                    |                      |            | % Month          | 2.0 Jul         | 1.6 Jan         | 1.3 Dec         | 1.2 Jun         | -9.21 -0.9 Oct | -8.07 -0.8 Aug | -5.87 -0.6 Mar | -3.17 -0.3 Apr | -1.19 -0.1 May | 0.4 Sep          | 0.5 Feb      | 3.4 Nov       | -4.6 Annual         |
|                    |                      | %06        | Orantity         | -19.21 -2.0 Jul | -15.23 -1.6 Jan | -13.10 -1.3 Dec | -12.01 -1.2 Jun | -9.21          | -8.07          | -5.87          | -3.17          | -1.19          | 4.01             | 5.28         | 33.06         | -44.71              |
|                    | Without ground water |            | % Month          | -1.9 Jul        | -1.2 Jan        | -1.2 Jun        | -1.1 Aug        | -0.8 Apr       | -0.6 Mar       | 0.0 Dec        | 0.2 May        | 0.5 Feb        | 1.5 Oct          | 2.0 Scp      | 6.2 Nov       | 3.7 Annual          |
|                    | Withou               | 20%        | Quantity 9       | 1               | -12.12          | -11.30          | -10.70          | -8.22          | -5.72          | -0.08          | 2.42           | 5.32           | 14.75            | 80.61        | 90.19         | 36.26               |
|                    |                      | ,          | Month            | Jul             | Jun             | Jan             | Aug             | Apr            | Mar            | May            | Fcb            | Dec            | Sep              | 000          | Nov           | Amnual              |
|                    |                      | 75%        | Month Quantity % | -18.84 -1.9 Jul | -13.73 -1.4 Jun | -12.73 -1.3 Jan | -11.51 -1.2 Aug | -8.83 -0.9 Apr | -7.17 -0.7 Mar | -1.99 -0.2 May | -1.59 -0.2 Fcb | 0.19 0.0 Dec   | 8.90   0.9   Sep | 9.78 1.0 Oct | 43.78 4.5 Nov | -13.74 -1.4 Annual  |
|                    |                      | 25         | Month O          | Jul             | Jan             | Jun             | Aug             | Apr            | Mar            | May            | Dec            | Feb            | Sep              | Oct          | Nov           | Annual              |

Table 4.14.14: Upper Coleroon Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water

|        |                 |                  |          |                      |          |            |                   |          | Upper Coleroon Sub-basin | eroon Su | b-basin  |                   |              |                  |                   |          |          |             |          |          |
|--------|-----------------|------------------|----------|----------------------|----------|------------|-------------------|----------|--------------------------|----------|----------|-------------------|--------------|------------------|-------------------|----------|----------|-------------|----------|----------|
|        |                 |                  | With     | Without ground water | d water  |            |                   |          |                          |          |          |                   |              | With             | With ground water | et.      |          |             |          |          |
|        | 75%             |                  | 20%      |                      |          | %06        |                   | 100%     |                          |          | 75%      |                   | 20%          |                  |                   | %06      |          |             | %001     |          |
| Month  | Quantity %      | % Month          | Quantity | w<br>%               | Month (  | Quantity % | % Month Qu        | Quantity | %                        | Month    | Quantity | % Month           | ith Quantity | itity %          | Month             | Quantity | 6,6      | Month       | Quantity | %        |
| Ju?    | -69.07 -5.1 Jul | 5.1 Jul          | -59.92   | 4.4 Jul              |          | -76.14     | -76.14 -5.6 Aug   | -95.77   | -7.1 Jul                 |          | -12.36   | -0.9 Jul          |              | -3.20 -0         | -0.2 Jul          | -1943    | -1.4 Jul | ותן         | -36.73   | -2.7     |
| Aug    | -61.16          | -61.16 4.5 Aug   | 48.15    | -3.6 Aug             | 90       | -71.20     | -71.20 -5.3 Jul   | -93.44   | -6.9 Mar                 | lar.     | -2.24    | -0.2 Mar          |              | 0.49 0.          | 0.0 Aug           | 15.01-   | -0.8 Aug | Aug         | -35.08   | -2.6     |
| Sep    | -17.49 -        | -17.49 -1.3 Mar  | -10.77   | -0.8 Sep             | _        | -35.69     | -35.69 -2.6 Sep   | -80.26   | -5.9 Apr                 | ji,      | -0.72    | -0.1 Apr          |              | 0.76 0.          | 0.1 Mar           | -4.35    | -0.3 Sep | Ç           | -20.93   | -1.5     |
| Mar    | -13.49 -1.0 Apr | 1.0 Apr          | -2.38    | -0.2 Mar             | <u>.</u> | -15.60     | -15.60 -1.2 Mar   | -20.75   |                          | 200      | -0.47    | 0.0 Jun           |              | 2.45 0.          | 0.2 Apr           | 98:1-    | -0.1 Mar | Mar         | -9.501   | 0.7      |
| Apr    | -3.86           | -3.86 -0.3 Jun   | -0.94    | -0.1 Feb             | _        | -6.44      | -6.44 -0.5 Feb    | -12.81   | ]                        | E        | 0.59     | 0.0 Feb           |              | 7.00 0.          | 0.5 Jun           | 18.0     | -0.1 Feb | eb e        | -5.36    | -0.4     |
| Feb    | -3.83           | -3.83 -0.3 Feb   | -0.46    | 0.0 Apr              | <b>b</b> | -5.00      | -5.00 -0.4 Oct    | -10.02   | -0.7 Feb                 | q        | 3.62     | 0.3 May           |              | 7.99 0.          | 0.6 Feb           | 19.1     | 0.1 Apr  | Apr         | 4.64     | ان<br>ان |
| Jun    | 2.80            | -2.80 -0.2 Sep   | 60'9     | 0.5 Jun              | -        | 4.23       | 4.23 -0.3 Apr     | -7.78    | -0.6 May                 | ay       | 5.41     | 0.4 Aug           |              | 12.53 0.         | 0.9 May           | 3.42     | 0.2 Jun  | lun         | 4.35     | Ç        |
| May    | 4.80            | 0.4 May          | 7.38     | 0.5 May              | >        | 2.81       | 0.2 Jun           | -7.74    | -0.6 Jan                 | e e      | 13.97    | LO Jan            |              | 19.48            | 1.4 Jan           | 9.72     | 0.7 May  | May         | -1.46    | ٦        |
| Jan    | 9.70            | 9.70 0.7 Jan     | 15.21    | 1.1 Jan              |          | 5.45       | 0.4 Jan           | 4.8      | -0.4 Sep                 | d        | 41.84    | 3.0 Sep           | 9            | 65.42 4.         | 4.8 Sep           | 23.64    | 1.7 Jan  | an          | -0.69    | 0        |
| Oct    | 45.70           | 3.4 Oct          | 69.99    | 4.9 Oct              |          | 29.54      | 2.2 May           | -2.07    | -0.2 Oct                 | ct       | 63.48    | 4.6 Oct           | -            | 84.41 6.         | 6.1 Oct           | 47.32    | 3.4 Oct  | )ct         | 7.76     | 9        |
| Dec    | 66.63           | 66.63 4.9 Dec    | 90.46    | 6.7 Dec              | L)       | 48.24      | 48.24 3.6 Dec     | 3.21     | 0.2 Dec                  | 200      | 78.95    | 5.8 Dec           |              | 102.8 7.         | 7.5 Dec           | 95.09    | 4.4 Dec  | Dec         | 15.53]   | =        |
| Nov    | 132.5           | 132.5 9.8 Nov    | 174.8    | 174.8 13.0 Nov       | >        | 06.66      | 99.90 7.4 Nov     | 20.03    | 1.5 Nov                  | 00       | 148.1    | 10.8 Nov          |              | 190.4 13.        | 13.9 Nov          | 5.511    | 8.4 Nov  | Nov         | 35.68    | 9:7      |
| Annual | 86.64           | 86.64 6.4 Annual | 236.64   | 236.64 17.5 Annual   | nual     | -28.36     | 28.36 -2.1 Annual | -312.36  | -23.2 Annual             | nnual    | 339.2    | 339.2 24.7 Annual |              | 489.2 35.6 Annua | 6 Annual          | 224.2    | 16.3     | 16.3 Annual | -59.8    | 4.4      |

Table 4.14.15: Lower Coleroon Sub-basin-Monthiy Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water

|                          |                      |      | %                | 9             | 0.1           | 0.1           | 0.3           | 0.3           | 0.4           | =              | 1.2            | 4              | 2.7            | 3.3            | 3.4            | 14.2               |
|--------------------------|----------------------|------|------------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|----------------|----------------|--------------------|
|                          |                      | 100% | Quantity         | -0.71         | 1.16          | 1.28          | 3.28          | 3.64          | 5.70          | 14.07          | 15.08          | 17.71          | 35.75          | 43.47          | 44.93          | 185.4              |
|                          |                      |      | Month            | 0.1 May       | 0.3 Jun       | 0.3 Apr       | 0.5 Jan       | 0.6 Feb       | 0.7 Mar       | 2.2 Dec        | 2.2 Nov        | 2.5 Oct        | Jul            | 4.5 Aug        | 4.9 Sep        | 22 Annual          |
|                          |                      |      | %                | 0.1           | 0.3           | 0.3           | 0.5           | 0.6           | 0.7           | 2.2            | 2.2            | 2.5            | 3.3 [Jul       | 4.5            | 4.9            | 22                 |
|                          | iter                 | %06  | Quantity         | 1.72          | 3.78          | 4.30          | \$0.9         | 8.14          | 8.53          | 28.08          | 28.76          | 32.96          | 42.59          | 58.74          | 63.68          | 287.3              |
|                          | With ground water    |      | Month            | 0.5 May       | 7 Jun         | 0.8 Apr       | 0.9 Feb       | 1.0 Mar       | 1.5 Jan       | 4.3 Nov        | 4.4 Dec        | 4.6 Oct        | 5.0 Jul        | 7.0 Aug        | 7.9 Sep        | 498.19 38.2 Annual |
|                          | Wit                  |      | %                |               | 0.7           |               |               |               |               |                |                |                |                |                |                | 38.                |
|                          |                      | 20%  | Quantity         | 6.83          | 9.29          | 10.69         | 11.12         | 13.28         | 09.61         | 15.53          | 57.03          | 59.76          | 65.14          | 96.06          | 103.24         | 498.19             |
|                          |                      |      | Month            | 0.2 May       | 0.4 Jun       | 0.5 Apr       | 0.6 Feb       | 0.7 Mar       | 0.9 Jan       | 2.7 Nov        | 2.8 Jul        | 3.2 Dec        | 3.6 Oct        | 5.2 Aug        | 5.7 Sep        | 26.3 Annual        |
|                          |                      |      | %                |               |               |               |               |               |               |                |                |                |                |                |                | 5 26               |
| Lower Colcroon Sub-basin |                      | 75%  | Quantity         | 3.10          | 5.26          | 6.02          | 7.41          | 9.52          | 11.51         | 35.47          | 37.11          | 41.62          | 46.49          | 67.41          | 74.34          | 342.76             |
| olcroon                  |                      |      | Month            | May           | Jun           | Apr           | 0.001 Feb     | 0.003 Mar     | 0.010 Jan     | 0.063 Nov      | 0.068 Dec      | Oct            | Jul            | 0.120 Aug      | 0.137 Sep      | 0.536 Annual       |
| ower C                   |                      |      | %                | -0.008 May    | -0.004        | -0.002 Apr    | 0.001         | 0.003         | 0.010         | 0.063          | 0.068          | 0.072 Oct      | 0.076 Jul      | 0.120          | 0.137          | 0.536              |
| ات                       |                      | %001 | Quantity         | -1.00         | -0.46         | -0.22         | 0.08          | 0.33          | 1.24          | 197            | 8.19           | 89.8           | 9.22           | 14.49          | 16.61          | 64.8               |
|                          |                      |      | Month            | May           | ໃນກ           | Apr           | Feb           | Mar           | Jan           | Nov            | Dec            | Jul            | Oct            | Aug            | Sep            | 166.7 1.38 Annual  |
|                          |                      |      | %                | 1.43 0.01 May | 2.16 0.02 Jun | 2.49 0.02 Apr | 2.76 0.02 Feb | 2.80 0.02 Mar | 6.49 0.05 Jan | 15.52 0.13 Nov | 20.61 0.17 Dec | 22.88 0.19 Jul | 24.47 0.20 Oct | 29.77 0.25 Aug | 35.36 0.29 Sep | 1.38               |
|                          | er .                 | %06  | Quantity         | 1.43          | 2.16          | 2.49          | 2.76          | 2.80          | 6.49          | 15.52          | 20.61          | 22.88          | 24.47          | 29.77          | 35.36          | 166.7              |
|                          | Without ground water |      | Month            | 0.1 May       | 0.1 Jun       | 0.1 Feb       | l Mar         | l Apr         | I Jan         | 0.2 Ju!        | 0.4 Nov        | 0.4 Dec        | 0.5 Oct        | 0.5 Aug        | 0.6 Sep        | 3.1 Annual         |
|                          | thout                |      | %                |               |               |               | 0             | 0             | O.            |                |                |                |                | 1              |                |                    |
|                          | W                    | 90%  | Quantity         | 6.54          | 7.56          | 7.67          | 7.91          | 61.6          | 17.56         | 29.96          | 48.04          | 53.88          | 56.65          | 86.198         | 74.92          | 377.6              |
|                          |                      |      | Month            | May           | Feb           | Jan           | Mar           | Apr           | Jan           | Jul            | Nov            | Dec            | )<br>()        | Aug            | Sep            | 222.2 I 84 Annual  |
|                          |                      |      | %                | 2.80 0.02 May | 3.64 0.03 Feb | 3.85 0.03 Jun | 4.15 0.03 Mar | 4.52 0.04 Apr | 9.47 0.08 Jan | 19.41 0.16 Jul | 28.00 0.23 Nov | 31.23 0.26 Dec | 33.13 0.27 Oct | 38.44 0.32 Aug | 46.01 0.38 Sep | <u>2</u>           |
|                          |                      | 75%  | Month Quantity % | 2.80          | 3.64          | 3.85          | 4.15          | 4.52          | 9.4           | 19.4           | 28.00          | 31.23          | 33.13          | 38.44          | 46.01          | 222.2              |
| <br> <br> -              |                      |      | Month            | May           | Jun           | Feb           | Mar           | Apr           | Jan           | =              | Nov.           | ĕ              | ö              | Aug            | Sep            | Annual             |

Table 4.14.16: Cauvery Delta Sub-basin-Monthly Deficits or Surpluses in Descending Order for 75%, 50%, 90% and 100% Water Year

|            |                  |                    |          |                      |             |                  |            | Cauvery Delta Sub-basin | a Sub-basin |                    |          |                   |          |            |          |         |
|------------|------------------|--------------------|----------|----------------------|-------------|------------------|------------|-------------------------|-------------|--------------------|----------|-------------------|----------|------------|----------|---------|
|            |                  |                    | With     | Without ground water | vater       |                  |            |                         |             |                    |          | With ground water | iter     |            |          |         |
|            | 75%              |                    | 20%      |                      | %06         |                  | 100%       |                         | 75%         |                    | %0\$     |                   | %06      |            | %001     |         |
| Month      | Month Quantity % | wonth %            | Quantity | %   Month            | th Quantity | % Month          | 1 Quantity | % Month                 | th Quantity | % Month            | Quantity | % Month           | Quantity | % Month    | Quantity | %       |
| May        | 10.45            | 10.45 0.1 May      | 24.26    | 0.2 May              | -0.51       | 0.51 0.0 May     | -9.90      | -0.1 May                | 11.44       | 0.1 May            | 25.25    | 0.3 May           | 0.03     | 0.0 May    | 16.8-    | Ģ       |
| Jun        | 16.48            | 16.48 0.2 Jun      | 31.34    | 0.3 Jun              | 4.68        | 0.0 Jun          | -5.42      | -0.1 Jun                | 21.95       | 0.2 Jun            | 36.82    | 0.4 Jun           | 69.7     | 0.1 Jun    | 0.05     | 0.0     |
| Apr        | 20.46            | 20.46 0.2 Feb      | 34.38    | 0.3 Apr              | 6.74        | 0.1 Apr          | 4.96       | 0.0 Apr                 | 25.53       | 0.3 Apr            | 42.78    | 0.4 Apr           | 9.53     | 0.1 Apr    | 0.11     | 0.0     |
| Feb        | 20.67            | 20.67 0.2 Apr      | 37.71    | 0.4 Feb              | 9.79        | 0.1 Jan          | 0.30       | 0.0 Fcb                 | 32.71       | 0.3 Feb            | 46.42    | 0.5 Feb           | 16.42    | 0.2 Jan    | 7.20     | 0       |
| Mar        | 24.69            | 24.69 0.2 Mar      | 38.62    | 0.4 Mar              | 13.63       | 13.63 0.1 Feb    | 0.47       | 0.0 Mar                 | 42.88       | 0.4 Mar            | 56.81    | 0.6 Mar           | 23.64    | 0.2 Fcb    | 12.51    | 0       |
| Jan        | 44.39            | 44.39 0.4 Jan      | 74.32    | 0.7 Jan              | 20.63       | 20.63 0.2 Mar    | 4.17       | 0.0 Jan                 | 51.29       | 0.5 Jan            | 81.21    | 0.8 Jan           | 24.43    | 0.2 Mar    | 22.36    | 0       |
| Jul        | 129.9            | 1.3 Jul            | 168.9    | 1.7 Nov              | 80.77       | 0.8 Dec          | 29.02      | 0.3 Nov                 | 164.8       | 1.6 Nov            | 238.9    | 2.4 Nov           | 94.68    | 0.9 Dec    | 48.92    | 0.5     |
| Nov        | 139.6            | 1.4 Nov            | 213.6    | 2.1 Dec              | 86.25       | von 6.0          | 30.47      | 0.3 Dec                 | 173.0       | 1.7 Dec            | 257.2    | 2.6 Dec           | 97,20    | 1.0 Nov    | 55.75    | ŏ       |
| <u>သို</u> | 153.1            | 1.5 Dec            | 237.3    | 2.4 Oct              | 96.14       | 1.0 Oct          | 34.12      | 0.3 Oct                 | 193.9       | 1.9 Jul            | 260.5    | 2.6 Oct           | 112.0    | 1,1 Oct    | 62.85    | ŏ       |
| ပ်         | 165.1            | 1.7 Oct            | 252.0    | 2.5 Jul              | 98.94       | 1.0 Jul          | 72.45      | 0.7 Jul                 | 221.5       | 2.2 Oct            | 280.7    | 2.8 Jul           | 149.4    | 1.5 Jul    | 164.1    | <u></u> |
| Aug        | 221.9            | 2.2 Aug            | 308.8    | 3.1 Aug              | 152.8       |                  | 93.70      | 0.9 Aug                 | 319.9       | 3.2 Aug            | 406.9    | 4.1 Aug           | 206.8    | 2.1 Aug    | 191.8    | 1.5     |
| Sep        | 256.4            | 256.4 2.6 Sep      | 363.2    | 3.7 Sep              | 171.6       | 1.7 Sep          | 00.66      | 1.0 Sep                 | 352.2       | 3.5 Sep            | 459.0    | 4.6 Sep           | 224.3    | 2.2 Sep    | 194.9    | 1.1     |
| Annual     | 1203.1           | 1203.1 12.1 Annual | 1784.4   | 18.0 Annual          | _           | 741.4 7.5 Annual | 343.4      | 3.5 Annual              | _           | 1611.2 16.1 Annual | 2193     | 2193 21.9 Annual  | 0.996    | 9.7 Annual | 751.5    | 7.      |

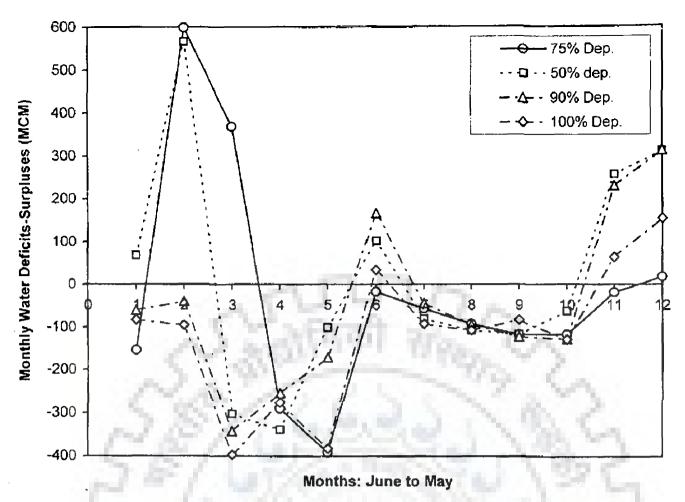


Figure 4.1(a): Upper Cauvery Sub-basin: Monthly Water Deficits- Surpluses
Without Ground Water

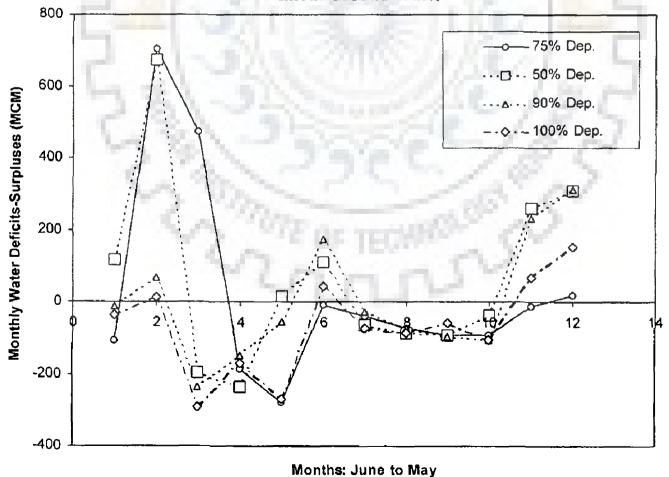


Figure 4.1(b): Upper Cauvery Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

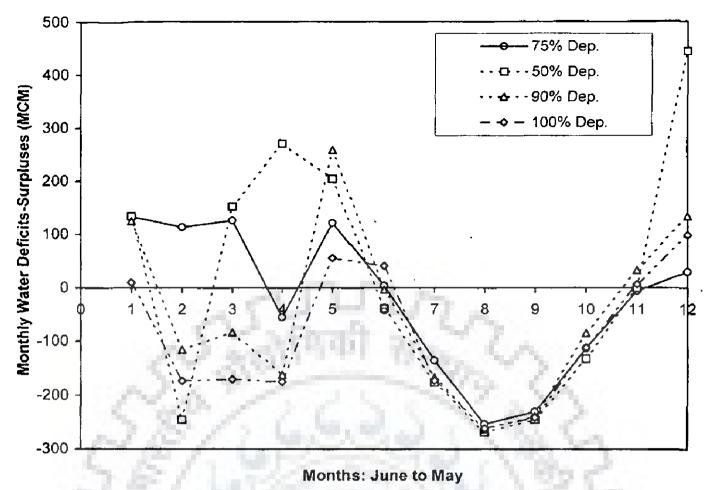


Figure 4.2(a): Kabini Sub-basin: Monthly Water Deficits- Surpluses Without Ground Water

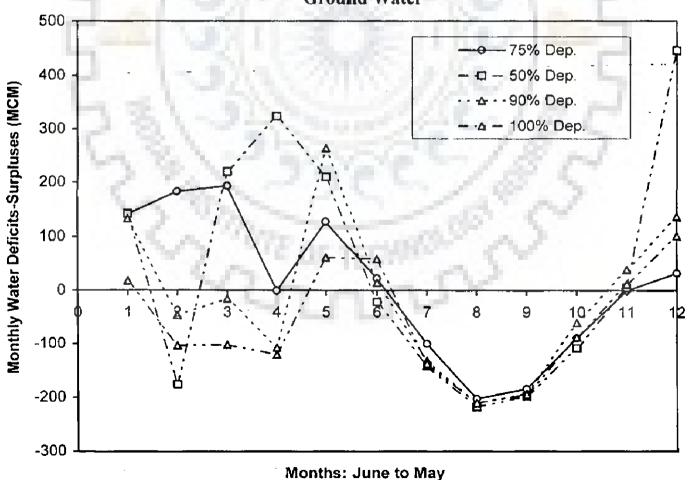


Figure 4.2(b): Kabini Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

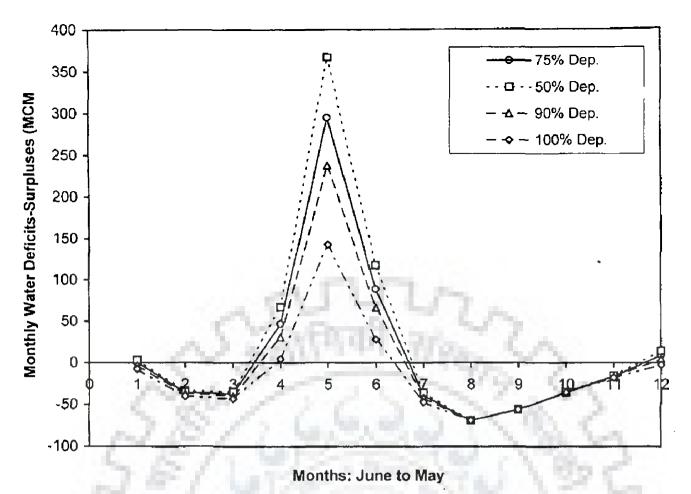


Figure 4.3(a): Shimsha Sub-basin: Monthly Water Deficits- Surpluses Without Ground Water

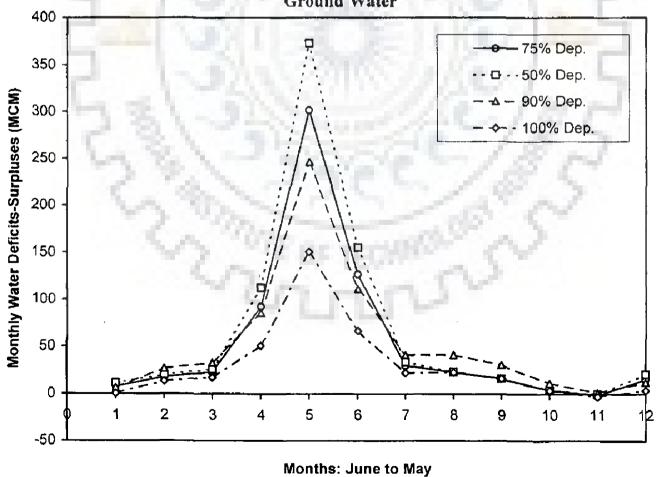


Figure 4.3(b): Shimsha Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

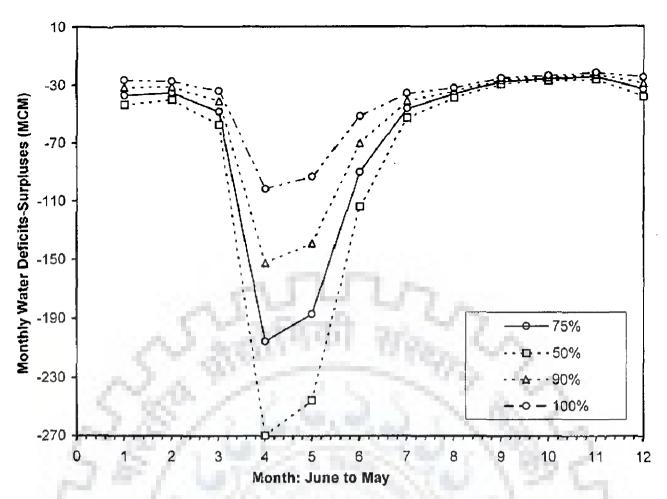


Figure 4.4(a): Arkavathi Sub-basin: Monthly Water Deficits- Surpluses Without Ground Water

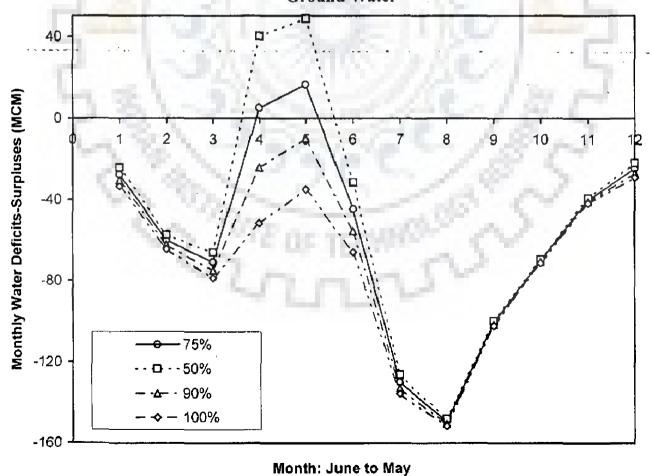


Figure 4.4(b): Arkavathi Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

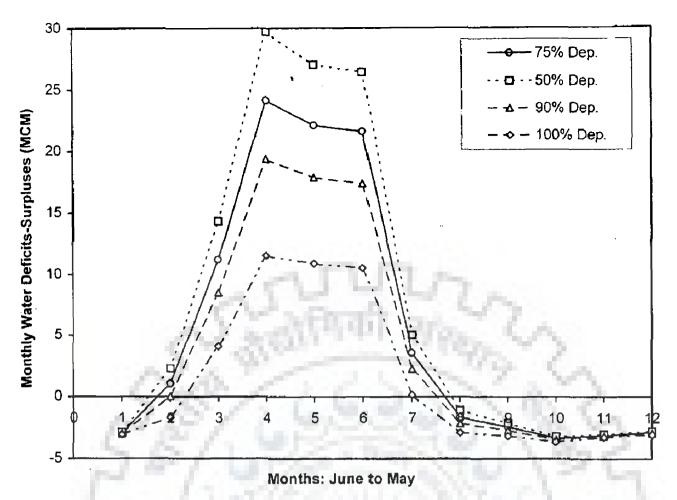


Figure 4.5(a): Middle Cauvery Sub-basin: Monthly Water Deficits- Surpluses

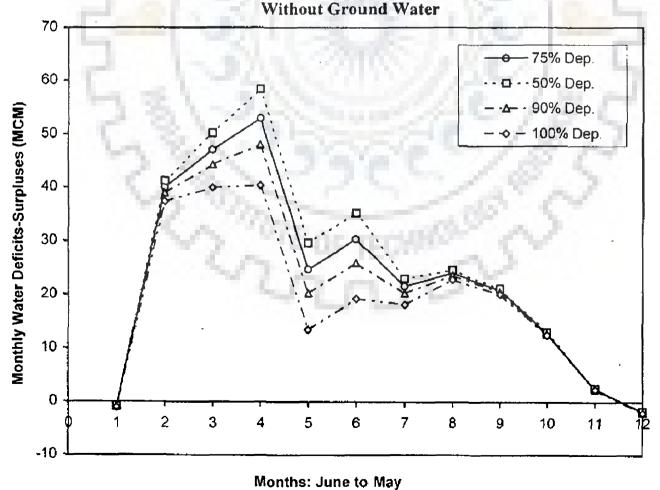


Figure 4.5(b): Middle Cauvery Sub-basin: Monthly Water Deficits-Surpluses
With Ground Water

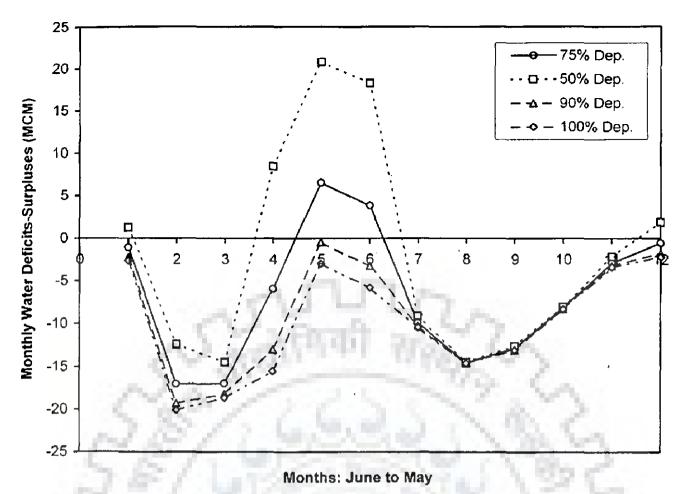


Figure 4.6(a): Suvarnavathi Sub-basin: Monthly Water Deficits- Surpluses
Without Ground Water

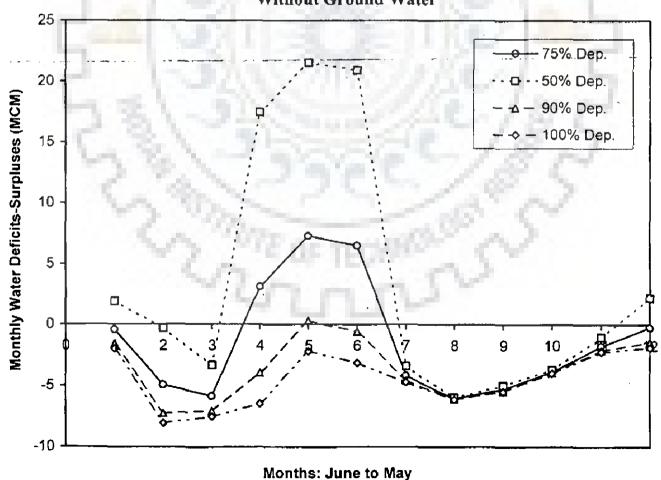


Figure 4.6(b): Suvarnavathi Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

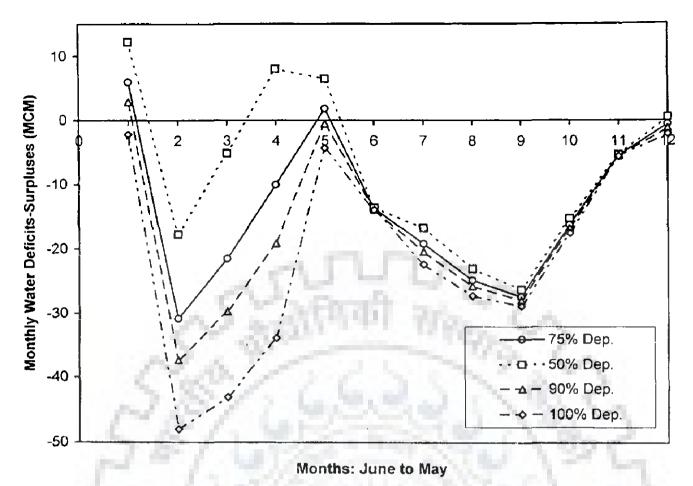
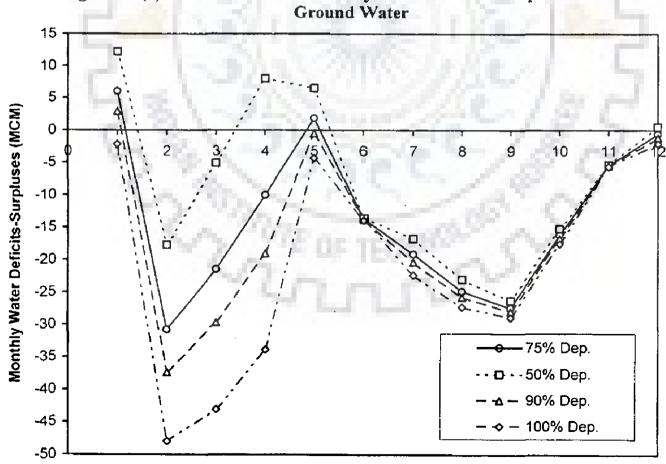


Figure 4.7(a): Palar Sub-basin: Monthly Water Deficits- Surpluses Without



Months: June to May

Figure 4.7(b): Palar Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

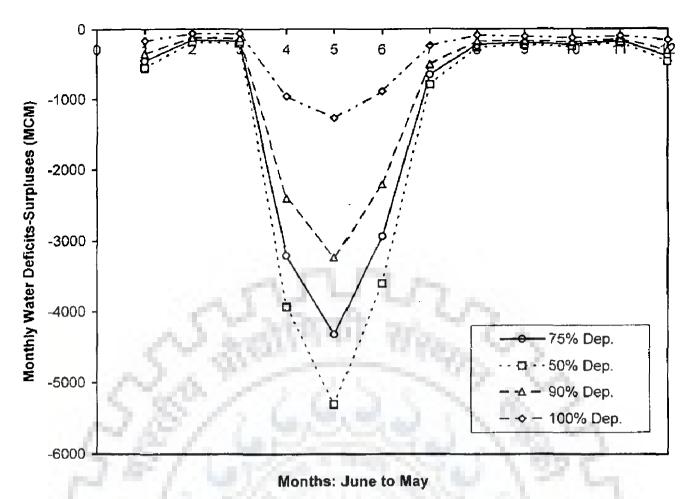


Figure 4.8(a): Chinnar Sub-basin: Monthly Water Deficits- Surpluses Without

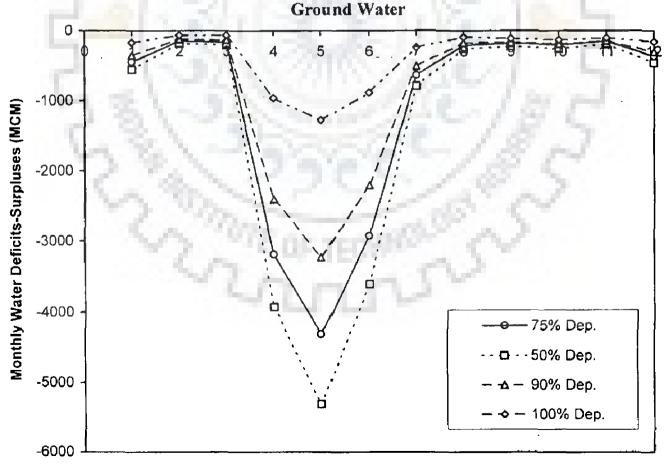


Figure 4.8(b): Chinnar Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

Months: June to May

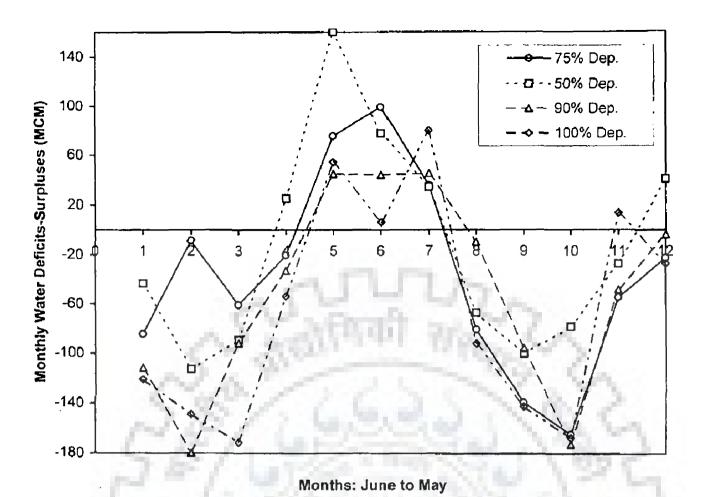


Figure 4.9(a): Bhavani Sub-basin: Monthly Water Deficits- Surpluses Without Ground Water

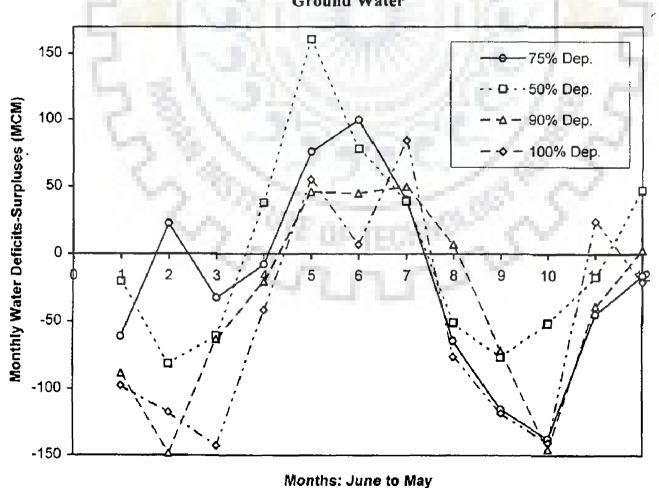


Figure 4.9(b): Bhavani Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

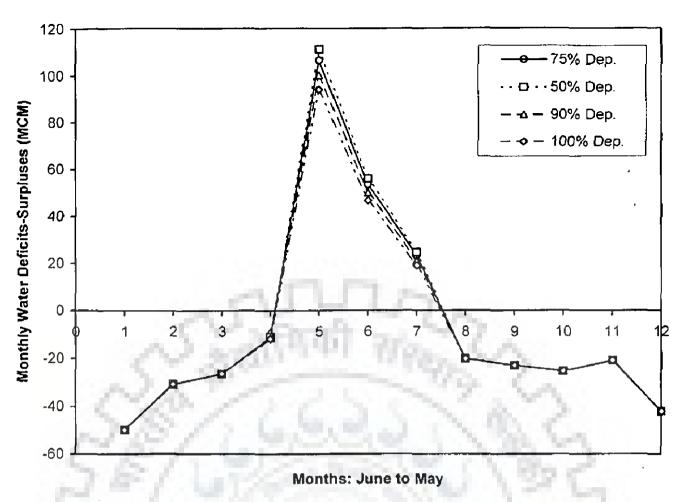


Figure 4.10(a): Noyil Sub-basin: Monthly Water Deficits- Surpluses Without Ground Water

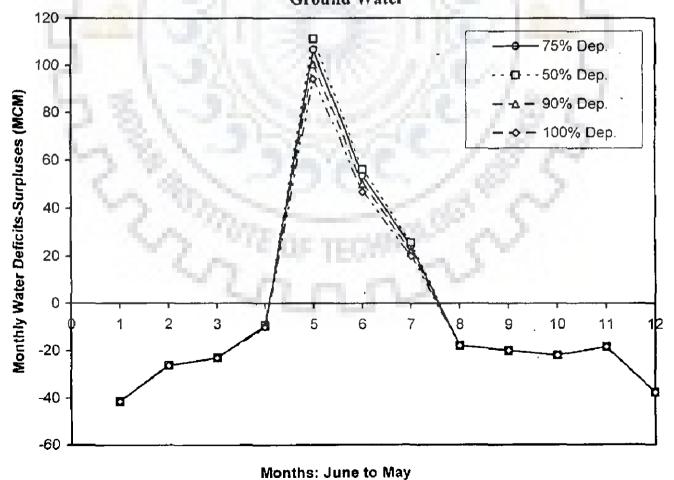


Figure 4.10(b): Noyil Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

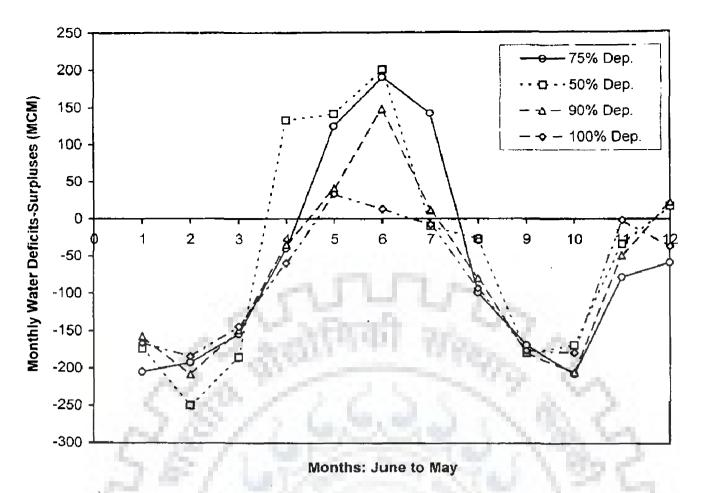


Figure 4.11(a): Amaravathi Sub-basin: Monthly Water Deficits- Surpluses
Without Ground Water

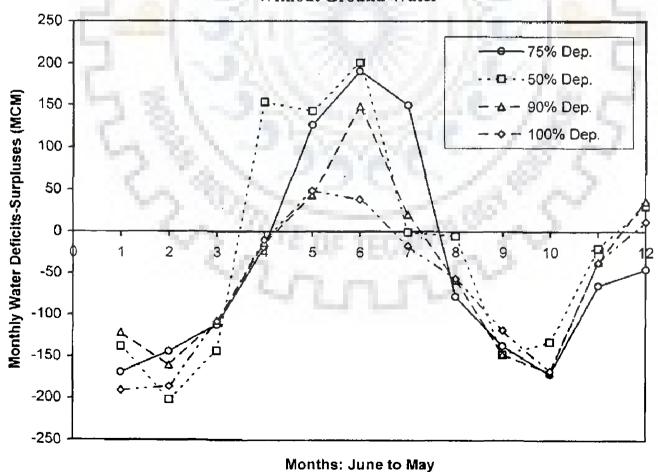


Figure 4.11(b): Amaravathi Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

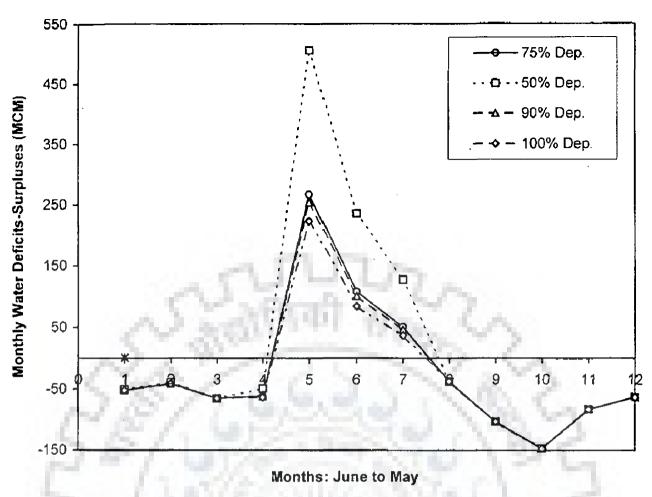


Figure 4.12(a): Tirumanimuttar Sub-basin: Monthly Water Deficits- Surpluses
Without Ground Water

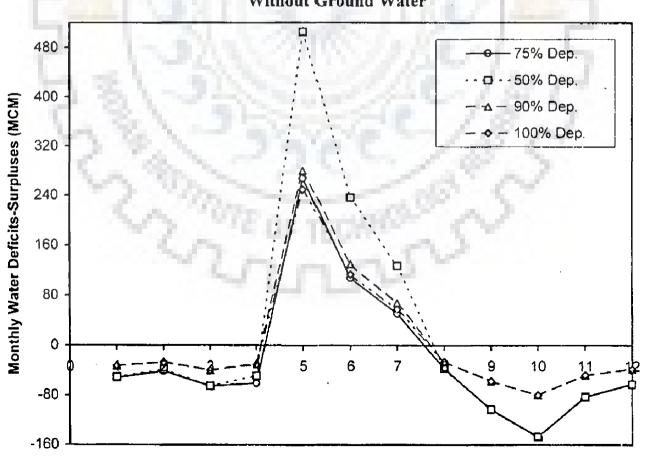


Figure 4.12(b): Tirumanimuttar Sub-basin: Monthly Water Deficits-Surpluses
With Ground Water

Months: June to May

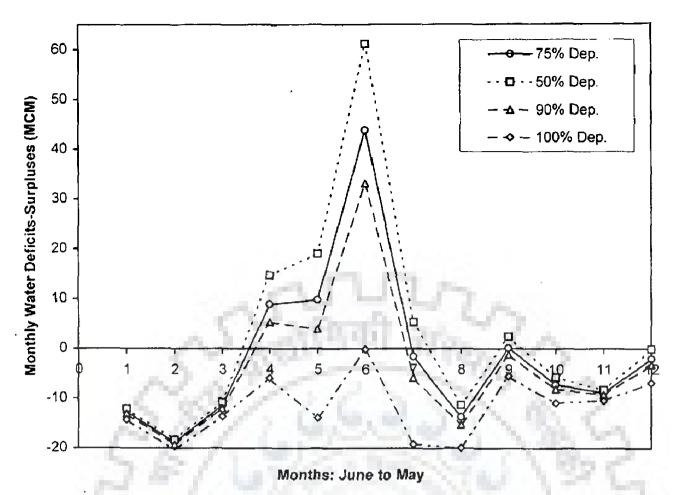


Figure 4.13(a): Ponnanai Sub-basin: Monthly Water Deficits- Surpluses Without

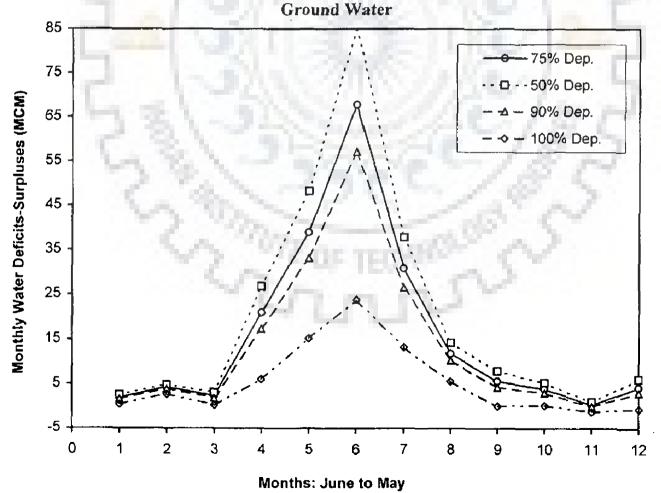


Figure 4.13(b): Ponnanai Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

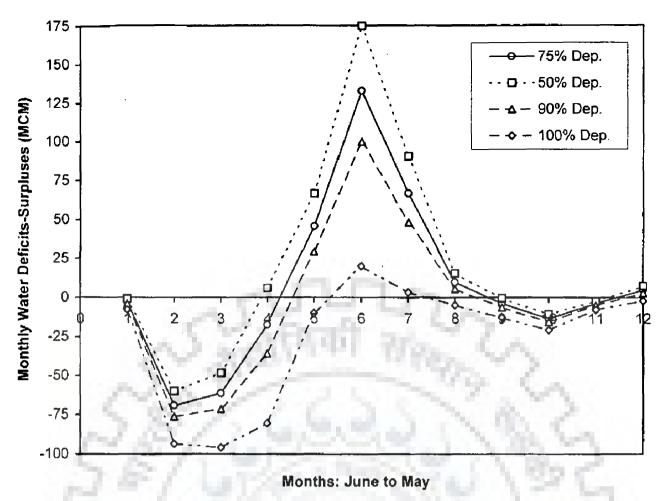


Figure 4.14(a): Upper Coleroon Sub-basin: Monthly Water Deficits- Surpluses
Without Ground Water

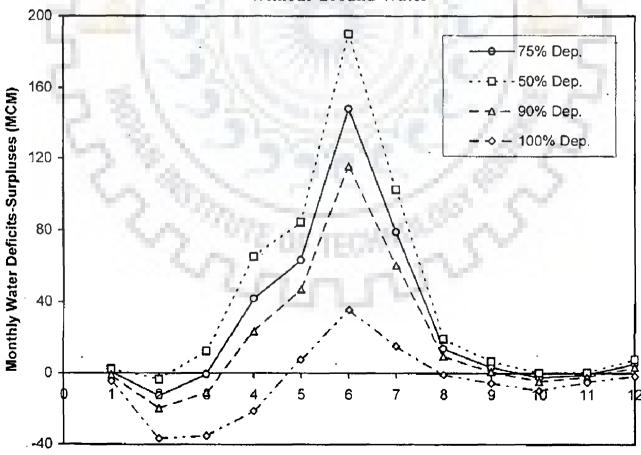


Figure 4.14(b): Upper Coleroon Sub-basin: Monthly Water Deficits-Surpluses
With Ground Water

Months: June to May

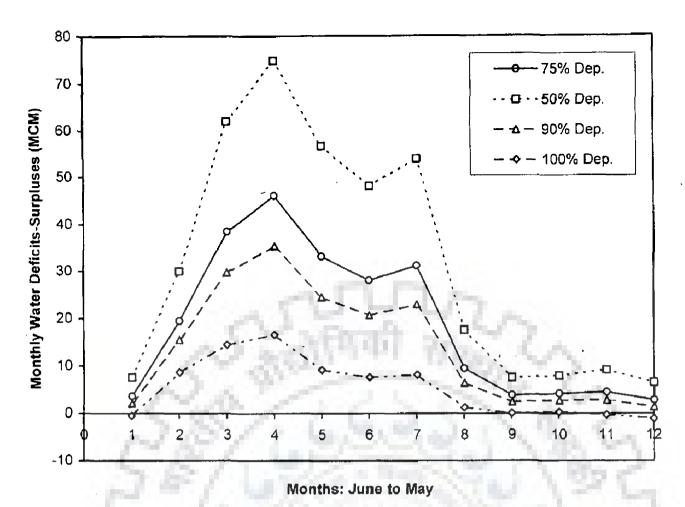


Figure 4.15(a): Lower Coleroon Sub-basin: Monthly Water Deficits- Surpluses
Without Ground Water

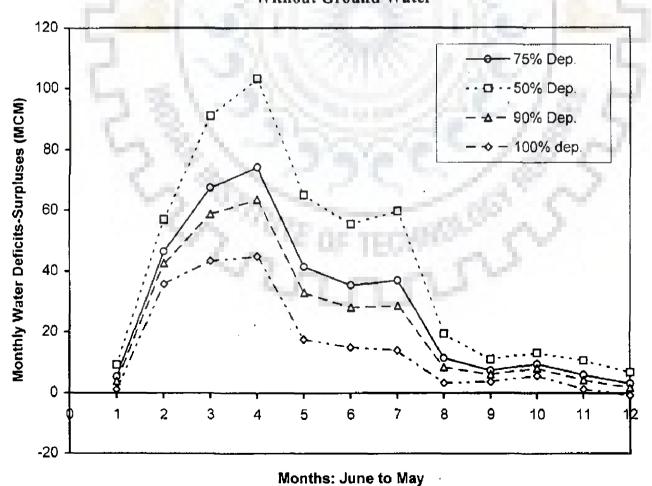


Figure 4.15(b): Lower Coleroon Sub-basin: Monthly Water Deficits-Surpluses
With Ground Water

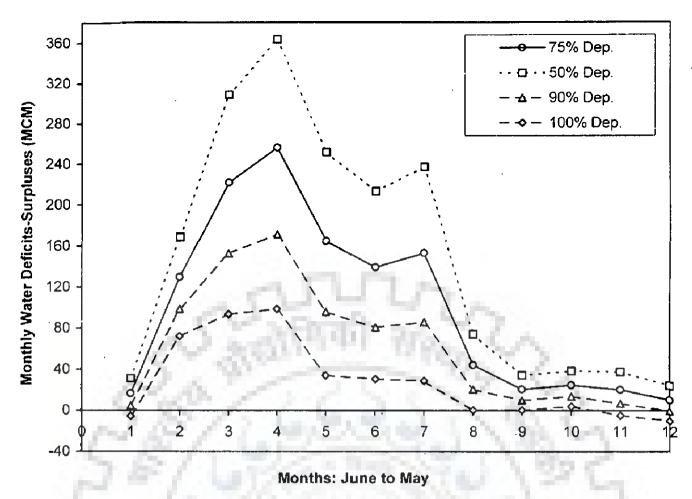


Figure 4.16(a): Cauvery Delta Sub-basin: Monthly Water Deficits- Surpluses
Without Ground Water

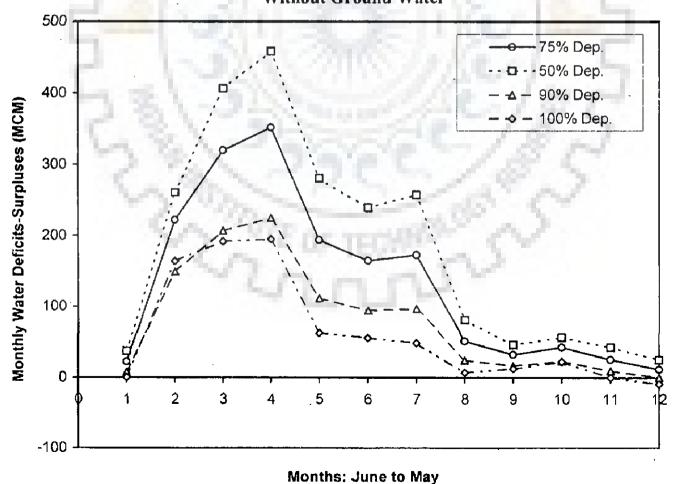


Figure 4.16(b): Cauvery Delta Sub-basin: Monthly Water Deficits-Surpluses With Ground Water

#### LINEAR PROGRAMMING MODEL

#### 5.1 INTRODUCTION

Operation research or system engineering provides methodologies for studying and analyzing various aspects of a complex river basin system, by using mathematical models or computer models. The linear programming and its offshoots are probably the most widely used methods of operation research. It also assists in decision-making process by selecting the best alternative policies subject to all pertinent constraints by simulation and optimization techniques.

A mathematical model is a set of equations that describes and represents the real system. Out of several mathematical programming techniques, linear programming (LP) has been widely used in the optimization of water resources systems for very obvious reasons of large number of variables are involved in a complex water resources problems.

Linear programming is a powerful mathematical technique in decision making to determine the monthly or seasonal releases from canal/reservoir, to allocate irrigated area so that the annual utilization of the available water resources among various uses can be maximized. The task of the linear programming model is to analyze the whole range of development alternatives in a river basin. To perform this task, a linear programming model for multipurpose, multi reservoir and multi-irrigated area proposed to be investigated in this study has to be as realistic as possible.

Some of the assumptions, which have been made for ease of formulation are:

1. The objective function and the constraints are in linear form,

- 2. It is deterministic in nature, i.e., hydrologic inputs are taken as known values and are certain to occur, and
- 3. The model is to be run for one representative year only at a time.

Major design variables/parameters considered are:

- 1. Capacity of the reservoir,
- The area sown for each crop,
- The annual amount of upstream water for irrigation and water supply (municipal and industrial uses),
- 4. The annual amount of downstream water for irrigation and water supply (municipal and industrial uses), and
- 5. Capacity of the associated canal system.

A LP model is formulated below:

#### 5.2 OBJECTIVE FUNCTION

A sample site is shown in Figure 5.1. The variables/ parameters of a reservoir are shown in Figure 5.2.

For linear programming model the following 4 single objective functions are considered individually:

- 1. To maximize the total annual diversions for irrigation and water supply (annual water utilization) from reservoirs (major projects) and remaining areas in each sub-basin not covered by reservoirs.
- 2. To maximize the area to be irrigated at each reservoir,
- 3. To maximize the agricultural food production at each reservoir, and
- 4. To maximize the total annual net benefits from crops at each reservoir.

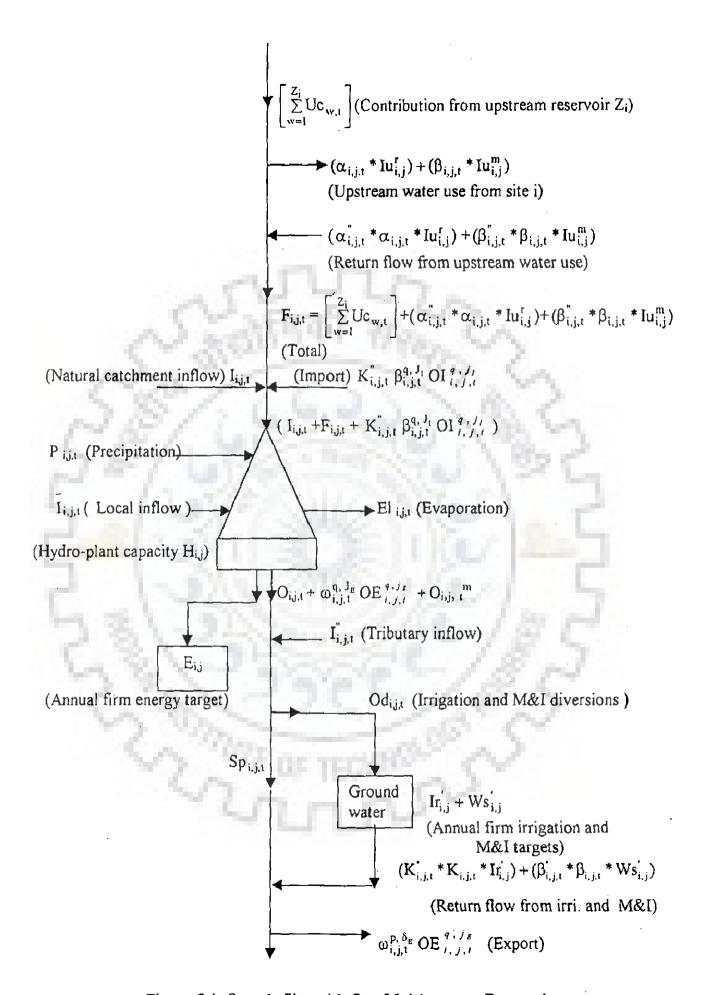


Figure 5.1: Sample Site with One Multipurpose Reservoir.

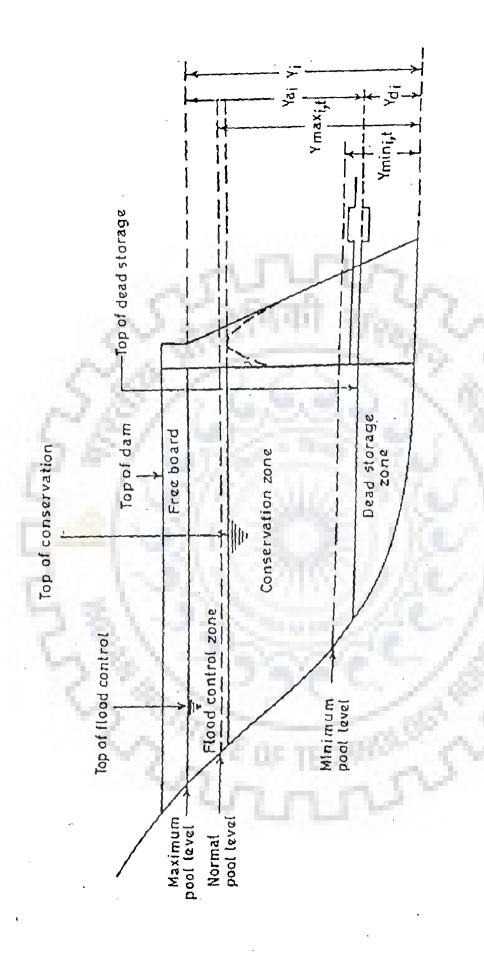


Figure 5.2: Various Reservoir Storage and Variables Related to a Reservoir Site

These objective functions are mathematically written as follows:

(1) To maximize the total annual diversions for irrigation and water supply/ or irrigation (annual water utilization) from reservoirs (major projects) and remaining areas in each sub-basin not covered by reservoirs, i.e.,

1(a)- For lumped irrigation and water supply for entire system:

Max 
$$Z = \sum_{j=1}^{NB} \sum_{i=1}^{N_j} (Ir_{i,j} + Ws_{i,j})$$
 (For lumped irrigation model) (5.2.1-I)

where

| i                 | Reservoir i                                                                                             |
|-------------------|---------------------------------------------------------------------------------------------------------|
| j                 | Sub-basin j                                                                                             |
| Nj                | Number of sites, in sub-basin j                                                                         |
| NB                | Number of sub-basins                                                                                    |
| Ir,               | Total annual reservoir diversions (annual water utilization) for irrigation from site i, in sub-basin j |
| Ws <sub>i,j</sub> | Annual water supply diversion from sites i, sub-basin j                                                 |

1(b)-For each reservoir (major project):

Max 
$$Z = \sum_{i=1}^{12} \sum_{k=1}^{NCI} W_{i,j,i}^{k} * A_{i,j}^{k}$$
 For all i and j (For crop consideration model)

(5.2.1-II)

| W <sup>k</sup><br>i. j. t | Total water diversion requirements in depth for crop k, at site i, in sub-basin j, in time t |
|---------------------------|----------------------------------------------------------------------------------------------|
| i                         | Reservoir i                                                                                  |
| j                         | Sub-basin j                                                                                  |
| k                         | Crop k                                                                                       |
| t ·                       | Time t                                                                                       |
| N <sub>j</sub>            | Number of sites, in sub-basin j                                                              |
| NCI <sup>i. j</sup>       | Total number of irrigated crops at site i, in sub-basin j                                    |
| $A_{i,j}^k$               | Irrigated-cropped area of crop k, at site i, in sub-basin j                                  |

(2) To maximize the area to be irrigated at each reservoir, i. e.,

$$\operatorname{Max} Z = \sum_{k=1}^{\operatorname{NCI}^{k,j}} A_{i,j}^{k}$$
 For all i and j (5.2.2)

where

| i                   | Reservoir i                                                 |
|---------------------|-------------------------------------------------------------|
| j                   | Sub-basin j                                                 |
| k                   | Crop k                                                      |
| NCI <sup>i, j</sup> | Total number of irrigated crops at site i, in sub-basin j   |
| $A_{i,j}^k$         | Irrigated-cropped area of crop k, at site i, in sub-basin j |

(3) To maximize the agricultural food production at each reservoir, i.e.,

Max 
$$Z = \sum_{k=1}^{NCI^{i,j}} A_{i,j}^{k} * y_{i,j}^{k}$$
 For all i and j (5.2.3)

where

| i                   | Reservoir i                                                 |
|---------------------|-------------------------------------------------------------|
| ј                   | Sub-basin j                                                 |
| k                   | Crop k                                                      |
| NCI <sup>i, j</sup> | Total number of irrigated crops at site i, in sub-basin j   |
| $y_{i,j}^k$         | Yield per unit area of crop k, at site i, in sub-basin j    |
| $A_{i,j}^k$         | Irrigated-cropped area of crop k, at site i, in sub-basin j |

4. To maximize the total annual net benefits from crops at each reservoir, i.e.,

Max 
$$Z = \sum_{k=1}^{NCI} A_{i,j}^{k} * y_{i,j}^{k} * b_{i,j}^{k}$$
 For all i and j (5.2.4)

| i | Reservoir i |
|---|-------------|
| j | Sub-basin j |
| k | Crop k      |

| NCI <sup>i, j</sup> | Total number of irrigated crops at site i, in sub-basin j   |
|---------------------|-------------------------------------------------------------|
| $y_{i,j}^k$         | Yield per unit area of crop k, at site i, in sub-basin j    |
| $A_{i,j}^k$         | Irrigated-cropped area of crop k, at site i, in sub-basin j |
| b <sup>k</sup> , j  | Net benefits from crop k, at site i, in sub-basin j         |

#### 5.3 THE CONSTRAINTS

The maximization of the objective function is to be achieved subject to the following constraints:

#### 5.3.1 Reservoir Continuity Equation Constraints

Continuity constraints are those constraints that are included in the model to ensure conservation of mass in a given time. In terms of a river system this means that the water that enters a point on the stream must leave that point on the stream, if it has not been stored in a reservoir or diverted out of the stream for a water use. The basic continuity principle applies throughout the entire reach of the stream for all the times. However, it is necessary to write continuity constraints only at site where water is stored diverted or imported. The continuity relationship for a multi reservoir system at a reservoir site can be written as follows:

$$\begin{split} &K_{i,j,t}^{'}*S_{i,j,t-1}=S_{i,j,t-1}+I_{i,j,t}+F_{i,j,t}+\sum(\psi_{i,j,t}^{q,j_{t}}*TI_{i,j}^{q,j_{t}})\\ &-\sum(\omega_{i,j,t-1}^{q,j_{t}}*TE_{i,j}^{-q,j_{t}})+\sum_{p}\sum_{j_{E}}K_{p,j,t}^{''}(\psi_{i,j,t}^{q,j_{t}}*OI_{i,j,p}^{q,j_{t}})\\ &-\sum_{j_{t}}\sum_{p}(\omega_{i,j,t}^{p,j_{t}}*OE_{i,j}^{-q,j_{t}})+P_{i,j,t}+I_{i,i_{t}}-O_{i,j,t}^{m}-O_{i,j,t}-O_{i,j,t}^{sa}-O_{i,j,t}^{sa}\\ &-(\alpha_{i,j,t}^{q,j_{t}}*Iu_{i,j}^{r,s}+\beta_{i,j,t}^{q,j_{t}}*Iu_{i,j}^{m,h,s})+(\alpha_{i,j,t}^{''}*\alpha_{i,j,t}^{q,j_{t}}*Iu_{i,j}^{r})+(\beta_{i,j,t}^{''}*\beta_{i,j,t}^{q,i_{t}}Iu_{i,j}^{m}) \end{split}$$

For all i, j and t

(5.3.1.1)

$$\begin{split} K_{i,j,t}^{'}*S_{i,j,t} - S_{i,j,t-1} + O_{i,j,t} - F_{i,j,t} - P_{i,j,t} - I_{i,j,t}^{'} - \sum_{i,j,t} (\psi_{i,j,t}^{q,j_{i}} *TI_{i,j}^{q,j_{i}}) + O_{i,j,t}^{se} \\ + \sum_{i} (\omega_{i,j,t}^{q,j_{i}} *TE_{i,j}^{q,j_{i}}) - \sum_{p} \sum_{j_{p}} K_{p,j,t}^{''} (\psi_{i,j,t}^{q,j_{i}} *OI_{i,j,t}^{q,j_{i}}) + \sum_{j_{i}} \sum_{p} (\omega_{i,j,t}^{p,j_{i}} *OE_{i,j}^{q,j_{i}}) \\ + (\alpha_{i,j,t} *Iu_{i,j}^{r,s} + \beta_{i,j,t} *Iu_{i,j}^{m,h,s}) - (\alpha_{i,j,t}^{''} *\alpha_{i,j,t} *Iu_{i,j}^{r}) - (\beta_{i,j,t}^{''} *\beta_{i,j,t} *Iu_{i,j}^{m}) \\ - I_{i,j,t} + O_{i,j,t}^{m} = 0 \end{split}$$
For all i, j and t (Rearranged equation)

The physical meaning of each term in the above equation is defined as below.

| S i, j, 1                | Final storage in the reservoir i, in sub-basin j, in time t                                                             |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------|
| S i, j, t-1              | Initial storage in the reservoir i, in sub-basin j, in time t                                                           |
| K i,j,t                  | Reservoir evaporation coefficient for site i, in sub-basin j, in time t                                                 |
| $I_{i,j,1}$              | Natural catchment inflow to reservoir/site i, in sub-basin j, in time t                                                 |
| F <sub>i, j, t</sub>     | Contribution from upstream reservoirs/sites to the reservoir/site I, in sub-basin j, in time t                          |
| $\Psi_{i,j,k}^{q,j}$     | Percentage of import to reservoir/site i, in sub-basin j, in time t, from site q, of exporting sub-basin j <sub>I</sub> |
| Tl <sub>i.j.t</sub>      | Import to reservoir/site i, in sub-basin j, in time t, from site q, of exporting sub-basin $j_I$                        |
| $\omega_{i,j,1}^{q,j_g}$ | Percentage of export from site/reservoir i, in sub-basin j, in time t, to site q, of importing sub-basin j <sub>E</sub> |
| $TE_{i,j,i}^{q,J_E}$     | Export from site/reservoir i, in sub-basin j, in time t, to site q, of importing sub-basin $j_E$                        |
| $P_{i,j,i}$              | Precipitation directly upon the reservoir i, in sub-basin j, in time t                                                  |
| Ī <sub>i, j, 1</sub>     | Local inflow to the reservoir/site i, from the surrounding area in sub-basin j, in time t                               |
| O <sub>i, j, t</sub>     | Mandatory releases to downstream natural channel from site i, in sub-basin j, in time t                                 |
| $Q_{i,j,t}$              | Release from reservoir/site i, in sub-basin j, in time t                                                                |
| Iu <sub>i, j</sub>       | Total annual upstream irrigation water use targets from surface water of reservoir/site i, in sub-basin j               |
| Ose                      | = Spennae lassee from reservoiriste ; in The tocini in time +                                                           |

Ose = Seepage losses from reservoir/site i, in sub-basinj, in time t

| Iu <sub>i,j</sub> <sup>m,s</sup> | Total annual upstream domestic and industrial water use target from surface water of site i, in sub-basin j |
|----------------------------------|-------------------------------------------------------------------------------------------------------------|
| $K_{i,j,t}$                      | % annual irrigation from site i, in sub-basin j, in time t                                                  |
| K ", j, t                        | Percent of return flow to river from irrigation from site i, in sub-basin j, in time t                      |
| Iu ',                            | Total annual upstream irrigation water use targets of reservoir/site i, in sub-basin j                      |
| Iu m                             | Total annual upstream domestic and industrial water use target of site i, in sub-basin j                    |

(a) The mandatory release should be equal to the percent of the inflow.

$$O_{i,j,t}^{m} - 0.01 * I_{i,j,t} = 0$$
 For all i, j and t (5.3.1.2)

(b) The total annual upstream M&I water use target should equal the sum of total annual upstream M&I water use target from surface water and total annual upstream M&I water use for rural human population and live stock population.

$$Iu \frac{mh}{i, j} + Iu \frac{mt}{i, j} - Iu \frac{m}{i, j} = 0$$
 For all i and j (5.3.1.3)

where

| Iu <sub>i, j</sub> | Total annual upstream domestic water use for rural human population of site i, in sub-basin j |
|--------------------|-----------------------------------------------------------------------------------------------|
| Iu <sub>i,j</sub>  | Total annual upstream domestic water use for livestock population of site i, in sub-basin j   |

(c) The total annual upstream irrigation water use target should equal the sum of annual upstream irrigation water use target from surface water and ground water.

$$Iu_{i,j}^{rg} + Iu_{i,j}^{rs} - Iu_{i,j}^{r} = 0$$
 For all i and j (5.3.1.4)

| Iu <sub>i, j</sub> | Total annual upstream irrigation water use targets from surface water of reservoir/site i, in sub-basin j |
|--------------------|-----------------------------------------------------------------------------------------------------------|
| Iu r               | Total annual upstream irrigation water use targets of reservoir/site i, in sub-basin j                    |

(d) From the annual upstream ground water available the sum of annual upstream water requirement for rural human population from ground water and annual upstream water requirement for live stock population from ground water has been subtracted. The annual upstream irrigation use by ground water should not exceed this quantity.

where

| Og us                                | Annual upstream ground water available for site i, in sub-basin j                                         |
|--------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Iu <sub>i, j</sub> <sup>m, h,g</sup> | Total annual upstream rural human population water use target from ground water of site i, in sub-basin j |

(e) The annual upstream water requirement from ground water for rural population should be 50 percent of the annual upstream M&I water use from ground water.

$$Iu_{i,j}^{mhg} - 0.5Iu_{i,j}^{mh} = 0$$
 For all i and j (5.3.1.6)

where

| Iu <sub>i, j</sub> <sup>m, h,g</sup>                             | Total annual upstream rural human population water use target from ground water of site i, in sub-basin j |
|------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| $\begin{bmatrix} \mathrm{Iu}_{i,j}^{\mathrm{m,h}} \end{bmatrix}$ | Total annual upstream domestic water use for rural human population of site i, in sub-basin j             |

(f) The annual upstream water use for rural population from surface water should be 50 percent of the annual upstream domestic water use for rural human population.

| Iu <sup>m,h,s</sup>                | Total annual upstream domestic water use for rural human population from surface water of site i, in sub-basin j |
|------------------------------------|------------------------------------------------------------------------------------------------------------------|
| Iu <sub>i, j</sub> <sup>m, h</sup> | Total annual upstream domestic water use for rural human population of site i, in sub-basin j                    |

(g) The value of the total inflow to a reservoir/site is the sum of all the downstream contributions made from the upstream reservoirs linked to the reservoir under consideration which includes spills, the return flows from all the irrigation areas and M&I water supply upstream of the reservoir under consideration.

$$F_{i,j,t} = \sum_{w=1}^{Z_{i,j}} \left[ Sp_{w,j,t} + (K_{w,j,t}^{"} * K_{w,j,t} * Ir_{w,j}^{"}) + (\beta_{w,j,t}^{"} * \beta_{w,j,t} * Ws_{w,j}^{"}) + \delta_{w,j,t}^{"} * O_{w,j,t}^{m} \right]$$

$$+ (\alpha_{i,j,t}^{"} * \alpha_{i,j,t} * Iu_{i,j}^{r}) + (\beta_{i,j,t}^{"} * \beta_{i,j,t} * Iu_{i,j}^{m})$$
For all i, j and t
$$[5.3.1.8]$$

| F <sub>i, j, t</sub>   | Contribution from upstream reservoirs/sites to the reservoir/site I, in sub-basin j, in time t |
|------------------------|------------------------------------------------------------------------------------------------|
| w                      | Reservoir / site contributing to the flow of ith downstream reservoir / site                   |
| Z i, j                 | Number of upstream reservoirs contributing to the flow of downstream site i, in sub basin j    |
| Sp w.j.t               | Secondary water release (spill) from site w, in time t                                         |
| K ", '                 | Percent of return flow to river from irrigation from site i, in sub-basin j,                   |
|                        | in time t                                                                                      |
| $K_{w,j,t}$            | Reservoir evaporation from site w, in sub-basin j, in time t                                   |
| lr <sub>w.j</sub>      | Total annual irrigation target from site w, in sub-basin j                                     |
| β " <sub>w, j, t</sub> | Percent of return flow to river from water supply from site i, in sub-basin j, in time t       |

| $\beta_{w,j,t}$        | Percent of annual water supply (Ws' <sub>w,j</sub> ) from site i, in sub-basin j, in time t                   |
|------------------------|---------------------------------------------------------------------------------------------------------------|
| Ws w,j                 | Total annual water supply target from site w, in sub-basin j                                                  |
| δ", , , t              | Percent of downstream mandatory release returning to river from site w, in time t                             |
| O <sub>i. j. t</sub>   | Mandatory releases to downstream natural channel from site i, in sub-basin j, in time t                       |
| $\alpha_{i,j,\dagger}$ | Percent of return flow to river from upstream water use for irrigation of site i, in sub-basin j, in time t   |
| α <sub>i, j, t</sub>   | Percent of annual upstream irrigation water use of site i, in sub-basin j, in time t                          |
| β <sub>i, j, t</sub>   | Percent of return flow to river from upstream water use for domestic use of site i, in sub-basin j, in time t |
| $\beta_{i,j,t}$        | Percent of annual upstream domestic and industrial water use of site i, in sub-basin j, in time t             |
| Iu m                   | Total annual upstream domestic and industrial water use target of site i, in sub-basin j                      |

$$F_{i,j,t} - \sum_{v=1}^{Z_i} \left[ Sp_{v,j,t} + (K_{w,j,t}^{"} * K_{w,j,t} * Ir_{v,j}^{"}) + (\beta_{w,j,t}^{"} * \beta_{w,j,t} * W_{S_{w,j}}) + \delta_{w,j,t}^{"} * O_{w,j,t}^{m} \right]$$

$$- (\alpha_{i,j,t}^{"} * \alpha_{i,j,t} * Iu_{i,j}^{t}) + (\beta_{i,j,t}^{"} * \beta_{i,j,t} * Iu_{i,j}^{m}) = 0$$
For all i, j and t (Rearranged equation)
$$[5:3.1.8]$$

In the model, the storage at the end of the time period t, plus natural catchment inflow, Plus all other possible inflows (sum of all the down stream contributions made from the upstream reservoirs linked to the reservoir under consideration which include spills, the return flows from all the irrigated areas and the municipal and industrial uses upstream of the reservoir under consideration), minus all downstream releases made from the reservoir under consideration. This is some times called a continuous model.

#### 5.3.2 Storage Limits

The contents of the reservoir at any period cannot exceed the capacity of the reservoir, but should be greater than the dead storage of the reservoir, i.e.

$$Yd_{i,j} \le Ymin_{i,j,t} \le S_{i,j,t-1} \le Ymax_{i,j,t} \le Y_{i,j}$$
 For all i, j and t (5.3.2)

| $Yd_{i,j}$            | Dead storage capacity of reservoir/site i, in sub-basin j                                  |
|-----------------------|--------------------------------------------------------------------------------------------|
| Ymin i,j,t            | Gross capacity up to the minimum pool level of reservoir/site i, in sub-basin j, in time t |
| S i, j, t-1           | Initial storage in the reservoir i, in sub-basin j, in time t                              |
| Ymax <sub>i,j,t</sub> | Gross capacity up to the normal pool level of reservoir/site i, in sub-basin j, in time t  |
| $Y_{i,j}$             | Gross storage capacity of reservoir/site i, in sub-basin j                                 |

#### 5.3.3 Reservoir Release Constraints

(a) The volume of the water released from the reservoir must be sufficient to meet the irrigation, domestic and industrial demand during that period by using surface and ground water potential, i.e., where,

$$O_{i,j,t} + I_{i,j,t}^{"} = Od_{i,j,t} + Sp_{i,j,t}$$
 For all i, j and t (5.3.3.1)

where

| O <sub>1, j, l</sub>  | Total release from site i, in sub-basin j, in time t                                                  |
|-----------------------|-------------------------------------------------------------------------------------------------------|
| Ir,                   | Water that joins the main stream just above the irrigation diversion canal-<br>site i, in sub-basin j |
| $Od_{i,j,i}$          | Total release at site i, in sub-basin j, in time t for irrigation and water supply                    |
| Sp <sub>i, j, t</sub> | Secondary water release (spill) from site i, in sub-basin j, in time t                                |

(b) The total release from reservoir in any period for irrigation and M&I water use is equal to release for irrigation and M&I water use.

Od 
$$_{i,j,t} = Od _{i,j,t}^{r} + Od _{i,j,t}^{m}$$
 For all i, j and t (5.3.3.2)

| $Od_{i,j,t}$ | Total release at site i, in sub-basin j, in time t for irrigation and water supply |
|--------------|------------------------------------------------------------------------------------|
| Od [, j, t   | Release at site i, in sub-basin j, in time t, for irrigation                       |
| Od m         | Release at site i, in sub-basin j, in time t, for water supply                     |

(c) Ground water required for irrigation in any period is a fraction of total annual ground water irrigation target.

$$Og'_{i,j,t} = K_{i,j,t} * Ir_{i,j}^{g}$$
 For all i, j and t (5.3.3.3)

where

| Og <sub>i,j,1</sub> | Ground water available for irrigation, from site i, in sub-basin j, in time t |
|---------------------|-------------------------------------------------------------------------------|
| K ,,,,              | % annual irrigation from site i, in sub-basin j, in time t                    |
| $Ir_{i,j}^g$        | Total annual ground water irrigation target from site i, in sub-basin j       |

(d) The release for irrigation use from surface water should be a fraction of the total annual surface water irrigation target.

$$Od_{i, j, t}^{T} = K_{i, j, t}^{*} Ir_{i, j}^{S}$$
 For all i, j and t (5.3.3.4)

where

| $Od_{i,j,t}^r$       | Release at site i, in sub-basin j, in time t, for irrigation             |
|----------------------|--------------------------------------------------------------------------|
| $\mathbf{K}_{i,j,i}$ | % annual irrigation from site i, in sub-basin j, in time t               |
| Ir, s                | Total annual surface water irrigation target from site i, in sub-basin j |

(e) Ground water required for M&I water use in any period should be equal to the sum of the M&I water supply target for urban and industrial water use from ground water.

$$Og_{i,j,t}^{m} = \xi_{i,j,t} (\phi_{i,j}^{U^{g}} W s_{i,j}^{U} + \phi_{i,j}^{I^{g}} W s_{i,j}^{I}) \qquad \text{For all } i, j \text{ and } t$$
 (5.3.3.5)

| Og <sup>m</sup>    | Ground water available for municipal and industrial from site i, in sub-basin j, in time t |
|--------------------|--------------------------------------------------------------------------------------------|
| ξ <sub>i,j,1</sub> | % of annual water use for industrial and urban from site i, in sub-basin j, in time t      |
| $\phi_{i,j}^{U^g}$ | % of annual ground water for urban domestic water requirement from site i, in sub-basin j  |
| Ws U,j             | Annual water requirement for urban domestic use from sites i, in sub-basin j               |
| ф і, ј             | % of annual ground water for industrial requirement from sites i, in sub-basin j           |
| Ws i, j            | Annual water requirement for industrial use from sites i, in sub-basin j                   |

(f) The release for M&I water use in any period should be equal to the sum of the M&I water supply target for urban and industrial water use from surface water.

$$Od_{i,j,t}^{m} = \xi_{i,j,t} (\varphi_{i,j}^{U^{s}} Ws_{i,j}^{U} + \varphi_{i,j}^{I^{s}} Ws_{i,j}^{I}) \qquad \text{For all } i, j \text{ and } t$$
 (5.3.3.6)

where

| Od m i,j,t                     | Release at site i, in sub-basin j, in time t, for water supply                             |
|--------------------------------|--------------------------------------------------------------------------------------------|
| ξ <sub>i,j,1</sub>             | % of annual water use for industrial and urban from site i, in sub-basin j, in time t      |
| $\phi_{i,j}^{U^s}$             | % of annual surface water for urban domestic water requirement from site i, in sub-basin j |
| Ws <sup>U</sup> <sub>i,j</sub> | Annual water requirement for urban domestic use from sites i, in sub-basin j               |
| φ 1 <sup>s</sup>               | % of annual surface water for industrial requirement from sites i, in sub-basin j          |
| Ws !                           | Annual water requirement for industrial use from sites i, in sub-basin j                   |

(g) The annual irrigation target should equal the sum of annual irrigation targets from the surface and ground waters.

$$Ir_{i,j}^{'} = Ir_{i,j}^{s} + Ir_{i,j}^{g}$$
 For all i and j (5.3.3.7)

| Ir ,         | Total annual irrigation target from site i, in sub-basin j               |
|--------------|--------------------------------------------------------------------------|
| $Ir_{i,j}^s$ | Total annual surface water irrigation target from site i, in sub-basin j |
| Ir, g        | Total annual ground water irrigation target from site i, in sub-basin j  |

(h) The annual M&I water use target should equal the sum of annual M&I water use targets from surface and ground water.

$$Ws'_{i,j} = Ws^{U}_{i,j} + Ws^{I}_{i,j}$$
 For all i and j (5.3.3.8)

where

| Ws <sub>i,j</sub>              | Annual water supply diversion from sites i, sub-basin j                              |
|--------------------------------|--------------------------------------------------------------------------------------|
| Ws <sup>U</sup> <sub>i,j</sub> | Annual surface water requirement for urban domestic use from sites i, in sub-basin j |
| Ws <sup>1</sup> <sub>i,j</sub> | Annual surface water requirement for industrial use from sites i,in sub-basin j      |

# 5.3.4 Ground Water Availability Constraints

(a) The total annual downstream water use for irrigation and water supply from ground water should be equal to the annual ground water available in the downstream.

$$\sum_{t} Og_{i,j,t}^{m} + \sum_{t} Og_{i,j,t}^{r} = Og_{i,j}^{ds} \qquad \text{For all i and j} \qquad (5.3.4.1)$$

| Og m           | Ground water available for municipal and industrial from site i, in sub-basin j, in time t |
|----------------|--------------------------------------------------------------------------------------------|
| $Og_{i,j,1}^r$ | Ground water available for irrigation, from site i, in sub-basin j, in time t              |
| Ogi, j         | Annual d/s ground water available for site i, in sub-basin j.                              |

(b) The total annual upstream use for irrigation and water supply from ground water should be equal to the annual ground water available in upstream.

$$Iu_{i,j}^{m,g} + Iu_{i,j}^{r,g} = Og_{i,j}^{us}$$
 For all i and j (5.3.4.2)

where

| Iu <sup>m, g</sup>                 | Total annual upstream M & I water use target from surface water of site i, in sub-basin j      |
|------------------------------------|------------------------------------------------------------------------------------------------|
| lu <sub>i, j</sub> <sup>r, g</sup> | Total annual upstream irrigation water use targets from ground water of site i, in sub-basin j |
| Ogi s                              | Annual upstream ground water available for site i, in sub-basin j.                             |

(c) The annual ground water available at the upstream and downstream of a site should equal to total annual ground water available at the site.

$$Og_{i,j}^{us} + Og_{i,j}^{ds} = Og_{i,j}$$
 For all i and j (5.3.4.3)

where

| Ogi. s             | Annual upstream ground water available for site i, in sub-basin j. |
|--------------------|--------------------------------------------------------------------|
| Ogd s              | Annual d/s ground water available for site i, in sub-basin j.      |
| Og <sub>i, j</sub> | Annual ground water available for site i, in sub-basin j           |

## 5.3.5 Sub-Basin Wise Annual Irrigation Constraints

Annual irrigation diversion from site i, in sub-basin j should not exceed total annual release for irrigation at site i in sub-basin j, i.e.,

$$OC_{i,j}^{r} = \sum_{t=1}^{12} Od_{i,j,t}^{r}$$
 For all i and j (5.3.5)

| $OC_{i,j}^{r}$ | Annual irrigation diversion from site i in sub-basin j. |
|----------------|---------------------------------------------------------|
|                | l f                                                     |

# 5.3. 6 Sub-Basin Wise Annual Water Supply Constraints

Annual water supply diversion from site i, in sub-basin j, should not exceed total annual release for water supply at site i in sub-basin j.

$$OC_{i,j}^{m} = \sum_{t=1}^{12} Od_{i,j,t}^{m}$$
 For all i and j (5.3.6)

where

| OC <sub>i,j</sub> | Annual water supply diversion from site i, in sub-basin j.     |
|-------------------|----------------------------------------------------------------|
| Od in i.j.t       | Release at site i, in sub-basin j, in time t, for water supply |

#### 5.3.7 Total Annual Canal Capacity Constraints

Total annual diversion for irrigation and water supply both at site i in sub-basin j should not exceed the canal capacity. i.e.,

$$(OC_{i,j}^r + OC_{i,j}^m) - CC_{i,j} \le 0$$
 For all i and j (5.3.7) where

| OC T                           | Annual irrigation diversion from site i, in sub-basin j    |
|--------------------------------|------------------------------------------------------------|
| OC <sup>m</sup> <sub>i,j</sub> | Annual water supply diversion from sites i, in sub-basin j |
| CC <sub>i,j</sub>              | Annual capacity of canal at site i, in sub-basin j         |

#### 5.3.8 Land Use Constraints

The total area under crops at any time t should be less than or equal to total available area. i.e.,

$$\sum_{k=1}^{NCI^{i,j}} \lambda_{i,j,t}^{k} * A_{i,j}^{k} \le TA_{i,j}$$
 For all i and j (5.3.8)

| $\lambda_{i,j,t}^{k}$ | Land use coefficient for crop k, for site i in, sub-basin j, in time t |
|-----------------------|------------------------------------------------------------------------|
| $A_{i,j}^k$           | Irrigation area of crop k, for site i, in sub-basin j                  |
| TA <sub>i,j</sub>     | Total culturable command area (CCA) of site i, in sub-basin j          |

#### 5.3.9 Crop Water Requirement Constraints

The water requirements of various crops are made in each month and cannot exceed the monthly availability of surface water and ground water, i.e.,

$$\sum_{k=1}^{NCt^{i,j}} W_{i,j,t}^{k} * A_{i,j}^{k} \le Od_{i,j,t}^{r} + Og_{i,j,t}^{r} \qquad \text{For all } i, j \text{ and } t$$
 (5.3.9)

where

| $W_{i,j,t}^k$                  | Water requirement for crop k, at site i, in sub-basin j, in time t            |
|--------------------------------|-------------------------------------------------------------------------------|
| A <sup>k</sup> <sub>i, j</sub> | Irrigation area of crop k, for site i, in sub-basin j                         |
| Od i, j, t                     | Release at site i, in sub-basin j, in time t, for irrigation                  |
| Og <sub>i,j,t</sub>            | Ground water available for irrigation, from site i, in sub-basin j, in time t |

## 5.3.10 Food Self-Sufficiency Constraints

The food production at each reservoir in the sub-basin/basin should be sufficient enough to meet requirements of the people living in the sub-basin/basin, taking their habits, i.e.,

#### (i) For cereal crops constraints

$$\sum_{k=1}^{NCT} A_{i,j}^{k} * y_{i,j}^{k} \ge FC_{i,j}$$
 For all i and j (5.3.10.1)

| $A_{i,j}^k$       | Irrigation area of crop k, for site i, in sub-basin j                                   |
|-------------------|-----------------------------------------------------------------------------------------|
| y k i,j           | Yield per quintal per hector area of crop k, from site i, in sub-basin j                |
| FC <sub>i,j</sub> | Cereal food requirements of the people living in the area of site i, in sub-<br>basin j |

#### (ii) For pulses crops constraints

$$\sum_{k=1}^{NCI_{i,j}^{P}} A_{i,j}^{k} * y_{i,j}^{k} \ge FP_{i,j}$$
 For all i and j (5.3.10.2)

#### where

| $A_{i,j}^k$ | Irrigation area of crop k, for site i, in sub-basin j                                   |
|-------------|-----------------------------------------------------------------------------------------|
| y k         | Yield per quintal per hector area of crop k, from site i, in sub-basin j                |
| $FP_{i,j}$  | Pulses food requirements of the people living in the area of site i, in sub-<br>basin j |

# (iii) For oilseed crops constraints

$$\sum_{k=1}^{NCI_{i,j}^{O}} A_{i,j}^{k} * y_{i,j}^{k} \ge FO_{i,j}$$
 For all i and j (5.3.10.3)

#### where

| A <sub>i, j</sub> | Irrigation area of crop k, for site i, in sub-basin j                                 |
|-------------------|---------------------------------------------------------------------------------------|
| $y_{i,j}^k$       | Yield per quintal per hector area of crop k, from site i, in sub-basin j              |
| FO <sub>i,j</sub> | Oilseed crops requirements of the people living in the area of site i, in sub-basin j |

# (iv) Upper and lower crop areas constraint

$$LL_{i, j}^{k} \le A_{i, j}^{k} \le UL_{i, j}^{k}$$
 For all i, j and k (5.3.10.4)

| $LL_{i,j}^{k}$ | Lower limit of crop area at site i, in sub basin j    |
|----------------|-------------------------------------------------------|
| A <sup>k</sup> | Irrigation area of crop k, for site i, in sub-basin j |
| $UL_{i,j}^k$   | Upper limit of crop area at site i, in sub basin j    |

#### 5.3.11 Hydroelectric Energy Constraints

The production of hydroelectric energy is a relatively well defined technical process.

There are only three decision variables which affect-

- (i) The flow through the turbine of the power plant,
- (ii) The head associated with flow, and
- (iii) The capacity of power plant.

The relationships of these variables to electric energy production are the origins of the energy constraints, and are defined below:

(i) The flow through the turbines should meet energy generation demand, i.e.,

$$E_{i,j,t} = Cf * (O_{i,j,t} + OE_{i,j,t}^{q,j_g} + O_{i,j,t}^{m}) * He_{i,j,t} * e_{i,j} * h_{i,j,t}$$
For all i, j and t (5.3.11.1)

where

| E <sub>i, j, 1</sub>                   | Total energy generated from hydropower plant at site i, in sub-basin j, in time t                          |
|----------------------------------------|------------------------------------------------------------------------------------------------------------|
| Cr                                     | Conversion factor from m cm/month to mw-h                                                                  |
| O <sub>i,j,1</sub>                     | Total release from site i, in sub-basin j, in time t                                                       |
| ΟΕ <sup>q, j</sup> <sub>ε</sub> , j, ρ | Export from site i, in sub-basin j, to irrigation area p, upstream of site q, in importing sub-basin $j_E$ |
| $O_{i,j,t}^m$                          | Mandatory releases to downstream natural channel from site i, in sub-<br>basin j, in time t                |
| He i, j, t                             | Average storage head at dam, for site i, in sub-basin j, in time t                                         |
| e <sub>i, j</sub>                      | Turbine and generator efficiency of hydropower plant at site i, in sub-<br>basin j                         |
| h <sub>i,j,t</sub>                     | Number of hours in the period t at dam for site i, in sub-basin j, in time t                               |

(ii) Total energy is defined by

$$E_{i,j,t} = \delta_{i,j,t} * E_{i,j} + \overline{E}_{i,j,t}$$
 For all i, j and t (5.3.11.2)

| E i. j. t                         | Total energy generated from hydropower plant at site i, in sub-basin j, in time t |
|-----------------------------------|-----------------------------------------------------------------------------------|
| $\delta_{i,j,t}$                  | Energy requirement in percentage at site i in sub-basin j in time t               |
| E <sub>i,j</sub>                  | Annual energy generation target for site i, in sub-basin j                        |
| $\overline{\overline{E}}_{i,j,t}$ | Secondary energy generated at dam in mw-h for site i, in sub-basin j, in time t   |

(iii) Energy production is also limited by the percent of time that the plant will produce power specified by the load factor, i.e.,

$$E_{i,j,t} = \alpha_{i,j,t} * H_{i,j} * h_{i,j,t}$$
 For all i, j and t (5.3.11.3)

| $E_{i,j,t}$        | Total energy generated from hydropower plant at site i, in sub-basin j, in time t                                        |
|--------------------|--------------------------------------------------------------------------------------------------------------------------|
| $H_{i,j}$          | Hydropower capacity at dam for site i, in sub-basin j                                                                    |
| $\alpha_{i,j,t}$   | Load factor at each hydropower site i, in sub-basin j, in time t, for each period t is an indicator of the energy demand |
| h <sub>i,j,1</sub> | Number of hours in the period t at dam for site i, in sub-basin j, in time t                                             |

# COMPUTATION OF INPUT DATA FOR LINEAR PROGRAMMING MODEL

#### 6.1 GENERAL

The Cauvery river basin has been divided into sixteen sub-basins having fifteen major irrigation projects as discussed in Chapter 3. The computation of input data for linear programming model, i.e., distribution of upstream and downstream irrigation and water supply requirements from medium and minor irrigation projects to project sites, distribution of ground water at project level, estimation of various co-efficients, estimation of flows of various annual water year dependabilities have been worked in this chapter. These computed values are used in the computation for LP model developed in Chapter 5 for the objective function No.1, i.e., maximization of annual surface and ground water utilization of for irrigation, water supply for domestic use, hydro-power and environmental uses. The notations used in the preparation of a LINDO format for running the model by writing the equations for readily available LINDO software package of 6.1 version, released in August 2001, by LINDO Systems, Inc, 1415 North Dayton St. Chicago, IL, U.S.A., and the water demands for various purposes as per NWDA also are given in this chapter.

The various basic data required for preparation of water balance studies for all the sixteen sub-basins in Cauvery river basin and Cauvery river basin as a whole, and for running the linear programming, mathematical model for Cauvery river basin, are collected from the various reports of National Water Development Agency (NWDA), New Delhi and Central Ground Water Board (CGWB), Faridabad, under the Ministry of Water Resources, Government of India. The data is computed in the required form and format to feed the data for running the model in LINDO software package of version 6.1 released in August 2001, for solving the problem.

The pertinent features of the various major projects in Cauvery river basin for all sixteen sub-basins are given in Table 6.1.

The data available from various reports of NWDA and the publications of CGWB are used for computation of the data for running the LP model to get the required results to achieve the designed objective functions. Sometimes the data available are not in the form, suitable for model computation. The data to be used are usually estimated from the available data to conform to the model requirements before use.

The following data are computed and described as below.

- (i) Distribution of upstream and downstream irrigation and water supply requirements from medium and minor irrigation projects to project sites,
- (ii) Distribution of Ground water,
- (iii) Estimation of various co-efficients, and
- (iv) Estimation of flows of various annual water year dependabilities.

# 6.2 DISTRIBUTION OF UPSTREAM AND DOWNSTREAM IRRIGATION AND WATER SUPPLY REQUIREMENTS FROM MEDIUM AND MINOR IRRIGATION PROJECTS TO PROJECT SITES

The locations of medium irrigation schemes in the catchments area of major irrigation projects are available but the details of locations for minor irrigation schemes in the catchment area of major irrigation projects are not available, hence the utilization

Table 6.1: Pertinent Features of Dam Sites in Cauvery River Basin

| -             | Lantude    | (16) | 13° 11' N              | 12 <sup>0</sup> 45' N | 12 <sup>o</sup> 29' N | NA                     | 12° 25' N     | 11 <sup>0</sup> 40' N | 11°47'N       | 11 <sup>0</sup> 55' N | 12 <sup>0</sup> 02'N | NA                 | 11° 54' N  | 11° 58' N   | 11º 47' N | 11° 28' N |         | 10°25'N           |
|---------------|------------|------|------------------------|-----------------------|-----------------------|------------------------|---------------|-----------------------|---------------|-----------------------|----------------------|--------------------|------------|-------------|-----------|-----------|---------|-------------------|
| Location      | Longitude  | (15) | 75011'E                | 76°03'E               | 75° 54' E             | NA                     | 76°33'E       | 75° 57' E             | 75° 54' E     | 76º 21' E             | 76º 15'E             | NA                 | 76° 26' E  | 76º 27' E   | 77° 48' E | 770 81'E  |         | 77° 16' E         |
| Utilisation   | (MCM)      | (14) | 162                    | 1536.12               | 509                   | 433.35                 | 1483          | 277.5                 | 495.5         | 852                   | 193                  | 24                 | 119        | 217.91      | 275       | 395.4     |         | 202.26            |
| CM)           | Gross      | (13) | 89.54                  | 1047                  | 241                   | 169.4                  | 1408          | 166.9                 | 8.709         | 552                   | 112                  | A'A                | 280        | 154         | 2709      | 928.8     |         | 113.3             |
| Storage (MCM) | Dead       | (12) | 8.89                   | 38                    | 12                    | 25                     | 125           | 23.8                  | 156           | 66                    | 30                   | NA                 | NA         | 24.1        | 62        | 21.1      |         | 5.19              |
| Stora         | Live       | (11) | 70.58                  | 915                   | 216                   | 144.4                  | 1172          | 143.1                 | 451.6         | 453                   | 82                   | 310                | 280        | 129.85 24.1 | 2647      | 7.706     |         | 108.1             |
| CCA           | (ha)       | (10) | 21,450                 | 2,65,079              | 53,538                | 44,500                 | 1,13,603      | 9,200                 | 22,500        | 45,730                | 19,300               | 1,700              | 40,470     | 10,526      | 18212     | 95,175    | þ       | 10,118            |
| Catchment     | area (km²) | (6)  | 557                    | 2810                  | 420                   | 280                    | 61901         | 61.44                 | 155.4         | 2142                  | 276.6                | 185                | 950        | 984         | 42217     | 4200      |         | 839.13            |
|               | District   | (8)  | Hassan                 | Hassan                | Kodagu                | Kodagu                 | Mandya        | Wynad                 | Wynad         | Mysore                | Mysore               | Mysore             | Mysore     | Mysore      | Salem     | Penyar    |         | Coimbatore 839.13 |
|               | State      | (1)  | Karnataka              | Kamataka              | Kamataka              | Karnataka              | Kamataka      | Kerala                | Kerala        | Karnataka             | Kamataka             | Kamataka           | Kamataka   | Kamataka    | Tamilnadu | Tamilnadu |         | Tamilnadu         |
| è             | Status     | (9)  |                        | Existing              | Existing              |                        | Existing      | Ongoing               | Ongoing       | Existing              | Existing             | Proposed           | proposed   | Existing    | Existing  | Existing  |         | Existing          |
|               | วแก-บลราก  | (5)  | Upper Cauvery Existing | Upper Cauvery         | Upper Cauvery         | Upper Cauvery Proposed | Upper Cauvery | Kabini                | Kabini        | Kabini                | Kabini               | Kabini             | Kabini     | Kabini      | Chinnar   | Bhavani   |         | Amravathi         |
|               | Notation   | (4)  | YCU                    | нсп                   | CCU                   | CCU                    | ксп           | BKB                   | MKB           | KKB                   | TKB                  | SKB                | UKN        | NKB         | МСН       | ВВН       |         | AAM               |
| Site          | No.        | (3)  | 1                      | 2                     | 3                     | 4                      | 5             | 6                     | 7             | 8                     | 6                    | 10                 | 11         | 12          | 13        | 14        |         | 15                |
| Name of       | project    | (2)  | Yagachi                | Hemavathi             | Harangi               | Cauvery                | KRS           | Banasursagar          | Mananthvady 7 | Kabini                | Taraka               | Sagar<br>doddakere | Upper Nugu | Nugu        | Mettur    | Lower     | Bhavani | Amravathi         |
| ,             | SI.No.     | (1)  |                        | 2                     | ٣                     | 4                      | 5             | 9                     | <i>L</i> .    | <b>∞</b>              | 6                    | 10                 | 11         | 12          | 13        | 14.       |         | 15.               |

of minor irrigation schemes was distributed on the proportion of catchment area basis of the major projects.

But the model results were not satisfactory, in the sense that the system targets met were much away from the plan proposals. Hence the minor irrigation utilization of the sub-basin was redistributed as per the state wise utilization of minor irrigation schemes data available in NWDA reports of Cauvery basin, in the proportion of catchment areas of the respective state wise projects. Hence the LP model results are improved.

The computation made for the distribution of minor irrigation schemes and medium irrigation project's contribution to the water requirements for rural human and live stock water supply, irrigation, and ground water; upstream and downstream of the major irrigation project are computed as follows:

Let,

Cai = Catchment area of the major irrigation project site i,

Ea Sum of net or gross catchment area of all the major irrigation projects, depending upon series or parallel major irrigation projects, in the subbasin j,

Iu<sup>m</sup><sub>i,j</sub> = Upstream rural water supply requirements at project level i, in sub-basin j,

Iu'<sub>i,j</sub> = Upstream irrigation water requirements by minor and medium irrigation projects,

 $RWT_j$  = Total rural water supply requirements of sub-basin,

RW<sub>i,j</sub> = Upstream rural water requirements at project level (M),

RWMI = Upstream rural water supply requirements at project level by minor projects (Q),

- RWMD = Upstream rural water supply requirements at project level by medium projects,
- RWMIH = Upstream rural human water requirements from minor irrigation projects,
- RWMIL = Upstream live stock water requirements from minor irrigation projects,
- RWMD = Upstream rural human water supply requirements from medium irrigation projects,
- RWMDL = Upstream live stock water supply requirements from medium irrigation projects.
- (1) Upstream rural water supply requirements at project level (M):
  - RW = [Intervening catchment area of project / Total catchment area of sub-basin] \* [Total annual rural water supply requirements of sub-basin],

$$= [Ca_{i} / Ca^{T}] * RWT$$

$$= Iu_{i,j}^{m}.$$

- (2) Upstream irrigation water requirements from minor irrigation at project level (P):
  - P = [Intervening catchment area of project] / [Total catchment area of sub-basin \*

    Total minor irrigation requirements of sub-basin].
- (3) Upstream rural water supply requirements at project level by minor projects (Q):
  - RWMI = [Upstream irrigation water requirements from minor irrigation at project level\* Upstream rural water supply requirements at project level] / [Upstream irrigation water requirements by minor irrigation at project level + Upstream irrigation water requirements by medium irrigation at project level]

RWMI = 
$$[P * M] / Iu_{i,j}^r$$
  
=  $[P * Iu_{i,j}^m] / Iu_{i,j}^r$ 

where M = Upstream rural water supply requirements at project level $= <math>[C_a, K_a]^* RWMIL]$ 

- (4) Upstream rural water supply requirements at project level by medium projects (R):
  - RWMD = [Upstream irrigation water requirements from medium irrigation at project level \* Upstream rural water supply requirements at project level] / [Upstream irrigation water requirements by minor irrigation at project level + Upstream irrigation water requirements by medium irrigation at project level]
  - RWMD = [Upstream irrigation water requirement from medium irrigation at project level \* Iu<sup>m</sup><sub>i,j</sub>] / Iu<sup>r</sup><sub>i,j</sub>
- (5) Upstream human population at project level:
  - = [Intervening catchment area of project / Total catchment area of subbasin] \* [Human population of the sub-basin].
- (6) Upstream lives stock population at project level:
  - = [Intervening catchment area of project / Total catchment area of subbasin] \* [Live stock population of the sub-basin].
- (7) Upstream rural human water supply requirements from minor irrigation projects: (RWMIH):
  - RWMIH = [Upstream rural water supply requirements from minor irrigation at project level \* Upstream human population at project level]/

    [Upstream human population at project level + Upstream live stock population at project level].
- (8) Upstream live stock water supply requirements from minor irrigation projects (RWMIL):

- RWMIL = [Upstream rural water supply requirements from minor irrigation at project level \* Upstream live stock population at project level] / [Upstream human population at project level + Upstream live stock population at project level].
- (9) Upstream human rural water supply requirements from medium irrigation projects (RWMDH):
  - (RWMDH) = [Upstream rural water supply requirements from medium irrigation at project level \* Upstream human population at project level] / [Upstream human population at project level + Upstream live stock population at project level].
- (10) Upstream live stock water supply requirements from medium irrigation projects (RWMDL):
  - RWMDL = [Upstream rural water supply requirements from medium irrigation at project level \* Upstream live stock population at project level] / [Upstream human population at project level + Upstream live stock population at project level].
- (11) Total rural human water supply requirement at project level (RWMIH + RWMDH):
  - RWMIH + RWMDH = [Upstream human rural water supply requirements from minor irrigation projects + Upstream human rural water supply requirements from medium irrigation projects].
- (12) Total lives stock water requirement at project level (RWMIL + RWMDL):
  - (RWMIL + RWMDL) = [Upstream live stock water requirements from minor irrigation projects + Upstream live stock water supply requirements from medium irrigation projects].

(13) Industrial and urban water supply for each major irrigation project to be distributed as: the intervening net or gross catchment area of the major project depending upon series or parallel projects in the sub-basin / total catchment area of the sub-basin multiplied by total Industrial / urban water requirement of the sub-basin.

### 6.3 GROUND WATER COMPUTATIONS AT PROJECT LEVEL

The total ground water available in the sub-basin is distributed at project level and the ground water available at each project level is distributed as upstream and downstream ground water as below:

Total ground water in the sub-basin =

=  $\Sigma$  Upstream ground water at project level

+ Σ Downstream ground water at project level

Total ground water at project level = Upstream and downstream ground water at project level.

### 6.3.1 Upstream Ground Water at Project Level =

= [Intervening gross or net catchment area of the major project / Total catchment of the sub-basin] \* [Total ground water available in the sub-basin].

### 6.3.2 Downstream Ground Water at Project Level

= [Cultivable command area of the major project / Total catchment of the sub-basin] \* [Total ground water available in the sub-basin].

If, the projects are in parallel, then, Catchment area = Gross catchment area of the major project, and, If, the projects are in series, then, Catchment area = Net catchment area of the major project.

The values of the distribution of upstream and downstream irrigation and water supply demands, and ground water are computed and given in the Table 6.2.

Table 6.2: Upstream and Downstream Annual Irrigation and Water Supply Requirements of All Major Projects in Cauvery River Basin

| !      |                 |           |                              |          |           |                     |                    |         |                  |                   | :                |                     |        |             |
|--------|-----------------|-----------|------------------------------|----------|-----------|---------------------|--------------------|---------|------------------|-------------------|------------------|---------------------|--------|-------------|
|        |                 | U/S Rural | U/S Rural Domestic Water Use | ater Use | U/S Irri  | rrigation Water Use | Jse                | D/S Dom | D/S Domestic Use | D/S<br>Irrigation | Trough<br>Strong | Ground Water<br>Use | Water  |             |
| SI.No. | Name of project | Human     | Live Stock                   | Total    |           |                     | Total              |         | -E               | Úse               | CAPORTS T        |                     |        |             |
|        |                 | WS        | WS.YL                        | lu".     | U/s Minor | U/s Medium          | Iu <sup>f</sup> ,j | WS      | WSi,j            | If.               | ),i,i,i          | S/N                 | D/S    | Totai       |
|        |                 | IUMH      | IUMIL                        | IUM      |           |                     | IUR                | WSU     | WSI              | IRD               |                  |                     | _      |             |
| Ξ      | (2)             | (3)       | (4)                          | (5)      | (9)       | (7)                 | (8)                | (6)     | (10)             | (11)              | (12)             | (13)                | (14)   | (15)        |
| 1      | Yagachi         | 2.48      | 3.42                         | 5.90     | 47.46     | 00.00               | 47.46              | 10.96   | 16.84            | 163.02            | 00.00            | 30.34               | 11.69  | 42.03       |
| 2      | Hemavathi       | 10.04     | 13.82                        | 23.86    | 191.97    | 67.38               | 259.35             | 44.34   | 68.11            | 339.72            | 1334.00          | 111.05              | 144.41 | 255.46      |
| ~      | Harangi         | 1.87      | 2.58                         | 4.45     | 35.79     | 00.00               | 35.79              | 8.27    | 12.70            | 509.00            | 00.0             | 22.88               | 29.17  | 52.05       |
| 4      | Cauvery         | 1.25      | .1.72                        | 2.97     | 23.86     | 00.00               | 23.86              | 5.51    | 8.46             | 433.35            | 00.00            | 15.25               | 24.24  | 39.50       |
| 'n     | KRS             | 31.69     | 43.60                        | 75.29    | 605.73    | 58.32               | 664.05             | 139.92  | 214.90           | 00.00             | 1483.00          | 189.46              | 0.00   | 189.46      |
| 9      | Banasurasagar   | 0.40      | 0.28                         | 89.0     | 1.52      | 00.00               | 1.52               | 1.76    | 2,44             | 88.50             | 189.00           | 3.37                | 2.09   | 5.46        |
| 7      | Mananthvady     | 1.01      | 0.71                         | 1.72     | 3.86      | 43.32               | 47.18              | 4.46    | 6.18             | 0.00              | 495.50           | 8.53                | 0.00   | 8.53        |
| 8      | Kabini          | 12.53     | 8.79                         | 21.32    | 47.78     | 492.55              | 540.33             | 55.23   | 76.56            | 852.00            | 627.35           | 103.57              | 09.9   | 110.17      |
| 6      | Taraka          | 1.80      | 1.26                         | 3.06     | 6.87      | 00'0                | 6.87               | 7.94    | 11.00            | 193.00            | 00.0             | 15.18               | 4.89   | 20.07       |
| 10     | Sagar Doddakere | 1.20      | 0.84                         | 2.04     | 4.59      | 00.00               | 4.59               | 5.31    | 7.36             | 24.00             | 95.00            | 10.15               | 0.93   | 11.09       |
|        | Upper Nugu      | 6.19      | 4.34                         | 10.53    | 23.58     | 100.47              | 124.05             | 27.26   | 37.78            | 677.00            | 289.69           | 52.14               | 88.6   | 62.02       |
| 12     | Nugu            | 0.22      | 0.16                         | 0.38     | 0.84      | 00.00               | 0.84               | 0.98    | 1.35             | 217.91            | 00.0             | 1.87                | 5.78   | 7.64        |
| 13     | Remaining area  | 22.64     | 15.63                        | 38.27    | 85.69     | 422.73              | 508.42             | 99.07   | 137.32           | 0.00              | 00.00            | 161.43              | 0.00   | 161,43      |
| 14     | Mettur          | 17.7      | 27.23                        | 44.94    | 380.2     | 302.1               | 682.3              | . 78    | 123              | 275               | 12712            | 177.6               | 0.00   | 177.6       |
| 15     | Lower Bhavani   | 24.9      | 21.54                        | 46.42    | 130.35    | 119.93              | 250.3              | 110     | 156.29           | 395.4             | 627.27           | 128.1               | 68.6   | 137.99      |
| 91     | Remaining area  | 11.6      | 10.02                        | 21.59    | 60.65     | 78.07               | 138.7              | 51.1    | 72.71            | 00.0              | 0.00             | 59.6                | 00.00  | 59.6        |
| 17     | Amravathi       | 4.73      | 5.31                         | 10.04    | 89.99     | 0                   | 89.99              | 20.9    | 30.91            | 202.26            | 00.0             | 31.21               | 3.76   | 34.97       |
| 18     | Remaining area  | 42        | 47.08                        | 89.03    | 591.32    | 499                 | 1090               | 185     | 274.9            | 0.0               | 0.00             | 276.79              | 00.0   | 0.00 276.79 |

#### 6.4 ESTIMATION OF VARIOUS COEFFICIENTS

The following coefficients are computed as follows:

### 6.4.1 Reservoir Evaporation Coefficient $(K'_{i,i,t})$

Firstly, the LP model for every individual projects were run without considering evaporation losses from the reservoirs and storages of each reservoirs were obtained, by adding of the dead storages of each sites the gross storages are calculated, by knowing the area of submergence at full reservoir level. The reservoir operation table (working table) was prepared for each reservoir using average monthly flows and considering evaporation losses. From the results,  $K_{i,j,t}$  was calculated as:

$$K'_{i,j,t} = 1 + (El_{i,j,t}/S_{i,j,t})$$

The values of  $El_{i,j,t}$  and  $S_{i,j,t}$  were taken from the results of LP model running on LINDO software for each site, i. Reservoir operation tables (working table) was prepared for each reservoir using average monthly flows and considering evaporation losses from the results. The values of  $K_{i,j,t}$  calculated for all the fifteen sites in Cauvery river basin are presented in Table 6.3.

### 6.4.2 Percent of Annual Irrigation (K<sub>i.i.t</sub>)

The values of  $K_{i,j,t}$  are computed from monthly crop requirements of each crop. This is the ratio of monthly and annual crop water requirements, such that  $\frac{12}{\sum_{t=1}^{K} K_{i,j,t}} = 1.$ 

Computation of K<sub>i,j,t</sub> is given below:

$$SUM_{i,j}(t) = \sum_{k=1}^{NCI^{i, j}} W_{i, j, t}^{k} * A_{i, j}^{k}$$
 for all i,j, and t (6.1)

$$TSUM_{i,j} = \sum_{t=1}^{12} SUM_{i,j}(t)$$
 for all i and j, (6.2)

Table 6.3: Estimated Monthly Reservoir Evaporation Coefficients at Cauvery River Basin from All Major Projects

|       |         |                   |         |                 |        |              |               |        |                       |        |            | Ì       |         |            |        |
|-------|---------|-------------------|---------|-----------------|--------|--------------|---------------|--------|-----------------------|--------|------------|---------|---------|------------|--------|
| Month | Yagachi | Yagachi Hemavathi | Harangi | Harangi Cauvery | KRS    | Banasursagar | r Mananthvady | Kabini | Sagardoddakere Taraka |        | Upper Nugu | Nugu    | Bhavani | Amaravathi | Mettur |
| (1)   | (2)     | (3)               | (4)     | (5)             | (9)    | (7)          | (8)           | (2)    | (3)                   | (4)    | (5)        | (9)     | (7)     | (8)        | (6)    |
| Jun   | 1.0271  | 1.0100            | 1.0098  | 1.0146 1.0113   | 1.0113 | 1.0088       | 1.0086        | 1.0221 | 1.0080                | 1.0121 | 1.0143     | 1.0113  | 1.0121  | 1.0137     | 1.0137 |
| Jul   | 1.0253  | 1.0094            | 1.0001  | 1.0137 1,0106   | 1,0106 | 1.0082       | 1.0080        | 1.0207 | 1.0075                | 1.0113 | 1.0134     | 1.0106  | 1.0128  | 1.0143     | 1.0143 |
| Aug   | 1.0257  | 1.0095            | 1.0093  | 1.0139          | 1.0108 | 1.0083       | 1.0081        | 1.0210 | 1.0076                | 1.0114 | 1.0136     | 1.0108  | 1.0126  | 1.0141     | 1,0141 |
| Sep   | 1.0256  | 1.0095            | 1.0093  | 1.0138          | 1.0107 | 1.0083       | 1.0081        | 1.0210 | 1.0076                | 1.0114 | 1.0135     | 1.0107  | 1.0108  | 1.0113     | 1.0112 |
| Oct   | 1.0242  | 1.0090            | 1.0088  | 1.0131          | 1.0101 | 1.0079       | 1.0077        | 1.0198 | 1.0071                | 1.0108 | 1.0128     | 1.010.1 | 1.0095  | 1.0091     | 1.0091 |
| Nov   | 1.0232  | 1.0086            | 1.0084  | 1.0125          | 1.0097 | 1.0075       | 1.0074        | 1.0190 | 1.0069                | 1.0103 | 1.0123     | 1.0097  | 1.010.1 | 1.0099     | 1.0099 |
| Dec   | 1.0250  | 1.0093            | 1.0001  | 1.0135          | 1.0105 | 1.0081       | 1.0079        | 1.0205 | 1.0074                | 1.0112 | 1.0132     | 1.0105  | 1.0112  | 1.0109     | 1.0109 |
| Jan   | 1.0281  | 1.0104            | 1.0102  | 1.0152          | 1.0118 | 1.0091       | 1.0089        | 1.0230 | 1.0083                | 1.0125 | 1.0149     | 1.0118  | 1.0121  | 1.0117     | 1.0117 |
| Feb   | 1.0293  | 1.0108            | 1.0106  | 1.0158 1.0123   | 1.0123 | 1.0095       | 1.0093        | 1.0239 | 1.0086                | 1.0130 | 1.0155     | 1.0123  | 1.0156  | 1.0154     | 1.0154 |
| Mar   | 1.0364  | 1.0135            | 1.0131  | 1.0196          | 1.0152 | 1.0118       | 1.0115        | 1.0298 | 1.0107                | 1.0162 | 1.0192     | 1.0152  | 1.0144  | 1.0147     | 1.0147 |
| Apr   | 1.0338  | 1.0125            | 1.0122  | 1.0182          | 1.0142 | 1.0110       | 1.0107        | 1.0277 | 1.0100                | 1.0150 | 1.0179     | 1.0142  | 1.0145  | 1.0158     | 1.0158 |
| May   | 1.0323  | 1.0120            | 1.0117  | 1.0175          | 1.0135 | 1.0105       | 1.0102        | 1.0265 | 1.0095                | 1.0144 | 1.0171     | 1.0135  | 1.0128  | 1.0147     | 1.0147 |
| İ     |         |                   |         |                 |        |              |               |        |                       |        |            |         |         |            |        |

$$K_{i, i, t} = SUM_{i, j}(t) / TSUM_{i, t}$$
 for all i, j, and t (6.3)

The computed values of K<sub>i,i,t</sub> are given in Table 6.4.

### 6.4.3 Percent of Return Flow to River from Irrigation (Kij,t)

The percent of return flow to river from irrigation was taken as 10 to 20 percent depending on the age of the reservoir.

### 6.4.4 Percent of Upstream Annual Water Use for Irrigation ( $\alpha_{i,j,t}$ )

The percent of upstream annual water use for irrigation is the percent ratio of monthly and annual crop water requirement. The computed values are same as given in Tables 6.4.

## 6.4.5 Percent of Return Flow to River from Upstream Water Use for Irrigation $(\alpha_{i,i,t})$

The percent of return flow to river from upstream water use for irrigation is taken as 10 to 20 percent depending on the age of the reservoir.

### 6.4.6 Percent of Upstream Annual Water Supply (β<sub>i, j, t</sub>)

The percent of upstream annual water supply use are computed as:

 $\beta_{i,j,t}$  = (Number of days in a month/ number of days in a year (365 days)\*100.

### 6.4.7 Percent of Return Flow to River from Upstream Water Use for Water Supply $(\beta_{i,j,t}^n)$

The percent of return flow to river from upstream water use for water supply is taken as 80 percent.

Table 6.4: The Values of Percentage of Irrigation for All 16-Sub-basins in Cauvery River Basin

|                                | · · | 1             | , , , , , , , , , , , , , , , , , , , | 0             |               |               | 0.0519        | 0.0 %%        | (5) a 0    | 0.11395       | 0             | 0.1           | 0?4.          |               |
|--------------------------------|-----|---------------|---------------------------------------|---------------|---------------|---------------|---------------|---------------|------------|---------------|---------------|---------------|---------------|---------------|
| Ę Ď                            | ن   | 0             | 0.5                                   | Ö             | 0             | . 0           | Ö             | [             | ļ          | ö             |               | 0             | 0             |               |
| Lower<br>Colercon              | (7) | 0.0134        | 0.2245                                | 0.2403        | 0.2349        | 0.0704        | 0.0619        | 0.0488        | 0.0169     | 0.0295        | 0.0446        | 0.0124        | 0.0024        | 1.0000        |
| Upper<br>Coleroon              | (9) | 0.0134        | 0.2245                                | 0.2403        | 0.2349        | 0.0704        | 0.0619        | 0.0488        | 0.0169     | 0.0295        | 0.0446        | 0.0124        | 0.0024        | 1.0000        |
|                                | (5) | 0.0709        | 0.1115                                | 0.0668        | 0.0584        | 0.1408        | 0.1158        | 0.1566        | 0.1237     | 0.0269        | 0.0539        | 0.0447        | 0.0302        | 1.0000        |
| Tirumani Ponnanai<br>muttar Ar | (4) | 0.0548        | 0.0414                                | 0.0723        | 0.0915        | 0.0732        | 0.0843        | 0.0605        | 0.0311     | 0.1303        | 0.1932        | 0.0990        | 0.0684        | 1.0000        |
| Amaravathi                     | (3) | 0.1307        | 0.1743                                | 0.1515        | 0.0782        | 0.0083        | 0.0057        | 0.0308        | 0.0774     | 0.1150        | 0.1322        | 0.0482        | 0.0477        | 1.0000        |
| Noyil                          | (2) | 0.1248 0.2145 | 0.1680 0.1216                         | 0.1530 0.0948 | 0.0680 0.0480 | 0.0052 0.0065 | 0.0049 0.0081 | 0.0258 0.0319 | 0.0620     | 0.1294 0.0799 | 0.1448 0.0884 | 0.0527 0.0673 | 0.0353 0.1771 | 1.0000 1.0000 |
| Bhavani                        | (1) | 0.1248        | 0.1680                                | 0.1530        | 0.0680        | 0.0052        | 0.0049        | 0.0258        | 0.0880     | 0.1294        | 0.1448        | 0.0527        | 0.0353        | 1.0000        |
| Clumar                         | (8) | 0.0730        | 0.0389                                | 0.0266        | 0.0935        | 0.0765        | 9060.0        | 0.1067        | 0.0527     | 0.1092        | 0.1333        | 0.1026        | 0.0965        | 1.0000        |
| Palar                          | (7) | 0112          | 7261.                                 | 1818          | .1474         | 6210          | .0512         | .0864         | .1048      | 1107          | 0990          | .0185         | 0056          | 0000          |
| Suvarnavathi                   | (9) | 0.0101 0.0    | 0.1889 0.1                            | 0.1736 0.1    | 0.1414 0.1474 | 0.0126 0.0    | 0.0419 0.0    | 0.0896 0.0864 | 0.1325 0.1 | 0.1185/0.1    | 0.0681 0.0    | 0.0179 0.0    | 0.0051 0.0056 | 1.0000 1.0    |
| Middle<br>Cauvery              | (5) | 0.0100        | 0.1884                                | 0.1733        | 0.1391        | 0.0125        | 0.0422        | 0.0870        | 0.1243     | 0.1126        | 0.0782        | 0.0273        | 0.0050        | 1.0000        |
| Arkavadıi                      | (4) | 0.0265        | 0.0644                                | 0.0866        | 1660.0        | 0.0721        | 0.0831        | 0.1578        | 0.1750     | 0.1127        | 0.0699        | 0.0332        | 0.0189        | 1.0000        |
| Kabini Shimsha                 | (3) | 0.0160        | 0.1059                                | 0.1187        | 0.0903        | 0.0133        | 0.0743        | 0.1369        | 0.1813     | 0.1430        | 0.0772        | 0.0299        | 0.0135        | 1.0000        |
| Kabim                          | (2) | 0.0790 0.0205 | 0.1782                                | 0,1744        | 0.1392        | 0.0155        | 0.0460        | 0.0910        | 0.1318     | 0.1199        | 0.0417 0.0623 | 0.0146        | 9900'0        | 1.0000 1.0000 |
| Upper<br>Cauvery               | (1) | 0.0790        | 0.1844                                | 0.1862        | 0.1823        | 0.1991        | 0.0134        | 0.0292        | 0.0343     | 0.0432        | 0.0417        | 0.0071        | 0.0000        | 1.0000        |

6.4.8 Percent of Annual Surface Water Requirement for Urban Domestic Water Use  $(\phi_{i,\ j}^{U^*})$ 

The percent of annual surface water requirement for urban domestic water use is taken as 100 percent.

6.4.9 Percent of Annual Ground Water Requirement for Urban Domestic Water Use  $(\varphi_{i,\ j}^{U^s})$ 

The percent of annual ground water requirement for urban domestic water use is taken as 0 percent.

6.4.10 Percent of Annual Surface Water Requirement for Rural Human Population Domestic Use (  $\phi_{i,\ j}^{RH'}$  )

The percent of annual surface water requirement for rural human population domestic use is taken as 50 percent.

6.4.11 Percent of Annual Ground Water Requirement for Rural Human Population Domestic Use  $(\phi_{i,j}^{RH^g})$ 

The percent of annual ground water requirement for rural human population domestic use is taken as 50 percent.

6.4.12 Percent of Annual Surface Water Requirement for Live Stock Use (  $\phi_{i,j}^{RL^s}$  )

The percent of annual surface water requirement for live stock use is taken as 0 percent.

6.4.13 Percent of Annual Ground Water Requirement for Live Stock Use ( $\varphi_{i,}^{RL_{i,j}^g}$ )

The percent of annual ground water requirement for live stock use is taken as 100 percent.

### 6.4.14 Percent of Annual Surface Water Requirement for Industrial Use $(\varphi_{i,j}^{I'})$

The percent of annual surface water requirement for industrial use is taken as 100 percent.

### 6.4.15 Percent of Annual Ground Water Requirement for Industrial Use $(\varphi_{i,j}^{Ig})$

The percent of annual ground water requirement for industrial use is taken as 0 percent.

### 6.4.16 Percent of Annual Water Use for Urban and Industrial $(\xi_{i,j,t})$

The percent of annual water use for urban domestic and industrial use is taken as 100 percent from surface water and zero percent from ground water.

### 6.4.17 Percent of Import to a Site $(\psi_{i,j,t}^{q,j_i})$

The percent of import to the importing site is computed in the ratio of the monthly irrigation requirements of the importing site to the total annual irrigation requirements of the importing site.

### 6.4.18 Percent of Export to Site ( $(\omega_{i_1,i_1,1}^{q_i,j_1})$ )

The percent of export from site i is computed in the ratio of monthly irrigation requirements of the importing site to the total annual irrigation requirements of the importing site.

### 6.5 ESTIMATION OF FLOWS OF VARIOUS ANNUAL WATER YEAR DEPENDABILITIES

The computation of water year annual dependable flows for the years representing a normal, dry and wet years were calculated using flow-duration analysis of annual (water year) flows. These were (i) 75% water year annual

dependable flow representing a water year under normal conditions, (ii) 90% water year annual dependable flow representing a water deficit year, (iii) 100% (lowest flow) water year annual dependable flow representing a critical water deficit year, and (iv) 50% water year annual dependable annual flow representing a water surplus year. The model constraints were written for NT = 12 months because the computations were done over one year interval only.

### 6.5.1 Estimation of Inflows at Project Levels

The inflow values for each reservoir in the Cauvery river basin are computed by using the rainfall data available in the various NWDA reports of compilation of basic data for all fifteen reservoirs in Cauvery river basin. The annual dependable yield of the reservoir is distributed in the proportion of the monthly rainfall data of the nearest rain gauge station to the reservoir. In the absence of catchment maps, this was adopted.

Inflows in the individual major projects in the Kabini and Upper Cauvery sub-basins are computed by considering the monthly/annual average rainfall values for the 75 percent annual water year dependable flow of the sub-basin from which the annual yield is calculated for water balance studies, from the nearest rain gauge station to that major project.

For the Krishnarajsagar (KRS) major project in the Upper Cauvery sub-basin, the inflow is computed by deducting the sum of inflows in the major project in sub-basin from total inflow of the sub-basin as this project is at the end or terminal point of the sub-basin.

For Chinnar, Bhavani and Amaravathi major projects the inflows are taken as given in these respective project reports as each of them is single major project in its

respective sub-basins.

The computed 50%, 75%. 90% and 100% monthly and annual water year dependable flows are given in Table 6.5 (a) to Table 6.5 (d).

### 6.6 THE LP LINDO FORMAT

The LP LINDO format is prepared for running the model by writing the equations in the required format for readily available LINDO software package of 6.1 version released in August 2001, by LINDO Systems, Inc., 1415 North Dayton St. Chicago, IL, U.S.A., and is given in appendix - I. The notations used in the LP model are given as below.

The nomenclature of the variables for writing the equations for running the model on LINDO software package was done by using first single letter of the name of a project site, first two letters of the name of a sub-basin and maximum first five letters of name of a variable, because the LINDO software package version 6.1 (August 2001) allows maximum eight letters for the nomenclature of a variable for running the model to obtain a feasible solution of the problem by running the model on it.

The projectwise and variablewise notations used for running the model on the LINDO software package are given as below in Tables 6.6.1 and 6.6.2, respectively.

Table 6.5 (a): Annual Flows with Different Dependabilities at Various Sites in Upper Cauvery Sub-basin

| (1)<br>Yagachi<br>Hemavathi | % Dep. | Jun   | Jul    | Aug   | Sep   | Oct   | Nov    | Dec  | Jan  | Feb  | Mar   | Apr    | May   | Annual |
|-----------------------------|--------|-------|--------|-------|-------|-------|--------|------|------|------|-------|--------|-------|--------|
| Yagachi<br>Hemayathi        | (2)    | (3)   | (4)    | (5)   | (9)   | (2)   | (8)    | (6)  | (01) | (11) | (12)  | (13)   | (14)  | (15)   |
| Hemavathi                   |        | 22.6  | 88.2   | 7.1   | 16.5  | 74.7  | 12.6   | 0.0  | 0.0  | 0.0  | 10.7  | 39.0   | 55.7  | 327.0  |
|                             |        | 91.4  | 356.5  | 28.7  | 8.99  | 301.8 | 50.7   | 0.0  | 0.0  | 0.0  | 43.2  | 157.6  | 225.2 | 1321.9 |
| Harangi                     | */902  | 24.9  | 131.2  | 28.4  | 8.4   | 26.1  | 12.0   | 1.5  | 0.0  | 0.0  | 2.0   | 14.8   | 1.1.1 | 246.4  |
| Cauvery                     | - %AC  | 28.1  | 76.6   | 25.5  | 12.2  | 7.5   | 4.5    | 0.8  | 0.0  | 0.0  | 1.3   | 5.6    | 1.9   | 164.0  |
| Remaining area              |        | 440.9 | 1552.4 | 389.6 | 280.3 | 543.0 | 217.3  | 21.7 | 0.0  | 30.3 | 73.7  | 351.7  | 342.4 | 4171.0 |
| Total                       |        | 6.709 | 2204.7 | 479.4 | 384.3 | 955.1 | 297.1  | 24.0 | 0.0  | 30.3 | 130.9 | 568.6  | 636.3 | 6230.3 |
|                             |        |       |        |       |       |       |        |      |      |      |       |        |       |        |
| Yagachi                     |        | 7.7   | 15.7   | 19.8  | 15.9  | 17.6  | 6.9    |      | 0    | 0    | 0     | 15.3   | 15.4  | 115.3  |
| Hemavathi                   |        | 114.1 | 232.1  | 292.4 | 235.4 | 260.1 | 102.4  | 15.1 | 0.0  | 0.0  | 0.0   | 226.6  | 227.4 | 1705.5 |
| Harangi                     | 7697   | 38.3  | 180.7  | 88.2  | 65.2  | 27.1  | 11     | 4.7  | 2.1  | 2.3  | 10.2  | 30.3   | 6.01  | 471    |
| Cauvery                     | 0/6/   | 61.4  | 193.1  | 79.9  | 50.7  | 9.91  | 8.4    | 4.1  | 0.0  | 0.0  | 3.4   | 13.1   | 27.9  | 458.6  |
| Remaining area              |        | 248.4 | 738.0  | 311.8 | 193.4 | 247.3 | 87.4   | 41.7 | 11.5 | 2.5  | 27.3  | 183.1  | 334.2 | 2426.6 |
| Total                       |        | 470.0 | 1359.6 | 792.1 | 9.095 | 568.7 | 216.1  | 9'99 | 13.6 | 8.7  | 40.9  | 468.4  | 615.8 | 5177.0 |
| Yagachi                     |        | 10.6  | 30.3   | 12.0  | 26.8  | 43.4  | 16.5   | 12.2 | 2.8  | 0.0  | 0.1   | 44.1   | 55.3  | 254.0  |
| Hemavathi                   |        | 42.8  | 122.4  | 48.7  | 108.5 | 175.4 | 9.99   | 49.4 | 11.3 | 0.0  | 0.3   | 178.4  | 223.7 | 1027.0 |
| Harangi                     | 7000   | 19.0  | 57.1   | 30.0  | 13.1  | 18.2  | 9.6    | 2.0  | 0.3  | 0.0  | 0.0   | 9.8    | 10.2  | 191.0  |
| Cauvery                     | 0/06   | 20.7  | 37.6   | 29.7  | 10.9  | 11.5  | 6.5    | 6.0  | 0.7  | 0.1  | 0.0   | 4.6    | 5.4   | 128.0  |
| Remaining area              |        | 257.4 | 746.7  | 280.5 | 392.3 | 567.2 | 327.2  | 31.0 | 11.8 | 7.4  | 0.5   | 282.0  | 346.1 | 3240.0 |
| Total                       |        | 350.4 | 994.0  | 400.9 | 551.6 | 815.7 | 426.4  | 95.4 | 26.5 | 7.5  | 0.0   | 517.6  | 640.7 | 4840.0 |
|                             |        |       |        |       |       |       |        |      |      |      |       |        |       |        |
| Yagachi                     |        | 7.13  | 36.19  | 7.45  | 43.16 | 25.29 | 8.61   | 0    | 0    | 15.4 | 0     | 8.01   | 13.74 | 165    |
| Hemavathi                   |        | 29.03 | 147.3  | 30.32 | 175.7 | 103   | 35.07  | 0    | 0    | 62.8 | 0     | 32.63  | 55.95 | 999    |
| Harangi                     | 70001  | 15.11 | 45.92  | 26.79 | 14.84 | 7.66  | 5.83   | 0    | 0    | 2.01 | 0     | 2.24   | 4.56  | 125    |
| Cauvery                     | 201    | 14.2  | 29.72  | 15.48 | 9.27  | 4.36  | 2.81   | 0    | 0    | 0.41 | 0 .   | 3.6    | 3.14  | 83     |
| Remaining area              |        | 238.2 | 623.6  | 211.1 | 265.7 | 255   | 108.64 | 0    | 0    | 16.4 | 0     | 139.97 | 248.5 | 2109   |
| Total                       | ·      | 303.7 | 882.7  | 291.1 | 508.7 | 395.3 | 161.0  | 0.0  | 0.0  | 97.0 | 0.0   | 186.5  | 325.9 | 3150.0 |

\*- Annual flow of given dependability

Table 6.5 (b): Annual Flows with Different Dependabilities at Various Sites in Kabini Sub-basin

| Name of Project      | % Dep.         | Ling  | in.    | Aug   | 3      | 3      | AOAI   | 757       | lan. | 22   | EVI (A) | ) idv | in in | Annual |
|----------------------|----------------|-------|--------|-------|--------|--------|--------|-----------|------|------|---------|-------|-------|--------|
| Ξ                    | (2)            | (3)   | (4)    | (5)   | (9)    | (7)    | (8)    | (6)       | (01) | (11) | (12)    | (13)  | (14)  | (15)   |
| Banasurasagar        |                | 57.11 | 142.7  | 70.0  | 52.7   | 28.4   | 8.8    | 5.1       | 0    | 0.0  | 0.8     | 5.3   | 24.6  | 392.9  |
| Mananthyady          |                | 98.3  | 315.8  | 75.4  | 66.7   | 103.1  | 47.5   | 1.9       | 0.0  | R.   | 15.7    | 35.11 | 24.1  | 387.1  |
| Taraka               |                | 20.7  | 17.0   | 18.9  | 47.0   | 56.7   | 37.3   | 1.3       | 0.0  | 0.2  | 80.     | 10.6  | 10.3  | 221.9  |
| Sagar Doddakere      |                | 10.3  | 56.4   | 9.6   | 84.6   | 67.3   | 84.6   | 6.1       | 10.9 | 0.0  | 0.0     | 16.0  | 20.0  | 391.7  |
| Kabini               | 20%            | 253.5 | 208.6  | 231.1 | 576.5  | 695.4  | 457.6  | 15.7      | 0.0  | 2.2  | 22.4    | 130.1 | 125.6 | 2718.8 |
| Upper Nugu           |                | 19.3  | 105.9  | 18.0  | 158.8  | 126.4  | 161.3  | 3.6       | 20.5 | 0.0  | 0.0     | 30.1  | 93.9  | 7377   |
| Nugu                 |                | 9.4   | 51.5   | 80.00 | 77.2   | 61.4   | 78.4   | 1.7       | 6.6  | 0.0  | 0.0     | 14.6  | 45.6  | 358.7  |
| Remaining area       |                | 48.2  | 94.9   | 60.3  | 153.2  | 230.9  | 132.2  | 16.2      | 10.1 | 5.0  | 1.8     | 118.5 | 82.7  | 964.1  |
| Total                |                | 533.4 | 1023.7 | 499.3 | 1232.3 | 1351.4 | 1017.3 | 37.9      | 50.9 | 8.9  | 50.1    | 320.4 | 447.2 | 6572.7 |
|                      |                |       |        |       |        |        |        |           |      |      |         |       |       |        |
| Banasurasagar        | ·¹             | 45.0  | 112.6  | 55.2  | 41.6   | 22.4   | 7.0    | <u>:-</u> | 8.0  | 0.0  | 9.0     | 4.2   | 19.4  | 310.0  |
| Mananthvady          |                | 17.6  | 249.2  | 59.5  | 52.6   | 81.4   | 37.5   | 1.5       | 0.0  | 2.8  | 12.4    | 27.7  | 19.0  | 621.0  |
| Taraka               |                | 16.4  | 13.5   | 15.0  | 37,3   | 45.0   | 29.6   | 1.0       | 0.0  | 0.2  | 1.5     | 8.4   | 1.8   | 6.571  |
| Sagar Doddakere      |                | 8.1   | 44.5   | 7.6   | 8.99   | 53.1   | 8.99   | 1.5       | 9.8  | 0.0  | 0.0     | 12.6  | 39.5  | 309.0  |
| Kabini               | 75%            | 200.0 | 164.6  | 182.3 | 454.8  | 548.6  | 361.0  | 12.4      | 0.0  | 8.1  | 17.7    | 102.7 | 1.66  | 2145.0 |
| Upper Nugu           |                | 15.2  | 83.6   | 14.2  | 125.3  | 66.7   | 127.2  | 2.9       | 16.1 | 0.0  | 0.0     | 23.7  | 74.1  | 582.0  |
| Nugu,                |                | 7.4   | 40.6   | 6.9   | 6.09   | 48.5   | 6,19   | 1.4       | 7.9  | 0.0  | 0.0     | 11.5  | 36.0  | 283.0  |
| Remaining area       |                | 38.0  | 74.9   | 47.6  | 120.9  | 182.2  | 104.3  | 12.8      | 8.0  | 4.0  | 9.3     | 93.5  | 65.3  | 760.6  |
| Total                |                | 407.6 | 783.4  | 388,3 | 960.3  | 1080.9 | 795.3  | 34.6      | 41.3 | 9.8  | 41.5    | 284.4 | 360.4 | 5186.6 |
| To the second of the |                |       |        | 37    | **     |        | Š      | 00        | 6    |      | -       | -     |       | 376    |
| Annohimody           |                | 2 5   | 17.71  | 000   | 0.0    | 7 4    |        | 200       | 100  | 200  | 9       | 2 0   | 3     | 27.0   |
| Tamba                | <del>- '</del> | 0.17  |        | 11.8  | 200    | 763    | 711    | 700       | 000  |      | 5 -     | 0 0   | 20.5  | 1100   |
| Sagar Doddakere      | '              | 147   | 5.7    | 0.5   |        | 141    | 26     | 000       | 00   |      | 601     | 7.3   | 17.1  | 008    |
| Kabini               | %06            | 57.7  | 00 et  | 823   | 433    | 323.1  | 80.6   | 6.0       | 000  | 00   | 93      | 57.7  | 1416  | 831.0  |
| Upper Nugu           | 1              | 85.7  | 29.2   | 30.5  | 0.0    | 72.4   | 12.7   | 0.0       | 0.0  | 0.0  | 54.6    | 37.5  | 87.6  | 410.0  |
| Nugu,                | ·              | 3.1   | 1.1    | 1-1   | 0.0    | 2.7    | 0.5    | 0.0       | 0.0  | 0.0  | 2.0     | 4.    | 3.2   | 15.0   |
| Remaining area       |                | 150.3 | 389.4  | 393.5 | 188.0  | 132.3  | 85.6   | 43.4      | 12.7 | 9:01 | 15.6    | 26.6  | 43.0  | 1491.0 |
| Total                |                | 349.7 | 492.1  | 541,4 | 244.0  | 598.0  | 194.1  | 44.6      | 12.9 | 10.8 | 94.0    | 143.5 | 314.5 | 3039.5 |
| Banasurasagar        |                | -     | 2.0    | -     | F      |        | 23     | 0         | 00   | 0.0  | 00      | -     | 12    | 17.3   |
| Mananthyady          | •              | 7.8   | 5.2    | 13.0  | 2.9    | 2.7    | 5.8    | 0.2       | 0.0  | 0.1  | 0.0     | 3.4   | 31    | 44.0   |
| Taraka               |                | 0.1   | 80.00  | 5.8   | 10.1   | 10.2   | 18.5   | 0.1       | 1.0  | 0.0  | 3.3     | 2.1   | 17.4  | 78.0   |
| Sagar Doddakere      | ·              | 9.0   | 7.2    | 7.2   | 1.7    | 3.2    | 11.4   | 0.4       | 0.1  | 0.0  | 9.0     | 8,0   | 11.5  | 52.0   |
| Kabini               | %00 <u>1</u>   | 9.9   | 61.2   | 40.6  | 70.1   | 70.8   | 128.3  | 0.7       | 5.2  | 0.0  | 22.9    | 14.8  | 120.9 | 542.0  |
| Upper Nugu           |                | 2.9   | 37.0   | 37.0  | 8.8    | 16.5   | 58.3   | 2.2       | 0.7  | 0.0  | 3.3     | 41.1  | 1.65  | 267.0  |
| Nugu,                |                | 0.1   | 1.4    | 4.    | 0.3    | 9.0    | 2.2    | 0.1       | 0.0  | 0.0  | 0.1     | 1.5   | 2.2   | 10.0   |
| Remaining area       |                | 98.0  | 253.9  | 256.5 | 122.5  | 86.2   | 55.8   | 28.3      | 8.3  | 6.9  | 101     | 17.4  | 28.0  | 972.0  |
| F                    | <u>.</u>       |       |        |       |        |        |        |           |      |      |         |       |       |        |

\*- Annual flow of given dependability

Table 6.5 (c): Annual Flows with Different Dependabilities at Various Sites in Bhavani Sub-basin

|                 |        |               | -     |        |       |       |        |       |       |          |       |       |       |        |
|-----------------|--------|---------------|-------|--------|-------|-------|--------|-------|-------|----------|-------|-------|-------|--------|
| Name of Project | % Dep. | Jun           | Jul   | Aug    | Sep   | Oct   | Nov    | Dec   | Jan   | Feb      | Mar   | Apr   | May   | Annual |
| (1)             | (2)    | (3)           | (4)   | (5)    | (9)   | (7)   | (8)    | (6)   | (10)  | <u>=</u> | (12)  | (3)   | (14)  | (15)   |
| Bhavani         |        | 168.8         | 146.0 | 152.2, | 172.3 | 264.3 | 141.4  | 113.6 | 69.1  | 8.06     | 150.9 | 0.99  | 137.5 | 1668.0 |
| Remaining area  | *%05   | 78.5          | 6.79  | 4.70.8 | 80.2  | 123.0 | 65.8   | 52.8  | 32.1  | 42.2     | 70.2  | 30.7  | 64.0  | 776.0  |
| Total           |        | 247.3         | 213.9 | 223.0  | 252.4 | 387.3 | 207.2  | 166.4 | 101.2 | 133.0    | 221.1 | 8.96  | 201.4 | 2443.9 |
|                 |        |               |       |        |       |       |        |       |       |          |       |       |       |        |
| Bhavani         |        | 106.1         | 255.9 | 183.1  | 97.9  | 143.5 | 178.2  | 103.4 | 55.9  | 48.1     | 48.1  | 39.7  | 55.4  | 1315.2 |
| Remaining area  | 75%    | 48.5          | 117.1 | 83.3   | 44.8  | 65.7  | 9.18   | 47.3  | 25.6  | 22.0     | 22.0  | 16.8  | 25.4  | 600.1  |
| Total           |        | 154.6         | 373.0 | 266.4  | 142.7 | 209.2 | 259.7  | 150.8 | 81.4  | 70.1     | 70.2  | 56.5  | 80.7  | 1915.3 |
|                 |        | ,             | l E   |        |       |       |        |       |       |          |       |       |       |        |
| Bhavani         |        | 46.4          | 148.8 | 85.8   | 93.5  | 91.9  | 129.1  | 154.5 | 97.8  | 10.8     | 34.8  | 71.6  | 67.9  | 1033   |
| Remaining area  | %06    | 21.6          | 69.2  | 39.9   | 43.5  | 42.7  | 0.09   | 71.8  | 45.4  | 5.0      | 16.2  | 33.3  | 31.5  | 480.0  |
| Total           |        | 0.89          | 218.0 | 125.7  | 137.0 | 134.7 | 1.89.1 | 226.2 | 143.2 | 15.8     | 51.0  | 104.9 | 99.4  | 1513   |
|                 |        |               |       | 2      |       |       |        |       |       |          |       |       |       |        |
| Bhavani         |        | 54.2          | 92.2  | 64.4   | 54.6  | 107.3 | 35.7   | 180.3 | 31.9  | 27.9     | 18.3  | 127.1 | 36.6  | 831.0  |
| Remaining area  | 0001   | 25.2          | 42.9  | 30.0   | 25.4  | 50.0  | 9.91   | 84.0  | 14.9  | 13.0     | 8.5   | 59.2  | 17.1  | 387.0  |
| Total           |        | 79.5          | 135.1 | 94.4   | 80.0  | 157.3 | 52.3   | 264.3 | 46.8  | 40.9     | 26.9  | 186.3 | 53.7  | 1218.0 |
| * 4             | F      | donomolohilit |       |        |       |       |        |       |       |          |       |       |       |        |

\*- Annual flow of given dependability

Table 6.5 (d): Annual Flows with Different Dependabilities at Various Sites in Amaravathi Sub-basin

| Name of Project | % Dep. | Jun  | Jul   | Aug   | Sep   | Oct   | Nov   | Dec   | Jan   | Feb  | Mar  | Apr   | May   | Annual |
|-----------------|--------|------|-------|-------|-------|-------|-------|-------|-------|------|------|-------|-------|--------|
| (1)             | (2)    | (3)  | (4)   | (5)   | (9)   | (7)   | (8)   | (6)   | (10)  | (11) | (12) | (13)  | (14)  | (15)   |
| Amaravathi      |        | 3.5  | 2.7   | 5.7   | 26.5  | 16.6  | 22.3  | 4.9   | 10.2  | 0.5  | 4.3  | 5.0   | 1.0.1 | 112.3  |
| Remaining area  | 20%    | 30.9 | 23.9  | 50.6  | 235.0 | 147.4 | 197.3 | 43.7  | 9.06  | 4.3  | 38.3 | 44.1  | 89.4  | 995.6  |
| Total           |        | 34.4 | 26.6  | 56.3  | 261.5 | 164.0 | 219.6 | 48.7  | 100.9 | 4.8  | 42.6 | 49.1  | 99.5  | 1108.0 |
|                 |        |      |       |       |       |       |       |       |       |      |      |       |       | ļ      |
| Amaravathi      |        | 27.9 | 27.8  | 61.3  | 34.0  | 47.7  | 65.0  | 45.9  | 15.7  | 5.8  | 4.1  | 5.5   | 10.9  | 351.4  |
| Remaining area  | 75%    | 35.3 | 92.0  | 77.5  | 43.0  | 60.4  | 82.3  | 58.0  | 20.1  | 7.3  | 5.2  | 7.0   | 13.8  | 501.8  |
| Total           |        | 63.2 | 119.8 | 138.8 | 694   | 108.1 | 147.3 | 103.9 | 35.8  | 13.1 | 9.2  | 12.5  | 24.6  | 853.2  |
| Amaravathi      |        | 6.9  | 9.4   | 9.6   | 6.5   | 17.0  | 7.1   | 4.9   | 0.5   | 9.0  | 3.4  | 10.7  | 5.2   | 81.9   |
| Remaining area  | %06    | 0.19 | 83.2  | 84.6  | 57.7  | 150.0 | 62.5  | 43.3  | 4.7   | 5.5  | 30,2 | 94.5  | 45.8  | 722.4  |
| Total           |        | 67.9 | 92.6  | 94.2  | 64.3  | 167.0 | 9.69  | 48.3  | 5.2   | 6.1  | 33.6 | 105.2 | 51.0  | 804.3  |
|                 |        |      | 4     |       |       |       |       |       |       |      |      |       |       |        |
| Amaravathi      |        | 4.3  | 9.3   | 8.6   | 7.1   | 5.7   | 3.3   | 5.1   | 3.5   | 0.8  | 3.3  | 8.2   | 4'6   | 64.9   |
| Remaining area  | 100%   | 37.8 | 82.6  | 87.4  | 62.6  | 50.7  | 29.2  | 45.1  | 30.9  | 7.2  | 29.2 | 72.8  | 41.0  | 576.5  |
| Total           |        | 42.1 | 6.19  | 97.3  | 69.7  | 56.4  | 32.4  | 50.2  | 34.4  | 8.0  | 32.5 | 81.0  | 45.7  | 641.5  |

\*- Annual flow of given dependability

Table 6.6.1: Notations Used in the LP LINDO Format for Projects

| Sl. No. | Name of project | Name of sub-basin | Notations used in the LINDO format |
|---------|-----------------|-------------------|------------------------------------|
| (i)     | (2)             | (3)               | (4)                                |
|         | (i)             | (i) [-1]          |                                    |
| 1       | Hemavathi       | Upper Cauvery     | HCU                                |
| 2       | Yagachi         | Upper Cauvery     | YCU                                |
| 3       | Harangi         | Upper Cauvery     | GCU                                |
| 4       | KRS             | Upper Cauvery     | KCU                                |
| 5       | Cauvery         | Upper Cauvery     | ccu                                |
| 6       | Banasursagar    | Kabini            | ВКВ                                |
| 7       | Mananthyadi     | Kabini            | MKB                                |
| 8       | Kabini          | Kabini            | KKB                                |
| 9       | Taraka          | Kabini            | ТКВ                                |
| 10      | Sagar Doddakere | Kabini            | SKB                                |
| 11      | Upper Nugu dam  | Kabini            | · UKN                              |
| 12      | Nugu            | Kabini            | NKB                                |
| 13      | Mettur          | Chinnar           | МСН                                |
| 14      | Lower Bhavani   | Bhayani           | ввн                                |
| 15      | Amaravathi      | Amaravathi        | AAM                                |

Table 6.6.2: Notations Used in the LP LINDO Format for Variables

| Variable                        | Notation<br>used in<br>LINDO<br>format | Variable                            | Notation used in LINDO format | Variable                                     | Notation<br>used in<br>LINDO<br>format |
|---------------------------------|----------------------------------------|-------------------------------------|-------------------------------|----------------------------------------------|----------------------------------------|
| (1)                             | (2)                                    | (1)                                 | (2)                           | (1)                                          | (2)                                    |
| I <sub>i, j, t</sub>            | I                                      | Ir <sup>g</sup>                     | IURG                          | Iu [, j                                      | IUR                                    |
| Ir <sub>i, j</sub>              | IUR                                    | $\operatorname{Ir}_{i,j}^{s}$       | IURS                          | Iu ;, j                                      | IURS                                   |
| Iu <sup>r, g</sup>              | IURG                                   | $\operatorname{Og}_{i,j}$           | OG .                          | Sp <sub>i,j,t</sub>                          | SP                                     |
| Iu <sub>i,j</sub>               | IUM                                    | $Og_{i,j,l}^m$                      | OGM                           | Ws i,j                                       | WSD                                    |
| Ių,                             | IUMS                                   | $\operatorname{OI}_{i,j,p}^{q,j_1}$ | Ol                            | Ws <sup>l</sup> <sub>i,j</sub>               | WSI                                    |
| Iu <sup>m, g</sup>              | IUMG                                   | $\mathrm{O}_{\mathrm{i,j,t}}$       | О                             | $Ws_{i,j}^{RH}$                              | IUMH                                   |
| $OC_{i,j}^{m}$                  | OCM                                    | O <sub>i, j, t</sub>                | ОМ                            | $\operatorname{Ws}^{\operatorname{R}}_{i,j}$ | IUR                                    |
| $Od_{,j,t}$                     | OD                                     | $Og^{r}_{i,j,t}$                    | OGR                           | $Ws^{RL}_{i,j}$                              | IUML                                   |
| $Od^{m}_{i,j,t}$                | ODM                                    | $S_{i,j,t-1}$                       | SO                            | Ws <sup>U</sup> <sub>i,j</sub>               | WSU                                    |
| $\operatorname{Od}_{i,j,t}^{r}$ | ODR                                    | S <sub>i,j,t</sub>                  | S                             | OE 4, je                                     | OE                                     |

#### 6.7 THE VARIOUS DEMANDS AS PER NWDA

The water demands for various purposes as per NWDA are given in Table 6.7.

# 6.8 COMPUTATION OF WATER REQUIREMENT TO MEET THE MINIMUM FOOD REQUIREMENTS OF THE AGRICULTURAL POPULATION IN THE COMMAND OF MAJOR RESERVOIRS

### 6.8.1 Estimation of Agriculture Population

The sub-basinwise rural and urban population within the Cauvery river basin is obtained from the various reports of compilation of basic data and preliminary water balance studies of NWDA. The rural and urban population for the year 1981 taken from the census figures is projected for the year 2050. The year 2050 is chosen as the water balance studies are carried out for the year 2050, after which a reassessment may be done. The total agricultural population at each major project level is computed in the proportion of the command area of each major project lying in the sub-basin for all the fifteen major reservoirs having irrigation component in sub-basins as per their culturable command areas. The computation of the agricultural population for all the fifteen major reservoirs in the basin having irrigation component in shown in Table 6.8.2.

### 6.8.2 Minimum Food Requirements

Nutritional requirements (proteins and calories) per capita per day: The daily dietary allowances of proteins and calories for male and female in different age groups are obtained from Ghei and Ghei (1973) and Thaper (1981). The daily dietary allowances are shown in Table 6.8.1.

Table 6.7: The Various Demands as per National Water Development Agency (NWDA)

|         |                       |                   | <del></del>             | <del></del>  | · · · · · · · · · · · · · · · · · · · |             |                           | <del></del>                   |
|---------|-----------------------|-------------------|-------------------------|--------------|---------------------------------------|-------------|---------------------------|-------------------------------|
| SI.No.  | Name of Sub-basin     | Iu <sub>i,j</sub> | $\mathbf{Iu}_{i,j}^{r}$ | $Ws^U_{i,j}$ | $Ws_{i,j}^{l}$                        | $Ws'_{i,j}$ | $\operatorname{Ir}_{i,j}$ | $OE_{i,j,t}^{q,j_{\epsilon}}$ |
| 31.140. |                       | IUM               | IUR                     | WSU          | WSI                                   | WSD         | IRD                       | OE                            |
| (1)     | (2)                   | (3)               | (4)                     | (5)          | (6)                                   | (7)         | (8)                       | (9)                           |
| 1       | Yagachi               | 5.9               | 47.45                   | 10.96        | 16.84                                 | 83.97       | 27.80                     | 0.00                          |
| 2       | Hemavathi             | 23.86             | 259.35                  | 44.34        | 68.11                                 | 339.72      | 112.45                    | 1134.0                        |
| 3       | Harangi               | 5.9               | 47.6                    | 10.96        | 16.84                                 | 471.24      | 27.80                     | 0.00                          |
| 4       | Cauvery               | 2.97              | 23.86                   | 5.51         | 8.46                                  | 413.35      | 13.97                     | 0.00                          |
| 5       | KRS                   | 75.29             | 664.05                  | 139.92       | 214.9                                 | 0           | 354.82                    | 1483.0                        |
| Total U | pper Cauvery s.b.     | 113.92            | 1042.3                  | 211.69       | 325.15                                | 1308.3      | 536.84                    | 2617.0                        |
| 6       | Banasursagar          | 0.68              | 40.82                   | 1.76         | 2.44                                  | 66.40       | 4.20                      | 189.00                        |
| 7       | Mananthvady           | 1.72              | 146.65                  | 4.46         | 6.18                                  | 7.43        | 10.64                     | 475.50                        |
| 8       | Kabini                | 21.32             | 530.4                   | 55.23        | 76.56                                 | 710         | 131.79                    | 627.35                        |
| 9       | Taraka                | 3.06              | 1.24                    | 7.94         | 11                                    | 157.87      | 18.94                     | 0.00                          |
| 10      | Sagardoddakere        | 2.05              | 0.83                    | 5.31         | 7.36                                  | 197.18      | 12.67                     | 95.00                         |
| 11 -    | Upper Nagu            | 10.5              | 104.72                  | 27.26        | 37.77                                 | 179.0       | 65.03                     | 289.60                        |
| 12      | Nugu                  | 0.38              | 0.15                    | 0.98         | 1.35                                  | 181.64      | 2.33                      | 0.00                          |
| 13      | Kabini s.b.r.area     | 236.39            | 362.25                  | 99.07        | 137.32                                | 0.00        | 236.39                    | 98.55                         |
| Total k | Kabini sub-basin      | 276.1             | 1187.1                  | 202.01       | 279.98                                | 1499.6      | 481.99                    | 1775.00                       |
| 14      | Shimsha s.b.          | 115.0             | 3150.69                 | 233.0        | 348.0                                 | 0.00        | 581.00                    | 15.00                         |
| 15      | Arkavathi s.b.        | 989.00            | 759.28                  | 430.00       | 559.00                                | 0.00        | 989.00                    | 810.29                        |
| 16      | Middle C.s.b.         | 183.00            | 1788.47                 | 74.00        | 109.00                                | 0.00        | 183.00                    | 211.00                        |
| 17      | Suvarnavathi s.b.     | 95.00             | 500.66                  | 32.00        | 63.00                                 | 0.00        | 95.00                     | 0.00                          |
| 18      | Palar s.b.            | 36.93             | 267.53                  | 0.00         | 44.0                                  | 0.00        | 44.00                     | 0.00                          |
| 19      | Chinnar s.b.r.area    | 0                 | 177.6                   | 0.00         | 0.00                                  | 0.00        | 0.00                      | 0.00                          |
| 20      | Mettur                | 201.00            | 275.00                  | 78           | 123                                   | 275         | 201.00                    | 12712                         |
| Total C | Chinnar sub-basin     | 201.00            | 452.60                  | 78.00        | 123.00                                | 275.00      | 201.00                    | 12712                         |
| 21      | Lower Bhawani         | 46.42             | 250.28                  | 109.87       | 156.29                                | 334.77      | 266.16                    | 627.39                        |
| 22      | Bhavani s.b.r.area    | 21.59             | 138.72                  | 51.12        | 72.71                                 | 0.00        | 123.83                    | 0.00                          |
| Total E | havani sub-basin      | 68.01             | 389                     | 160.99       | 229                                   | 334.77      | 389.99                    | 627.39                        |
| 23      | Noyil s.b.            | 58.24             | 208.79                  | 189.00       | 252.00                                | 0.00        | 441.00                    | 0.00                          |
| 24      | Amaravathi            | 10.04             | 66.68                   | 20.88        | 30.91                                 | 159.86      | 51.79                     | 0.00                          |
| 25      | Amaravathi s.b.r.area | 89.03             | 336.11                  | 185.12       | 274.09                                | 0.00        | 459.21                    | 0.00                          |
| Total A | Amaravathi s.b.       | 99.07             | 402.79                  | 206.00       | 305.00                                | 159.86      | 511.00                    | 0.00                          |
| 26      | Tirumanimuttar s.b.   | 418.46            | 2728.5                  | 370.00       | 530.00                                | 0.00        | 900.00                    | 0.00                          |
| 27      | Ponnai Ar s.b.        | 26.44             | 693                     | 113.00       | 155.00                                | 0.00        | 268.00                    | 0.00                          |
| 28      | Upper Coleroon s.b.   | 45.02             | 578.7                   | 90.00        | 130.00                                | 0.00        | 220.00                    | 0.00                          |
| 29      | Lower Coleroon s.b.   | 10.97             | 536.00                  | 63.00        | 83.00                                 | 0.00        | 146.00                    | 0.00                          |
| 30      | Cauvery Delta s.b.    | 294.71            | 3475.00                 | 349.00       | 461.00                                | 0.00        | 810.00                    | 0.00                          |

Table 6.8.1: Daily Dietary Allowances

|                | Requiremen | t of male | Requirement | of female |
|----------------|------------|-----------|-------------|-----------|
| Age group      | Proteins   | Calories  | Proteins    | Calories  |
| (1)            | (2)        | (3)       | (4)         | (5)       |
| 0 to 9 years   | 42.00      | 1500      | 42.00       | 1500      |
| 10 to 19 years | 83.33      | 2600      | 73.33       | 2133      |
| 20 to 39 years | 65.00      | 3000      | 60.00       | 2200      |
| 40 to 59 years | 65.00      | 2800      | 60.00       | 2100      |
| Above 60 years | 65.00      | 2500      | 60.00       | 2000      |

The agricultural population projected for year 2050 in the command of major reservoirs in Cauvery River Basin is presented in Table 6.9.2 as below.

Table 6.8.2: Agricultural Population in the Command of Major Reservoirs in Cauvery River Basin

| Sl. No. | Name of reservoir | CCA (Ha) | Agricultural Population (Nos.) |
|---------|-------------------|----------|--------------------------------|
| (1)     | (2)               | (3)      | (4)                            |
| 1       | Hemavathi         | 265079   | 993907                         |
| 2       | Yagachi           | 21450    | 80445                          |
| 3       | Harangi           | 53,538   | 200739                         |
| 4       | KRS               | 1,13,603 | 425951                         |
| 5       | Cauvery           | 44,500   | 151854                         |
| 6       | Kabini            | 45,730   | 549034                         |
| 7       | Sagar Doddakere   | 1,700    | 126375                         |
| 8       | Taraka            | 19,300   | 270135                         |
| 9       | Nugu              | 10,526   | 485882                         |
| 10      | Mananthyadi       | 22,50    | 270135                         |
| 11      | Banasursagar      | 9,200    | 126375                         |
| 12      | Upper Nugu dam    | 40,470   | 20410                          |
| 13      | Mettur            | 18212    | 693044                         |
| 14      | Lower Bhavani     | 95,175   | 1426764                        |
| 15      | Amaravathi        | 10,118   | 1827334                        |

The population projection in terms of age group and sex as obtained from the population projection for India, 1981-2001 and shown in Table 6.8.3 is used for the present analysis.

Table 6.8.3: Population Projection in India in Terms of Age Group and Sex

| Age group      | Male (%) | Female (%)    |
|----------------|----------|---------------|
| (1)            | (2)      | (3)           |
|                | 100      | 100           |
| 0 to9 years    | 21.42    | 21.44         |
| 10 to 19 years | 20.23    | 20.20         |
| 20 to 39 years | 33.16    | <b>3</b> 2.51 |
| 40 to 59 years | 17.69    | 18.48         |
| Above 60 years | 7.50     | 7.37          |

The average per day requirement of Proteins and calories for males and females are worked out separately by using the weighted average method. The male female ratio is used to obtain the weighted average of protein and calorie requirement on a per capita per day basis. The male female ratio of 931 females per 1000 males for Cauvery river basin gives a percentage of 53.45% males and 46.55% females. The computations for obtaining per capita per day requirement of calorie and protein are shown below:

### A) Calorie requirement

(i) Weighted average of calorie requirement for males

= 2524.90 calorie units

(ii) Weighted average of calorie requirement for females

The combined weighted average calorie requirement per capita per day for the whole population shall be

- B) Protein requirement
  - (i) Weighted average of protein requirement for males

(i) Weighted average of protein requirement for females

The combined weighted average calorie requirement per capita per day for the whole population shall be:

$$= [(53.45 * 63.78) + (46.55 * 58.33)] / 100$$

The calculations done for all the remaining projects being similar except for minor difference in the male female ratio (number of females per 1000 males), are not shown here.

Crop produce requirement per capita per day:

The protein and calorie content of different crops as obtained from Ghei and Ghei (1973) and Thaper (1981) are shown in Table 6.8.4.

Table 6.8.4: Protein and Calorie Content of Different Crops

| Crop           | Proteins (Grams/Kilogram) | Calories (Units/Kilograms) |
|----------------|---------------------------|----------------------------|
| (1)            | (2)                       | (3)                        |
| Paddy          | 75                        | 3460                       |
| Maize (HY)     | 111                       | 3420                       |
| Jowar (HY)     | 104                       | 3490                       |
| Soyabeen       | 432                       | 4320                       |
| Red Gram       | 223                       | 3350                       |
| B Gram         | 240                       | 3470                       |
| Vegetables (K) | 40                        | 800                        |
| Wheat          | 121                       | 3410                       |
| Gram           | 121                       | 3600                       |
| Linseed (Alsi) | 203                       | 5300                       |
| Peas           | 197                       | 3150                       |
| Ground nut     | 315                       | 5610                       |
| Vegetables (R) | 40                        | 800                        |

Table 6.8.5(a): Per Capita per Day Crop Produce to Satisfy the Nutritional Requirements for the Population in the Command of Major Projects

| Сгор       | Crop produce required (Kg per capita per day) | Protein<br>content of<br>crop<br>(Grams/Kg) | Calorie<br>content of<br>crop<br>(Units/Kg) | Proteins (per<br>capita per<br>day) Grams) | Calories (per capita per day) (Units) |
|------------|-----------------------------------------------|---------------------------------------------|---------------------------------------------|--------------------------------------------|---------------------------------------|
| (1)        | (2)                                           | (3)                                         | (4)                                         | (5)                                        | (6)                                   |
| Paddy      | 0.15                                          | 75                                          | 3460                                        | 11.25                                      | 519                                   |
| Jowar/Ragi | 0.075                                         | 104                                         | 3420                                        | 7.8                                        | 256.5                                 |
| Groundnut  | 0.06                                          | 315                                         | 5610                                        | 18.9                                       | 336.6                                 |
| Vegetables | 0.25                                          | 40                                          | 800                                         | 10                                         | 200                                   |
| Wheat      | 0.095                                         | 121                                         | 3410                                        | 11.495                                     | 323.95                                |
| Gram       | 0.12                                          | 121                                         | 3600                                        | 14.52                                      | 432                                   |
| Peas       | 0.25                                          | 40                                          | 800                                         | 10                                         | 200                                   |
|            |                                               |                                             | Total                                       | 101.37                                     | 2686.5                                |

The cropping patterns suggested by NWDA are considered, and taking into account the average food habits of people, the per capita per day crop produce for each food crop is decided so as to fulfill the per capita per day nutritional requirement (proteins and calories) of the population. The calculations are shown in Table 6.8.5(a). The calculated per capita per day requirements of crops should give a higher per capita per day nutritional (protein and calorie) content than the per capita per day nutritional requirement obtained as per the daily dietary allowances. Computation of crop production to meet the minimum food requirement of agricultural population is given in Table 6.8.5(b).

### 6.8.3 Water Requirements to Meet the Minimum Food Requirements

The average yield of crops per unit area (hectare) is obtained from the data available in the Agricultural Statistics by Narmada Planning group (1989). As Narmada river basin being near to Cauvery river basin the easily available data is used. The crop coefficients (depicting the proportion of crop produce to the yield of crop) are considered for crops such as paddy and groundnut to decide the crop produce (on an average one quintal of paddy gives 66.0 Kilograms of milled rice, and one quintal of groundnut gives 70Kilograms of groundnut seed). The area of a crop to be brought under cultivation for meeting the crop produce requirement of each crop is worked out on an annual basis for the agricultural population in the command of each major reservoir. The average field water requirements (depth in m) of individual crops in the respective sub-basins are used to work out the annual water requirement for each crop. The summation of all the crops gives the annual field water requirements sufficient to fulfill the minimum food requirements of the agricultural population in the command area of each major reservoir. The computed values are shown in Table 6.8.6.

Table 6.8.5(b): Computation of Crop Production to Meet the Minimum Food Requirement of Agricultural Population

|               |                |                   |                | Upper Cauvery Sub-basin          | rry Sub-basin  |                  |                |                  |
|---------------|----------------|-------------------|----------------|----------------------------------|----------------|------------------|----------------|------------------|
| Name          | (1) He         | (1) Hemavathi     | (2) Y          | Yagachi                          | 1 (E)          | (3) Harangi      | (4)            | (4) KRS          |
| of            | Crop area to   | Crop production   | Crop area to   | Crop production                  | Crop area to   | Crop production  | Crop area to   | Crop production  |
| crop          | meet min. food | to meet min.      | meet min. food | to meet min.                     | meet min. food | to meet min.     | meet min. food | to meet min.     |
|               | requirement    | food requirement  | rcquirement    | food requirement                 | requirement    | food requirement | requirement    | food requirement |
|               | Ha             | Quintals          | Ha             | Quintals                         | Ha             | Quintals         | Ha             | Quintals         |
| (1)           | (2)            | (3)               | (4)            | (5)                              | (9)            | (J)              | (8)            | (6)              |
| kh. Paddy     | 281.7          | 1491              | 22.8           | 121                              | 56.9           | 301              | 120.7          | 639              |
| kh. Jowar     | 93.4           | 745               | 7.6            | 09                               | 18.9           | 151              | 40.0           | 319              |
| kh.Ragi       | 200.2          | 745               | 16.2           | 09                               | 40.4           | 151              | 85.8           | 319              |
| Total         |                | 2982              |                | 241                              |                | 602              |                | 1278             |
| Pulses        | 90.4           | 298               | 7.3            | 24                               | 18.2           | 09               | 38.7           | 128              |
| Fruits & veg. | 24.8           | 2485              | 2.0            | 201                              | 5.0            | 502              | 10.6           | 5901             |
| Ground mut    | 1.091          | 596               | 13.0           | 48                               | 32.3           | 120              | 9.89           | 256              |
|               |                |                   |                | Kabini Sub-basin                 | ub-basin       |                  |                |                  |
| Nome          | (6) Banz       | (6) Banasurasagar | (7) Man        | lananthvady                      |                | (8) Kabini       | (6)            | (9) Taraka       |
| crop          | Crop area to   | Crop production   | Crop area to   | Crop production                  | Crop area to   | Crop production  | Crop area to   | Crop production  |
| <u>.</u>      | meet min. food | to meet min.      | meet min. food | <ul> <li>to meet min.</li> </ul> | meet min. food | to meet min.     | meet min. food | to meet min.     |
|               | requirement    | food requirement  | requirement    | food requirement                 | requirement    | food requirement | requirement    | food requirement |
|               | Ha             | Quintals          | Ha             | Quintals                         | Ha             | Quintals         | Ha             | Quintals         |
| (1)           | (2)            | (3)               | (4)            | (5)                              | (9)            | ( <i>L</i> )     | (8)            | (6)              |
| kh.Paddy      | 35.81          | 190               | 76.55          | 405                              | 155.59         | 824              | 33             | 174              |
| kh.Jowar      | 11.88          | 95                | 25.39          | 203                              | 99.15          | 412              | 22             | 174              |
| kh.Ragi       | 25.45          | 95                | 54.40          | 203                              | 110.57         | 412              | 19             | 70               |
|               |                | 379               |                | 810                              | C Yr D         | 1647             | 21             | 417              |
| Pulses        | 11.49          | 38                | 24.56          | 81                               | 49.91          | 165              | 1              | ν <sub>0</sub>   |
|               |                |                   | 7              |                                  |                |                  | 0              |                  |
| Ground nut    | 20.36          | 76                | 43.52          | 162                              | 88.46          | 329              |                | 0                |
| Fruits & veg. | 3.16           | 316               | 6.75           | 675                              | 13.73          | 1373             | 1.39           | 139              |

Table 6.8.5(b) (Contd....)

|               | (10) Sage      | (10) Sagerdoddakere | (11) up        | upper Nugu       | (12)           | (12) Nugu        | (5) C          | (5) Cauvery      |
|---------------|----------------|---------------------|----------------|------------------|----------------|------------------|----------------|------------------|
| Name of       | Crop area to   | Crop production     | Crop area to   | Crop production  | Crop area to   | Crop production  | Crop area to   | Crop production  |
| crop          | meet min. food |                     | meet min. food |                  | meet min. food | to meet min.     | meet min. food | to meet min.     |
|               | requirement    | food requirement    | requirement    | food requirement | requirement    | food requirement | requirement    | food requirement |
|               | Ha             | Quintals            | Ha             | Quintals         | Ha             | Quintals         | Ha             | Quintals         |
| (1)           | (2)            | (3)                 | (4)            | (5)              | (9)            | (7)              | (8)            | (6)              |
| kh. Paddy     | 31.30          | 991                 | 5.78           | 31               | 137.70         | 729              | 43.0           | 228              |
| kh.Jowar      | 10.38          | 83                  | 1.92           | 15               | 45.67          | 364              | 14.3           | 114              |
| kh.Ragi       | 22.25          | 83                  | 4.11           | . 15             | 97.85          | 364              | 30.6           | 114              |
|               |                | 331                 |                | · 19             |                | 1458             |                | 456              |
| Pulses        | 10.04          | 33                  | 1.86           | 9                | 44.17          | 146              | 13.8           | 46               |
|               |                |                     |                |                  |                |                  | 0              |                  |
| Ground nut    | 17.80          | 99                  | 3.29           | 12               | 78.28          | 292              | 3.8            | 380              |
| Fruits & veg. | 2.76           | 276                 | 0.51           | 51               | 12.15          | 1215             | 24.5           | 91               |
|               |                |                     |                |                  |                |                  |                |                  |

|               | (13)           | Mettur           | (14) E       | (14) Bhavani     | (15)An         | (15)Amaravathi               |
|---------------|----------------|------------------|--------------|------------------|----------------|------------------------------|
| Name of       | Crop area to   | Crop production  | Crop area to | Crop production  | Crop area to   | Crop area to Crop production |
| crop          | meet min. food | to meet min.     | _            | to meet min.     | meet min. food | to meet min.                 |
| ,             | requirement    | food requirement | requirement  | food requirement | requirement    | food requirement             |
|               | Ha             | Quintals         | Ha           | Quintals         | - Ha           | Quintals                     |
| (1)           | (2)            | (3)              | (4)          | (5)              | (9)            | (1)                          |
| kh.Paddy      | 196.4          | 1040             | 404.3        | 2140             | 517.9          | 2741                         |
| kh.Jowar      | 65.1           | 520              | 134.1        | 1070             | 171.7          | 1371                         |
| kh Ragi       | 139.6          | 520              | 287.3        | 1070             | 368.0          | 1371                         |
|               |                | 2079             |              | 4280             |                | 5482                         |
| Pulses        | 63.0           | 208              | 129.7        | 428              | 166.1          | 548                          |
| Ground nut    | 17.3           | 1733             | 35.7         | 3567             | 45.7           | 4568                         |
| Fruits & vcg. | 7.111          | 416              | 229.9        | 856              | 294.4          | 1096                         |

Table 6.8.6: Crop Produce, Yields and Crop Water Requirements

|                     | Name of       | Crop produce     | Yield of    | Field water |
|---------------------|---------------|------------------|-------------|-------------|
|                     |               | required Qtl per | çrop        | Requirement |
|                     | Crop          | Capita per day   | (Qtl. / ha) | of crop (m) |
| 1                   | 2             | 3                | 4           | 5           |
| Cereals             | Kharif Paddy  | 0.0015           | 5.293       | 0.482       |
|                     | Kharif Jowar  | 0.00075          | 7.980       | 0.152       |
|                     | Kharif Ragi   | 0.00075          | 3.724       | 0.152       |
| Pulses              | Pulses        | 0.00030          | 3.300       | 0.306       |
| Oil seed            | Ground nut    | 0.00060          | 3.724       | 0.102       |
| Fruits & vegetables | Fruits & veg. | 0.00250          | 100         | 0.761       |



### COMPUTATION AND RESULTS OF LINEAR PROGRAMMING MODEL

### 7.1 GENERAL

A linear programming model for Cauvery river basin has been developed in Chapter 5. This model has constraints based on continuity equation of reservoir sites, total release from the reservoir, projectwise and sub-basinwise irrigation, domestic water supply for rural human population, live stock and urban population from surface and ground water, industrial use, hydropower, and environmental use, exports and imports from irrigation projects, regeneration from irrigation, domestic and industrial water use, availability of surface and ground water, land use and crop water requirements, hydro electric energy and some design constraints according to the interim award of Cauvery Water Dispute Tribunal (CWDT), about the water sharing among the co-basin states, i.e., Karnataka, Kerala, Tamilnadu and Pondicherry. The characteristics of the Cauvery river system and interim award of CWDT, under taken for this study and the data required for this purpose are given in Chapter 3.

The data such as inflows to reservoirs and sub-basins, capacities of reservoirs and canals, monthly water requirements and time period for each crop, projectwise cultivable command area (CCA), percentage CCA of each crop for each project and each sub-basin, availability of surface water were collected from various technical reports of National Water Development Agency (NWDA), New Delhi, a autonomous body under the Ministry of Water Resources, Government of India as given in the list

of references and the data about ground water availability was collected from the report of Ground Water Resources of India (1995), published by Central Ground Water Board, under the Ministry of Water Resources, Government of India, Faridabad. Some additional constraints were added in the model, in terms of sharing of river water and limiting its use under numerous techno-economic and management constraints pertaining to CWDT, and the detailed modeling of many more site specific hydrological/physical constraints of the problem. In addition certain data have been computed from available information in Chapter-6. It includes the computation of various coefficients such as reservoir evaporation coefficients, computation of percent annual water use for irrigation and water supply from each site and sub-basin, monthly percent of export and imports for each project and sub-basin, estimation of flows of various annual water year dependabilities and computation of ground water availability for each project and sub-basin from the district wise ground water data available from publication, ground water resources of India published by Central Ground Water Board (CGWB) under the Ministry of Water Resources, Government of India, Faridabad, (1995).

The mathematical formulation of linear programming model has 3650 constraints. Out of these 3578 are equalities, 60 are of less than or equal to type, and 12 are greater than or equal to type. The number of unknown decision variables are 1000 which includes variables relating to crop area, reservoir storage, reservoir releases and spills, diversion of water for irrigation and water supply, capacity of reservoirs, upstream and downstream annual irrigation and water supply, ground water use. Models of many practical problems under investigation in water resources development programmes may be generally solved on personal computers using

simplex-based algorithms.

In this research work the readily available LINDO package of 6.1 version released in August 2001, by LINDO Systems, Inc. 1415 North Dayton St. Chicago, IL, USA, having the maximum capacity of 4000 constraints and 8000 variables with 100 integer variables and 2000000 non zeros, was used to solve the LP model problem, as there are many constraints and variables to handle such a big problem.

#### 7.2 COMPUTATION OF LP MODEL

The computations were carried out for various water year dependable flows representing a normal, dry and wet years. These were calculated using flow-duration analysis of annual (water year) flows. These were: (i) 75% water year dependable flow representing a water year for water sharing under normal condition as per the interim award of Cauvery Water Dispute Tribunal (CWDT), (ii) 90% water year dependable flow representing a water deficit year, (iii) 100% water year dependable flow resenting a critical water deficit year, and (iv) 50% water year dependable flow representing a water surplus year. The model constraints were written for NT = 12 months because the computations were done over one year interval only.

In the LP model, constraints were written only for one year. Computation of LP model has been done on the basis of monthly flows, using 50%, 75%, 90% and 100% water year dependable flows. The reservoir storage at the end of year (June to May) was taken to be same as at the beginning of the same year, i.e.,  $S_{i, 12} = S_{i, 0}$ , assuming no over the year carry over storages in reservoirs. The return flows from irrigation and water supply and industrial water uses were taken as 10% to 20%, 80% and 80% respectively, as per norms of NWDA.

All the values of  $I_{i,t}$ ,  $P_{i,t}$  and  $O_{i,j,t}^{m}$  in equation (3) were taken as zero. Based on the CWDT some additional constraints on various design variables were added in terms of either upper bounds or limiting their values. In this chapter, we briefly review as to how far we have succeeded in this effort, i.e., an attempt made to add additional constraints in the model as per the CWDT award and analyzing the results by applying the LP model developed in Chapter 5 to Cauvery river basin.

As the first objective function of the problem is for, maximization of annual water utilization for irrigation, water supply, industrial, hydropower and environmental uses from surface water and ground water, the model was first run for 75% water year dependable flow. The model was run for each project in parallel separately, without consideration of the contribution from the upstream project within a sub-basin, and then it was combined at a sub-basin level with consideration of the contribution of inflows from the projects in series and for remaining area.

In the Upper Cauvery sub-basin, there are five irrigation projects, in Kabini sub-basin, there are seven irrigation projects and in Chinnar, Bhavani and Amaravathi sub-basins there is one project in each sub-basin. In other sub-basins there are no major irrigation projects. For such sub-basin, having no major irrigation project, the LP model is run as a single model for that sub-basin as a whole at the end point of the sub-basin. Then combining all the models for each sub-basin, a single model for Cauvery river basin as a whole is obtained with consideration of the sub-basins in parallel or in series for contribution of inflows from upper irrigation projects and the upper sub-basins in series.

The computational methodology for LP model run for the whole Cauvery river system is explained below, with a simple example of Upper Cauvery sub-basin with details of what exactly is the configuration for which LP model is run. The input data where exact possible mentioning the notations used in LP model is given in Chapter 6. The list of output decision variables, resulting from model are given in Table 6.6.2.

The methodology adopted while running the LP model at a project level, a sub-asin level and Cauvery basin as a whole level as follows:

- 1. Select the upper most sub-basin, i.e., Upper Cauvery in the Cauvery basin.
- Analyze each major reservoir one-by-one in Upper Cauvery sub-basin Fig.3.3.1, as follows:
  - (a) Analyze Yagachi as an independent reservoir.
  - (b) (i) Analyze downstream Hemavathi as an independent reservoir without any regulated contribution from upstream Yagachi reservoir.
    - (ii) Analyze downstream Hemavathi reservoir in series with upstream Yagachi reservoir with regulated contribution Yagachi.
  - (c) Analyze Harangi as an independent reservoir.
  - (d) Analyze Cauvery as an independent reservoir.
  - (e) (i) Analyze downstream KRS as an independent reservoir without any regulated contribution from upstream reservoirs mentioned as above.
    - (ii) Analyze downstream KRS in series with upstream reservoirs with regulated contributions from upstream Hemavathi, Harangi and Cauvery reservoirs. Thus analyzing the entire Upper Cauvery sub-basin as as an one entity.
- (3) Like in step-2, all the sub-basins having major reservoirs are first analyzed as individual sub-basins.
- (4) Whole sub-basin not having any major reservoir is analyzed assuming that all the water is being utilized at the end of the sub-basin.
- (5) Lastly, all the 16 sub-basins are combined together and the entire Cauvery basin is analyzed as a whole gasin wide would sun was made fer entire Cauvery basin.

  According to the interim award of Cauvery Water Dispute Tribunal (CWDT).

205 TMC ft (5800 MCM) of water is to be released to Tamilnadu state at Mettur, the 13<sup>th</sup> reservoir in the 8<sup>th</sup> sub-basin from the upstream reservoirs in Karnataka state, and its monthwise releases are also maintained in the interim award. Firstly, to run the

model the annual export of water from Mettur was taken, equal to the CWDT value of 5800 MCM through Mettur reservoir and monthly exports were taken as per the monthly quantities maintained in CWDT. Then the model was run by changing the export quantities from Mettur to the sub-basins below Metter as less than and greater than the 5800 MCM, to check the effect on upstream and downstream irrigation and water supply in the sub-basins above and below of Mettur reservoir. The export quantities taken for running the model were 4200MCM, 6200 MCM and the highest maximum possible values for various dependabilities flows were found out as 6700 MCM, 6900MCM, 7200 MCM and 7800 MCM in case of 100%, 90%, 75% and 50% water year dependable flows, respectively. Hence the upper bound or limiting the values of monthly releases were taken in the proportion of the monthly quantities of export maintained in CWDT. These include upper bound and equal values on monthly irrigation diversions through Mettur, equal to bounds on capacities of reservoirs and canals, and mixed bounds on ground water availability and uses, annual downstream and upstream irrigation, domestic (rural, urban and live stock population water requirements) and industrial water uses, exports. Then the model was run on the basis of monthly flows, of 50%, 90% and 100% water year dependabilities. The results of LP model for Cauvery river basin for 75%, 50%, 90%, and 100% water year dependable flows are presented in this chapter. While running the LP model for Cauvery river basin, the following points are observed and the steps taken while running the model AS UR LEGAM are given as below.

### 7.2.1 Sample Computational Steps (for Kabini Sub-Basin)

The following steps are taken while running the model for Kabini sub-basin with all major projects and remaining area for improvements of objective function values so as to make the system efficient for irrigation and water supply use

Step (1): The locations of medium irrigation schemes in the catchments area of major projects are available but the details of locations for minor irrigation schemes in the

catchment area of major projects are not available hence the utilization of minor irrigation schemes was distributed on the proportion of catchment area basis of the major projects.

But the model results were not satisfactory in the sense that the system targets met were much away from the plan proposals. Hence the minor irrigation utilization of the sub-basin was redistributed as per the state wise utilization of minor irrigation schemes data available in NWDA reports of Cauvery basin, in the proportion of catchment areas of the respective state wise projects.

Step (2): (a) The inflow data for the major projects were taken from the salient features of the respective major projects, as per the yield availability data at the time of preparation of project reports by the respective state governments and was distributed in the proportion of monthly inflows of water balance studies of sub-basin with and without ground water, but the total sum of individual projects was not tallying to the total water available in water balance studies of the sub-basin.

Step (2): (b) Then the rainfall data is taken from the nearest rain-gauge stations of the respective major projects of 75% water year dependable flow and multiplied by the catchment area of the respective projects for getting the monthwise run-off or monthwise inflows available at the respective major projects. The data was taken from the basic data booklet of the Kabini sub-basin prepared by NWDA.

Inflows for the remaining area is kept equal to the water demands of urban and industrial water requirements for remaining area and balance inflows (i.e. in flow calculated in step 2(a)- Urban and industrial water requirements) from the remaining area is distributed to upstream major projects in the proportion of the catchment areas of the upstream major projects and added to flows in step 2(a)

Step (3): Initially satisfactory results were not obtained as the model was utilizing water for irrigation, only from ground water and not from surface water. Further modifications were made while running the model was that the spills for Banasursagar project were kept equal to zero for each month in Banasursagar project. Then the results were improved.

Case (1): The proposed export quantity of 495.50 MCM was reduced to 400 MCM from the ongoing Manathvady multipurpose project to get a feasible solution from the model.

Case (2): Flow pattern was changed and was taken as per the average month wise inflows of Manathvady and Banasursagar, keeping the annual rainfall values the same.

Case (3): Number of trials were made while running the model by changing the storage capacities of Nugu and Sagar Doddakere project for various alternatives but values of the objective functions were not improved hence,

Case (4): Further modification for model was made by increasing the storage capacity of Kabini project-I from the existing storage capacity of 453 MCM to 610 MCM, the value of objective function was increased from 1464.27 MCM to 1683.60 MCM, with a very good and satisfactory results for utilization of water for irrigation and water supply from all the major projects in the Kabini sub-basin. But for final results of the model the capacity of the Kabini project is kept as per its designed capacity and the final results of the LP model are obtained and presented in this chapter.

### Assumptions:

The following observations were found while running the optimization LP model for the Cauvery river basin.

- (1) The changes were done while running the model that the exports from the various major irrigation project / sub-basins were taken in the proportion of monthly irrigation requirements of the importing sub-basins instead of exports in the monthly water availability in the exporting sub-basins
- (2) The main Cauvery river bifurcates at Grand anicut into Upper Coleroon and Cauvery Delta, the total discharge of river is considered as 60% and 40% to Cauvery delta and Upper Coleroon sub-basins respectively.
- (3) Model was checked by running as per the monthly releases as per the interim award of Cauvery Water Dispute Tribunal and it also was checked for the

values greater than and less than the values of tribunal award and it was also observed that what is the effect on upstream and downstream of the Mettur dam, to fulfill the various requirements of irrigation and water supply to the subbasins below Mettur reservoir.

- (4) The environmental requirements were considered as 1% of the monthly inflows in the sub-basins and regeneration from irrigation was considered as 10% to 20% as per age consideration of the dams, of net irrigation requirements at field level and 80% from domestic and industrial water requirements.
- (5) Ground water utilization was considered as 100% and the available ground water was calculated from data collected from the Central Ground Water Board (CGWB), Faridabad, India. It was calculated in proportionate area basis of the districts in the catchments of each sub-basin.
- (6) For 75% water year dependable flows, the monthly distribution of export from Mettur for 4200 MCM annual value was take as less than or equal to the monthly values of tribunal award but in the results the values in the month of June, January, February and April were taking equal to zero hence 4200 MCM value was distributed in the proportion of, the values of monthly releases as per interim award of Cauvery Water Dispute Tribunal's Award (CWDT).
- (7) For 75% water year yield for 4200 MCM, 5800 MCM, 6200 MCM and 7200 MCM export from Mettur to the sub-basins below Mettur reservoir, in the proportion of, the values of monthly releases as per interim award of Cauvery Water Dispute Tribunal's Award (CWDT).
- (8) Changes observed in the values of utilization in case of 7200 MCM:
- (a) Above Mettur: In case of Nugu reservoir down stream irrigation changes from 137 to 440 MCM.
  - (b) Below Mettur: In case of Noyil sub-basin utilization for irrigation is equal to zero.

The results obtained by running the LP model for Cauvery basin as a whole with 50%, 75%, 90% and 100% water year dependable flows with various export quantities of 4200 MCM, 5800 MCM, 6200 MCM, 6700 MCM, 6900 MCM and 7200 MCM, are presented in Tables 7.1.1 to 7.1.4, respectively.

### 7.3 RESULTS OF LP MODEL FOR 75% WATER YEAR DEPENDABLE FLOW (A NORMAL YEAR) (FOR MAXIMIZATION OF WATER UTILIZATION)

Based on the steps as given in Section 7.2.1, the model was first run by using 75% water year dependable flow. The results of LP model for Cauvery river basin as a whole are presented in Tables 7.1.1(a) to 7.1.1(d). The results of LP model for the values of other design variables and exporting quantity of 4200 MCM, 5800 MCM, 6200 MCM, and 7200 MCM, from Mettur reservoir to the downstream sub-basins below Mettur reservoir, respectively, are presented in Tables 7.1.1(a), 7.1.1(b), 7.1.1(c), and 7.1.1(d). As per the NWDA reports, the maximum designed exports from Mettur reservoir to the sub-basins below the Mettur reservoir and out side of Cauvery basin is found 12712 MCM. But as per LP model, the maximum possible quantity of exports from Mettur to the downstream sub-basins and out of basin, at 75% water year dependable flow was found equal to 7200 MCM. As per NWDA the export value from the Mettur reservoir is given as 12712 MCM, while from the results of LP model the maximum export of 7200 MCM only is possible. The final combined results all the 16 cases of model running with 75%, 90%, 100% and 50% water year dependable flows with 7200 MCM, 6200 MCM, 4200 MCM, and 7800 MCM exports from Mettur reservoir are presented in Table 7.1.5(a) to Table 7.1.5(c).

## 7.4 RESULTS OF LP MODEL FOR 90% WATER YEAR DEPENDABLE FLOW (A WATER DEFICIT YEAR) (FOR MAXIMIZATION OF WATER UTILIZATION)

The model was run for Cauvery river basin for 90% water year dependable flow. The results are presented in Tables 7.1.2(a) to 7.1.2(d). The Tables 7.1.2(a),

7.1.2(b), 7.1.2(c), and 7.1.2(d) for the values of other design variables and exporting quantity of 4200 MCM, 5800 MCM, 6200 MCM, and 6900 MCM from Mettur reservoir to the sub-basins below Mettur reservoir, respectively. As per the NWDA reports, the maximum designed exports from Mettur reservoir to the sub-basins below the Mettur reservoir and out side of Cauvery basin is found 12712 MCM. But as per LP model, the maximum possible quantity of exports from Mettur to the downstream sub-basins and out of basin, at 90% water year dependable flow was found equal to 6900 MCM. The final combined results all the 16 cases of model running with 75%, 90%, 100% and 50% water year dependable flows with 7200 MCM, 6200 MCM, 4200 MCM, and 7800 MCM exports from Mettur reservoir are presented in Table 7.1.5(a) to Table 7.1.5(c).

# 7.5 RESULTS OF LP MODEL FOR 100% WATER YEAR DEPENDABLE FLOW (A CRITICAL WATER DEFICIT YEAR) (FOR MAXIMIZATION OF WATER UTILIZATION)

The model was run for the Cauvery river basin using 100% water year dependable flow. The results are presented in Tables 7.1.3(a) to 7.1.3(d). The Tables 7.1.3(a), 7.1.3(b), 7.1.3(c), and 7.1.3(d) for the values of other design variables and exporting quantity of 4200 MCM, 5800 MCM, 6200 MCM, and 6700 MCM from Mettur reservoir to the downstream sub-basins below Mettur reservoir respectively. As per the NWDA reports, the maximum designed exports from Mettur reservoir to the sub-basins below the Mettur reservoir and out side of Cauvery river basin was found 12712 MCM. But as per LP model, the maximum possible quantity of exports from Mettur to the downstream sub-basins and out of basin, at 100% water year dependable flow was found equal to 6700 MCM. The final combined results all the 16 cases of

model running with 75%, 90%, 100% and 50% water year dependable flows with 7200 MCM, 6200 MCM, 4200 MCM, and 7800 MCM exports from Mettur reservoir are presented in Table 7.1.5(a) to Table 7.1.5(c).

### COMPUTATION 7.6 OF LP MODEL FOR 50% WATER YEAR **DEPENDABLE FLOW SURPLUS** YEAR) (FOR WATER MAXIMIZATION OF WATER UTILIZATION)

The model was run for the Cauvery river basin for 50% water year dependable flow. The results are presented in Tables 7.1.4(a) to 7.1.4(d). The Tables 7.1.4(a), 7.1.4(b), 7.1.4(c), and 7.1.4(d) for the values of other design variables and exporting quantity of 4200 MCM, 5800 MCM, 6200 MCM, and 7800 MCM from Mettur reservoir to the sub-basins below Mettur reservoir, respectively. As per the NWDA reports, the maximum designed exports from Mettur reservoir to the sub-basins below the Mettur reservoir and out side of Cauvery basin was found 12712 MCM. But as per LP model, the maximum possible quantity of exports from Mettur to the downstream sub-basins and out of basin, at 50% water year dependable flow was found equal to 7800 MCM. The final combined results all the 16 cases of model running with 75%, 90%, 100% and 50% water year dependable flows with 7200 MCM, 6200 MCM, 4200 MCM, and 7800 MCM exports from Mettur reservoir are presented in Table 7.1.5(a) to Table 7.1.5(c).

### 7.7 COMPUTATION OF LP MODEL RESULTS WITH CROP CONSIDERATIONS

The LP model was run for the objective functions given by equations 5.2.1-II, 5.2.2, 5.2.3 and 5.2.4, with crops being considered as the decision variables in the model, and the results were obtained for all the objectives for analysis, only for the

75% annual dependable flow. The model runs were made at the individual project/site level, i.e., for all the 15 major projects in the Cauvery river system. The surface water contribution as diversions for irrigation from a reservoir, were made available from the LP model results in Section 7.3. Similarly, the ground water contributions towards irrigation were also obtained from the results in Section 7.3. The model was run for monthly time periods on an annual basis. The results are given in Tables 7.2.1 to 7.2.16.

### 7.8 HYDROPOWER COMPUTATION

The efficiency for energy generation is assumed to be 85% with a hydropower plant factor of 0.6 for all periods in a year. The values of heads for energy generation are computed externally by independent computer programs using the storage elevation curve for each of the multipurpose hydropower reservoirs (i.e., Kabini, Banasurasagar, Mananthvady and Mettur). At variable head sites, average storage head was determined by trial and error.

The nonlinear constraint equation 5.3.11.1 was linearized by assuming an effective head and comparing it with the head specified in the model solution. The values of productive heads are to be substituted externally into the model and are varied after obtaining the solution because of the nonlinear nature of the hydropower generation equation. The parameters used in hydropower energy computations are given in Table 7.3.1. The process was repeated till the reservoir storages obtained are equivalent to the values of heads and the annual system hydropower values get stabilized. The results are given in Tables 7.3.2 to 7.3.5.

Table 7.1.1(a): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

| Sub-besin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |          |                       |                   |             |            |          |         |         | Exp          | Export From Mettur Reservoir = 4200 MCM | Mettur R          | eservoir   | = 4200 M   | CM         |               |          |         |         |              |        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------|-------------------|-------------|------------|----------|---------|---------|--------------|-----------------------------------------|-------------------|------------|------------|------------|---------------|----------|---------|---------|--------------|--------|
| Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Light   Ligh |          |                       | W S/O             | ater utiliz | ation from | minor an | d mediu | m imgal | ion proje    | cts*                                    | D/s wate          | r utilizat | ion from 1 | najor irng | ation pro     |          | Exports | Wat     | er utilizatı | цo     |
| NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME   NAME    | SI.No.   | Sub-basin/<br>Project | Iu <sup>m,g</sup> | Ium,s       |            |          |         | lu.'.g  | lurs<br>Lurs |                                         | Ws <sub>l,j</sub> |            | WSij       | 85.7       | · <del></del> |          |         | Surface | Ground       | Total  |
| (3)         (4)         (5)         (6)         (7)         (8)         (9)         (11)         (12)         (13)         (14)         (15)         (16)         (17)         (18)         (19)           124         1.24         2.48         3.42         5.9         2.56         18.08         1.08         1.18         1.19         1.18         1.39         2.21         1.44         1.85         1.19         1.14         1.49         2.56         1.24         1.19         1.12         1.44         1.81         1.14         1.49         2.56         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24         1.24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |          |                       | IUMHG             | IUMHS       | 1          | -        |         | -       | IURS         | IUR                                     | MSU               | MSI        | MSD        | IRG        | RS            | RD<br>RD | OE.     |         |              |        |
| 124         124         248         342         59         25.68         18.08         43.76         10.96         16.84         27.8         11.69         71.33         83.02         0         118.43         42.05         13.63         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4         12.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | $\odot$  | (2)                   | (3)               | (4)         | (5)        | (9)      | (2)     | (8)     | (9)          | (10)                                    | (11)              | (12)       | (13)       | (14)       | (15)          | (91)     | (11)    | (81)    | (61)         | (20)   |
| 502         502         10         138         219         9221         148.30         249.4         68.11         112.5         144.41         84.05         128.7         143.4         143.6         139.9         121.2         124.2         28.8         34.2         35.1         148.30         168.4         178.2         218.2         218.2         21.39         356.1         168.4         27.8         29.17         139.0         148.4         188.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2         18.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -        | Yagachi               | 1.24              | 1.24        | 2.48       | 3.42     | 5.9     | 25.68   | 18.08        | 43.76                                   | 10.96             | 16.84      | 27.8       | 11.69      | 71.33         | 83.02    | 0       | 118.45  | 42.03        | 160.48 |
| 1.24         1.24         2.48         3.42         5.9         18.22         21.39         39.61         10.96         16.84         27.8         29.17         21.91         21.94         22.94         22.34         38.91         413.3         0         269.62         32.06         33.61         10.96         16.85         12.92         12.94         22.34         8.51         41.31         31.73         24.94         32.34         35.1         41.31         31.34         33.49         31.34         33.49         33.49         33.49         34.40         32.44         32.34         35.1         31.73         31.73         31.73         31.73         32.44         47.96         37.83         31.73         31.73         32.44         47.96         37.83         31.83         31.83         31.83         31.83         31.83         31.83         31.83         31.83         31.83         31.84         31.84         32.44         32.24         32.34         32.44         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34         32.34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2        | Hemavathi             | 5.02              | 5.02        | 01         | 13.8     | 23.9    | 92.21   | 148.30       | 240.5                                   | 44.34             | 68.11      | 112.5      | 144.41     | 84.26         | 228.7    | 1134    | 1484.03 | 255.5        | 1739.5 |
| 0.625         1.25         1.77         2.97         12.90         9.44         22.34         5.51         8.46         13.97         24.24         389.1         413.14         39.49           1.5.85         1.12         2.12         1.20         9.44         22.34         5.51         13.97         1413.14         39.49         189.5           1.5.85         1.12         2.24         2.24         2.44         4.2         2.09         64.31         6.43         4.85         180         25.08         180           0.51         0.51         1.01         0.71         1.72         1.20         1.76         2.44         4.25         2.09         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.43         6.83         8.23         1.76         9.90         9.90         9.90         9.90         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83         9.83                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |          | Harangi               | 1.24              | 1.24        | 2.48       | 3.42     | 5.9     | 18.22   | 21.39        | 39.61                                   | 10.96             | 16.84      | 27.8       | 29.17.     | 219.2         | 248.4    | 0       | 269.62  | 52.05        | 321.67 |
| 15.85   15.85   31.7   41.6   75.3   130.0   634.21   764.2   139.9   214.9   354.8   0   0   0   1506   2510.87   189.5     24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          | Cauvery               | 0.625             |             |            | 1.72     | 2.97    | 12.90   | 9.44         | 22.34                                   | 15.5              | 8.46       | 13.97      | 24.24      | 389.1         | 413.3    | 0       | 413.14  | 39.49        | 452.63 |
| 24         24         48         66         114         279         831         1110         212         325         537         210         764         973         2640         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4796         4786         4736         4786         4786         4736         4786         4786         4786         4786                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          | KRS                   | 15.85             |             | 31.7       | 43.6     | 75.3    |         | 634.21       | 764.2                                   | 139.9             | 214.9      | . 354.8    | 0          | 0             | 0        | Ι.      | 2510.87 | 189.5        | 2700.3 |
| Act         0.2         0.2         0.4         0.28         0.68         1.52         0.00         1.52         1.76         2.44         4.2         2.09         64.31         66.4         189         257.71         4.09           by         0.51         0.51         1.01         0.71         1.72         7.02         139.65         146.7         446         6.18         10.64         0.00         0.00         0.00         2760         4280         8.235           6.27         6.27         6.27         1.2         7.02         139.65         1.24         7.94         11         18.94         4.89         153         157.9         0         172.82         8.29           Rese         0.06         0.06         1.2         0.06         1.24         7.94         1.1         18.94         4.89         157.9         0         172.82         8.29           Acros         0.06         0.12         0.06         1.24         7.94         1.1         1.89         4.89         157.9         0         172.82         1.05         1.04         1.05         0         0         0         0         0         0         0         0         0         <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Total U  | oper Cauvry s.b.      | 24                |             |            | 99       | 114     | 279     | 831          | 1110                                    | 212               | 325        | 537        | 210        | 764           | 973      | 2640    | 4796    | 578          | 5375   |
| ly         0.51         0.51         1.01         0.71         1.72         7.02         139,65         146         6.18         10.64         0.00         0.00         0.00         276.0         426.80         8.235           Kerc         6.27         6.27         1.2.5         8.79         1.13         88.51         530.40         618.9         55.23         76.56         13.18         6.6         849.4         856         202         1719.86         1102           Rerc         0.09         0.9         1.2         1.26         3.06         1.24         0.00         4.39         1.53         1.57         0         172.82         8.29           1.0         0.05         0.2         1.26         3.06         1.24         7.94         1.1         18.94         4.89         1.53         1.57         0         172.82         8.29           1.0         0.0         0.0         1.24         1.06         0.15         2.36         1.24         1.26         2.72         1.74         4.89         1.57         4.0         1.75         1.74         4.89         1.89         1.80         1.71         8.23         1.31         4.30         1.32         1.32 <td>9</td> <th>Banasursagar</th> <td>0.2</td> <td>0.2</td> <td>0.4</td> <td>0.28</td> <td>89'0</td> <td>1.52</td> <td>0.00</td> <td>1.52</td> <td>1.76</td> <td>2.44</td> <td>4.2</td> <td>2.09</td> <td>64.31</td> <td>66.4</td> <td>189</td> <td>257.71</td> <td>4.09</td> <td>261.8</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 9        | Banasursagar          | 0.2               | 0.2         | 0.4        | 0.28     | 89'0    | 1.52    | 0.00         | 1.52                                    | 1.76              | 2.44       | 4.2        | 2.09       | 64.31         | 66.4     | 189     | 257.71  | 4.09         | 261.8  |
| Kerc         6.27         6.27         12.5         8.79         21.3         8.8.51         530.40         618.9         55.23         76.56         131.8         6.6         849.4         856         202         1719.86         110.2           Kerc         0.09         0.9         1.24         7.94         11         18.94         4.89         153         157.9         0         172.82         8.29           Act         0.0         0.124         7.94         11         18.94         4.89         153         157.9         0         172.82         8.29           Act         0.0         0.124         7.94         11         18.94         4.89         153         157.9         0         172.82         8.29           Act         0.0         0.124         7.94         11         18.94         4.89         153         157.9         0         172.82         8.29           Act         0.1         0.24         0.00         0.15         0.00         0.15         0.00         1.36         1.35         0.33         1.87         1.95         1.96         1.91         1.91         1.92         1.91         1.92         1.14         1.15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 7        | Mananthyady           | 0.51              | 0.51        | 101        | 0.71     | 1.72    | 7.02    | 139.65       | 146.7                                   | 4.46              | 6.18       | 10.64      | 00.0       | 0.00          | 0        | 276.0   | 426.80  | 8.235        | 435.03 |
| Kere         0.6         0.9         1.2         3.06         1.24         0.00         1.24         7.34         1.1         18.94         4.89         153         157.9         0         172.82         8.29           see         0.6         0.6         1.2         3.06         1.24         0.00         4.59         5.31         7.36         12.67         0.93         23.07         24         95         131.34         6.97           1         3.08         6.16         4.34         10.5         4.4.70         82.17         126.9         27.26         37.78         65.04         9.88         430.1         440         29         131.34         6.97           acas         1.132         2.12         0.26         0.15         0.00         0.15         0.98         1.37         2.36         0.98         4.89         1.37         1.87         1.95         1.96         9.98         1.13         1.13         2.26         1.26         0.20         0.15         0.00         0.15         0.00         1.37         2.36         1.37         2.36         1.37         2.36         2.33         1.37         2.36         1.37         2.36         1.37         2.36                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |          | Kabini                | 6.27              | 6.27        | 12.5       | 8.79     | 21.3    | 88.51   | 530.40       | 618.9                                   | 55.23             | 76.56      | 131.8      | 9.9        | 849.4         | 856      | 202     | 1719.86 | 110.2        | 1830   |
| Kere         0.6         0.6         0.6         0.6         0.6         0.6         0.6         0.6         0.8         2.05         4.59         0.00         4.59         5.31         7.36         12.67         0.93         23.07         24         95         131.34         6.97           1         3.08         3.08         6.16         4.34         10.5         4.70         82.17         126.9         27.26         37.78         65.04         9.88         430.1         440         290         870.41         6.50         9.88         430.1         440         290         870.41         6.50         9.88         430.1         440         290         870.41         6.50         9.88         430.1         440         290         870.41         6.50         9.88         430.1         440         290         870.41         6.50         9.89         430.1         6.00         0.15         27.26         9.77         462.25         9.90         137.3         236.4         0.00         0.00         0.00         0.00         137.3         236.4         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |          | Taraka                | 0.0               |             |            | 1.26     | 3.06    | 1.24    | 0.00         | 1.24                                    | 7.94              | =          | 18.94      | 4.89       | 153           | 157.9    | 0       | 172.82  | 8.29         | 181.11 |
| 1.3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         3.08         0.15         0.00         0.15         0.20         0.15         0.00         0.15         0.20         1.35         2.33         1.87         1.95         1.96         0         1.97.48         2.29           area         11.32         21.13         22.6         1.56         38.3         1.34.5         327.77         462.25         99.07         1.37.3         236.4         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>01</td> <th>Sagardoddakere</th> <td>9.0</td> <td></td> <td></td> <td>0.85</td> <td>2.05</td> <td>4.59</td> <td>0.00</td> <td>4.59</td> <td>5.31</td> <td>7.36</td> <td>12.67</td> <td>0.93</td> <td>23.07</td> <td>24</td> <td>95</td> <td>131.34</td> <td>6.97</td> <td>138.31</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 01       | Sagardoddakere        | 9.0               |             |            | 0.85     | 2.05    | 4.59    | 0.00         | 4.59                                    | 5.31              | 7.36       | 12.67      | 0.93       | 23.07         | 24       | 95      | 131.34  | 6.97         | 138.31 |
| area         11.32         11.32         12.2         0.16         0.38         0.15         0.00         0.15         0.98         1.35         2.33         1.87         195         196.9         0         197.48         2.29           area         11.32         11.32         22.6         15.6         13.4         32.777         462.25         99.07         1373         236.4         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | =        | Upper Nagu            | 3.08              |             |            | 4.34     | 10.5    | 44.70   | 82.17        | 126.9                                   | 27.26             | 37.78      | 65.04      | 9.88       | 430.1         | 440      | 290     | 870.41  | 62           | 932.41 |
| 11.32   11.32   22.6   15.6   38.3   134.5   327.77   462.25   99.07   137.3   236.4   0   0   0   99   674.50   161.4     25.3   23   46   32   78   282   1080   1362   202   280   482   26   1715   1741   1151   4451   363     48.5   48.5   48.5   97   32   129   22.5   30.3   52.8   155.0   0.00   155.0   0.00   0.00   0.00   0.00     48.5   48.5   8.5   17   18   35   178.5   2010.0   2188.5   74.0   109.0   183.0   0.00   0.0   0.0   0.00   0.00     53.5   3.5   3.5   3.5   44.2   104.5   20.80   12.130   11.00   0.00   0.00   0.00   0.00   0.00     53.5   8.855   17.7   27.2   44.9   124.6   82.97   207.60   0.00   0.00   0.00   0.00   0.00   0.00   0.00     53.6   15.8   15.8   15.8   12.8   12.8   12.8   12.8   12.8   12.8   12.8     54.6   54.6   59.8   12.8   12.8   12.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8   12.8     55.6   59.8   12.8   12.8     55.6   59.8   12.8   12.8     55.6   59.8   12.8   12.8     55.6   59.8   12.8   12.8     55.6   59.8   12.8   12.8     55.6   59.8   12.8   12.8     55.6   59.8   12.8     55.6   59.8   12.8     55.6   59.8   12.8     55.6   59.8   12.8     55.6   59.8   12.8     55.6   59.8   12.8     55.6   59.8   12.8     55.6   59.8   12.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   59.8     55.6   5 |          | Nugu                  | 0.11              | 0.11        | 0.22       | 0.16     | 0.38    | 0.15    | 0.00         | 0.15                                    | 0.98              | 1.35       | 2.33       | 1.87       | 195           | 6.961    | 0       | 197.48  | 2.29         | 199.77 |
| 25.5         26.5         46.         32         78         282         1362         202         280         482         26         1715         1741         1151         4451         363           Color         26.5         26.5         28.5         28.6         13.0         1000.7         233.0         348.0         581.0         0.00         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | [2       | Kabini s.b.r.area     | 11.32             |             | 22.6       | 15.6     | 38.3    | 134.5   | 327.77       | 462.25                                  | 70.66             | 137.3      | 236.4      | 0          | 0             | 0        | 66      | 674.50  | 161.4        | 835.93 |
| 26.5         26.5         53         62         115         506.0         294.7         1000.7         233.0         348.0         581.0         0.00         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Total K  | abini s.b.            | 23                | Н           |            | 32       | 78      | 282     | 1080         | 1362                                    | 202               | 280        | 482        | 26         | 1715          | 1741     | 1151    | 4451    | 363          | 4814   |
| 48.5         48.5         97         32         129         22.5         30.3         52.8         155.0         0.0         155.0         0.00         0.00         0.00         0.00         233.80         103           ni         3.5         17         18         35         178.5         2010.0         2188.5         74.0         109.0         183.0         0.00         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 </td <td>14</td> <th>Shimsha.</th> <td>26.5</td> <td></td> <td></td> <td>62</td> <td>115</td> <td>506.0</td> <td>294.7</td> <td>1000.7</td> <td>233.0</td> <td>348.0</td> <td>581.0</td> <td>00.00</td> <td>0</td> <td>0</td> <td>0.00</td> <td>902.19</td> <td>594.5</td> <td>1496.7</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 14       | Shimsha.              | 26.5              |             |            | 62       | 115     | 506.0   | 294.7        | 1000.7                                  | 233.0             | 348.0      | 581.0      | 00.00      | 0             | 0        | 0.00    | 902.19  | 594.5        | 1496.7 |
| wery         8.5         8.5         8.5         17         18         35         178.5         2010.0         2188.5         74.0         109.0         183.0         0.00         0         0         0         10.0         183.0         65.00         0.00         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 15       | Arkavathi             | 48.5              | 4           |            | 32       | 129     | 22.5    | 30.3         | 52.8                                    | 155.0             | 0.0        | 155.0      | 0.00       | 0             | 0        | 0.00    | 233.80  | 103          | 336.8  |
| ni         3.5         3.5         3.5         7         24         31         36.40         32.00         33.00         65.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <td>16</td> <th>Middle Cauvery</th> <td>8.5</td> <td></td> <td></td> <td>18</td> <td>35</td> <td>178.5</td> <td>2010.0</td> <td>2188.5</td> <td>74.0</td> <td>109.0</td> <td>183.0</td> <td>0.00</td> <td>0</td> <td>0</td> <td>14.00</td> <td>2215.47</td> <td>205</td> <td>2420.5</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 16       | Middle Cauvery        | 8.5               |             |            | 18       | 35      | 178.5   | 2010.0       | 2188.5                                  | 74.0              | 109.0      | 183.0      | 0.00       | 0             | 0        | 14.00   | 2215.47 | 205          | 2420.5 |
| 11.6         11.6         23.2         2.1         44.2         100.5         20.80         121.30         11.00         10.00         21.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12       | Suvamavathi           | 3.5               |             | 7          | 24       | 31      | 36.40   | 0.00         | 36.40                                   | 32.00             | 33.00      | 65.00      | 0.00       | 0             | 0        | 0.00    | 68.50   | 63.9         | 132.4  |
| Exercise         8.855         8.855         17.7         27.2         44.9         124.6         82.97         207.60         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 81       | Palar                 | 11.6              |             |            | 21       | 44.2    | 100.5   | 20.80        | 121.30                                  | 11.00             | 10.00      | 21.00      | 0.00       | 0             | 0        | 0.00    | 53,40   | 133.1        | 186.52 |
| 0         0         0         0         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         4576.00         0.00         4576.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 19       | Chinnar s.b.r.area    | 8.855             |             |            | 27.2     | 44.9    | 124.6   | 82.97        | 207.60                                  | 0.00              | 0.00       | 0.00       | 00.0       | 0             | 0        | 0.00    | 91.83   | 160.7        | 252.5  |
| 9         9         18         27         45         125         83         208         78         123         201         0         275         275         275         4200         4768         161           154         154         309         282         591         1530         4350         6080         997         1228         2225         236         2754         2990         9483         2202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ŀ        | Mettur                | 0                 |             | 0          | 0        | 0       | 0.00    | 0.00         | 0                                       | 78.00             | 123.0      | 201.0      | 0.00       | 275           | 275      | 4200.00 | 4676.00 | 0            | 4676   |
| 154 154 309 282 591 1530 4350 6080 997 1228 2225 236 2754 2990 9483 2202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Total C  | hinnar s.b            | 6                 |             | 18         | 27       | 45      | 125     | 83           | 208                                     | 78                | 123        | 201        | 0          | 275           | 275      | 4200    | 4768    | 191          | 4929   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Total at | ove Mettur            | 154               |             |            | 282      | 591     | 1530    | 4350         | 0809                                    | 766               | 1228       | 2225       | 236        | 2754          | 2990     |         | 9483    | 2202         | 19690  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |          |                       |                   |             |            |          |         |         |              |                                         |                   |            |            |            |               |          |         | •       |              |        |

Table 7.1.1(a) continued...

Table 7.1.1(a): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                              |                   |                                                    | ı                |                   |             |           | Ex                | Export From Mettur Reservoir = 4200 MCM | Mettur R          | eservoir    | = 4200 M  | CM                                                   |                  |          |                     |         |                   |          |
|------------------------------|-------------------|----------------------------------------------------|------------------|-------------------|-------------|-----------|-------------------|-----------------------------------------|-------------------|-------------|-----------|------------------------------------------------------|------------------|----------|---------------------|---------|-------------------|----------|
|                              | w S/D             | U/S water utilization from minor and medium irriga | ation from       | minor a           | nd mediu    | ım irriga | tion p            | ccts*                                   | D/s wate          | r utilizati | on from r | D/s water utilization from major irrigation projects | ation pro        | <b> </b> | Exports             | Wat     | Water utilization | on<br>On |
| Sl.No. Sub-basin/<br>Project | Iu <sup>m,g</sup> | ľu <sup>m,s</sup>                                  | Wsi,j Wsi,j Iuin | Ws <sub>i,j</sub> |             | lu!'.g    | lu <sup>r,s</sup> | Iu <sup>r</sup> ,                       | Ws <sub>i,j</sub> | Wsl         | Wsi,j     | E.                                                   | Ir. <sup>S</sup> | Ir., (   | OE <sup>q.,je</sup> | Surface | Ground            | Total    |
| -                            | IUMHG             | IUMHG IUMHS                                        | IUMH             | IUML IUM          |             | IURG      | IURS              | IUR                                     | WSU               | WSI         | WSD       | IRG                                                  | IRS              | IRD      | OE                  |         |                   | <u> </u> |
| (1) (2)                      | (3)               | (4)                                                | (5)              | (9)               | (1)         | (8)       | (6)               | (10)                                    | (11)              | (12)        | (13)      | (14)                                                 | (15)             | (91)     | (17)                | (81)    | (61)              | (20)     |
| 21 Lower Bhawani             | 12.44             | 12.44                                              | 24.88            | 21.54             | 21.54 46.42 | 84.20     | 250.28            | 334.48                                  | 6.601             | 156.3       | 266.2     | 00.00                                                | 334.8            | 334.77   | 0                   | 863.66  | 118.18            | 981.84   |
| 22 Bhavani s.b.r.area        | a 5.785           | 5.785                                              | 11.57            | ĺ                 | 10.02 21.59 | 43.79     | 138.72            | 182.51                                  | 51.12             | 72.71       | 123.8     | 0.00                                                 | 0                | ō        | 408                 | 676.33  | 59.595            | 735.93   |
| Total Bhawani s.b.           | 18                | 18                                                 | 36               | 32                | 89          | 128       | 389               | 517                                     | 191               | 229         | 390       | 0                                                    | 335              | 335      | 408                 | 1540    | 178               | 1718     |
| 23 Noyil                     | 5.95              | 5.95                                               | 11.90            |                   | 8.25 20.15  | 18.09     | 2.01              | 20.10                                   | 123               | 0.00        | 123       | 00.0                                                 | 0.00             | 0        | 0.00                | 130.96  | 32.29             | 163.25   |
| 24 Amaravathi                | 2.365             | 2.365                                              | 4.73             | 5.31              | 5.31 10.04  | 23.53     | 43.15             | 89.99                                   | 20.88             | 30.91       | 51.79     | 13.76                                                | 198.5            | 212.26   | 00'0                | 295.80  | 44.965            | 340.77   |
| 25 Amaravathi                | 20.98             | 20.98                                              | 41.96            |                   | 47.07 89.03 | 137.6     | 400.32            | 537.962                                 | 185               | 274.1       | 459.2     | 0.00                                                 | 0.00             | 0.00     | 0.00                | 880.51  | 205.69            | 1086.20  |
| s.b.r.area                   |                   |                                                    |                  |                   |             |           |                   |                                         |                   |             |           |                                                      |                  |          |                     |         |                   |          |
| Total Amaravathi s.b.        | 23                | 23                                                 | 47               | 52                | 66          | 161       | 443               | 605                                     | 206               | 305         | 511       | 14                                                   | 199              | 212      | 0                   | 1176    | 251               | 1427     |
| 26 Tiramanimuttar            | 109.74            | 109.74                                             | 219.5            | 1661              | 199 418.5   | 41.28     | 150.00            | 191.28                                  | 370.00            | 216.00      | 586.00    | 0.00                                                 | 0.00             | 0.00     | 0.00                | 845.74  | 350               | 1195.74  |
| 27 Ponnai Ar                 | 8.125             | 8.125                                              | 16.25            | 10.19             | 10.19 26.44 | 175.5     | 108.2             | 283.7                                   | 113.0             | 155.0       | 268.0     | 00.00                                                | 0.00             | 0.00     | 0.00                | 384.34  | 193.8             | 578.13   |
| 28 Upper Coleroon            | 10.745            | 10.745                                             | 21.49            | 23.53 45.02       | 45.02       | 180.0     | 630.7             | 810.7                                   | 90.0              | 130.0       | 220.0     | 0.00                                                 | 0.00             | 0.00     | 0.00                | 861.40  | 214.28            | 1075.67  |
| 29 Lower Colcroon            | 3.05              | 3.05                                               | 6.1              | 4.87 10.97        | 10.97       | 105.0     | 536.0             | 641.0                                   | 63.0              | 83.0        | 146.0     | 00.0                                                 | 0.00             | 0.00     | 0.00                | 685.05  | 112.92            | 797.97   |
| 30 Cauvery Delta             | 80.815            | 80.815                                             | 161.6            | 133.1             | 294.7       | 11.1      | 3250.4            | 3261.5                                  | 349.0             | 461.0       | 810.0     | 0.00                                                 | 0.00             | 0.00     | 0.00                | 4141.21 | 225               | 4366.21  |
| Total below Mettur           | 260               | 760                                                | 520              | 463               | 983         | 820       | 5510              | 6330                                    | 1475              | 1579        | 3054      | 14                                                   | 533              | 547      |                     | 9357    | 1557              | 10914    |
| Gross Total                  | 414               | 414                                                | 829              | 745               | 1574        | 2350      | 0986              | 12410                                   | 2472              | 2807        | 5279      | 250                                                  | 3287             | 3537     |                     | 18840   | 3759              | 30604    |
|                              |                   |                                                    |                  |                   |             |           |                   |                                         |                   |             |           |                                                      |                  | }        |                     |         |                   |          |

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. .no.(11) + Col. no(12); Col. no. (18) = Col. no.(4) + Col. no(13) + Col. no.(15) + Col. no.(17); Col. no. (19) = Col. no.(3) + Col. no (6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. <u>@</u>

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Table 7.1.1(b): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

| Surfa wate (18) 1715 1715 1715 1715 1715 1715 1715 171                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                    | S/11  | ater utiliza | ation from | minor             | nd medi  |        | tion proje | Export From Mettur Reservoir = | Mettur K<br>D/s wate | eservoir<br>vr intilizat | = 5800 MCM | major irris                             | Pation D | rojects | Exports | Wa      | Water utilization | ion          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|--------------------|-------|--------------|------------|-------------------|----------|--------|------------|--------------------------------|----------------------|--------------------------|------------|-----------------------------------------|----------|---------|---------|---------|-------------------|--------------|
| 11 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 may   1 m |         |                    | 200   | מוניו חוזווק | ation non  | I IIIII a         | TOUR DIR |        | TOUT TION  | 23                             | I'm ciri             |                          |            | 111111111111111111111111111111111111111 | 2 2 2    | 2       |         |         |                   |              |
| TUMHG   TUMHG   TUMH   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML   TUML  | SI.No.  |                    | Ium.8 | lum,s        |            | WS <sub>i,j</sub> | lum      | lu'i,g | lur,s      | Iu                             | WS                   | WS                       | Ws         | Irg                                     | II.S     | II.     | OE, j.p | Surface | Ground            | Ţota<br>Jeta |
| 11   11   11   11   11   11   11   1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | _       |                    | î     |              | _          |                   |          | 2      | 2.         | ?                              | 6                    |                          |            | 7                                       | 7        |         |         | water   | water             | Š            |
| 124   124   248   342   2588   1712   4280   10.56   11.64   11.65   11.64   14.44   18.502   11.74   144.44   18.502   11.74   144.44   144.41   144.64   18.502   11.74   144.44   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64   144.64    |         |                    | _     | IUMHS        | IUMH       | IUML              | -        | IURG   | IURS       | IUR                            | MSO                  | WSI                      | dsw        | IRG                                     | IRS      | IRD     | OE      |         |                   |              |
| 1.24   1.24   2.48   3.42   5.96   25.68   17.12   42.80   10.96   16.84   21.80   11.65   11.33   83.02   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   84.512.28.67   11.34   1444   11.34   1444   11.34   1444   11.34   1444   11.34   1444   11.34   1444   11.34   1444   11.34   1444   11.34   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1444   1 | Ξ       | (2)                | (3)   | <b>a</b>     | (5)        | (9)               | 0        | (8)    | (6)        | (10)                           | (11)                 | (12)                     | (13)       | (14)                                    | (15)     | (91)    | (17)    | (18)    | (19)              | (50)         |
| 5.02         5.02         1.04         13.82         23.86         92.21         148.30         240.51         112.45         14.44         84.26         12.86         11.34         12.44         12.84         12.85         14.44         84.26         11.24         12.86         14.24         12.84         12.47         12.49         12.85         11.24         2.86         14.24         2.84         10.96         68.84         27.80         29.17         20.92         238.36         10.96         16.84         27.80         29.17         20.92         238.46         10.96         16.86         11.34         22.44         22.42         38.81         10.96         10.90         10.00         10.00         10.00         10.00         10.00         13.81         24.07         10.97         24.24         42.0         20.00         00.00         00.00         10.00         10.00         12.80         24.07.1         10.20         10.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80         12.80 <t< td=""><td>_</td><td>Yagachi</td><td>1.24</td><td>1.24</td><td>2.48</td><td>3.42</td><td></td><td>25.68</td><td>17.12</td><td>42.80</td><td>10.96</td><td>16.84</td><td></td><td>11.69</td><td>71.33</td><td></td><td>0</td><td>117.49</td><td>42.03</td><td>159.52</td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | _       | Yagachi            | 1.24  | 1.24         | 2.48       | 3.42              |          | 25.68  | 17.12      | 42.80                          | 10.96                | 16.84                    |            | 11.69                                   | 71.33    |         | 0       | 117.49  | 42.03             | 159.52       |
| 1.24   1.24   2.48   3.42   5.90   18.22   17.26   35.48   10.96   16.84   27.80   29.17   209.2   238.36   0   255.49   255.49   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25.51   25 | 7       | Hemavathi          | 5.02  | 5.02         | 10.04      | 13.82             | L        | 92.21  | 148.30     | 240.51                         | 44.34                | 68.11                    | 112.45     | 144.41                                  | 84.26    | 228.67  | 1134    | 1484.0  | 255.5             | 1739.49      |
| 15.85   15.85   1.25   1.72   2.97   12.90   94.4   22.34   5.51   8.46   13.97   24.24   389.1   13.13   0   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0.00   0. | 3       | Harangi            | 1.24  | 1.24         | 2.48       |                   | 1        | 18.22  | 17.26      | 35.48                          | 10.96                | 16.84                    | 27.80      | 29.17                                   | 209.2    | 238.36  | 0       | 255.49  | 52.05             | 307.54       |
| 15.85   15.85   31.69   43.60   75.29   130.01   664.05   794.06   139.02   214.90   334.82   0.00   0.0   0.00   1506   2540.71     24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 4       | Cauvery            | 0.63  | 0.63         | 1.25       | 1.72              |          | 12.90  | 9.44       | 22.34                          | 5.51                 | 8.46                     |            | 24.24                                   | 389.1    |         | 0       | 413.14  | 39.49             | 452.63       |
| 95.b.         24         48         66         114         279         856         1135         212         325         537         210         7539         963         2640         4811           gar         0.20         0.20         0.40         0.28         0.68         1.52         0.00         1.52         1.76         2.44         4.20         2.09         64.3         66.40         1.89         257.71           dy         0.51         1.01         0.71         1.72         7.02         1.86         1.66         0.00         0.00         0.00         2.64         1.89         25.77           dy         0.51         1.01         1.02         1.02         1.02         1.02         1.02         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 5       | KRS                | 15.85 | 15.85        | 31.69      | 43.60             |          | 130.01 | 664.05     | 794.06                         | 139.92               | 214.90                   |            | 0.00                                    | 0.0      |         | 1506    | 2540.71 | 189.5             | 2730.17      |
| age         0.20         0.40         0.28         0.68         1.52         0.00         1.52         1.76         2.44         4.20         2.09         64.3         66.40         189         257.71           ddy         0.51         1.01         0.71         1.72         7.02         139.65         146.67         4.46         6.18         10.64         0.00         0.00         20.00         276.0         426.80           dect         6.27         12.53         8.79         21.32         88.51         550.40         6.89         15.78         0.00         0.00         20.00         276.0         426.80         18.84         82.00         276.0         17.86         18.84         82.00         0.00         0.00         0.00         276.0         17.88         17.88         17.89         18.84         18.82         17.88         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.84         18.82         18.84         18.84         18.84         18.84         18.84         18.84         18.84                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Total L | Jpper Cauvry s.b.  | 24    | 24           | 48         | 99                |          | 279    | 856        | 1135                           | 212                  | 325                      |            | 210                                     | 753.9    |         | 2640    | 4811    | 578               | 5389         |
| Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Color   Colo | ေ       | Banasursagar       | 0.20  | 0.20         | 0.40       | 0.28              |          | 1.52   | 0.00       | 1.52                           | 1.76                 | 2.44                     |            | 2.09                                    | 64.3     |         | 681     | 257.71  | 4.09              | 261.80       |
| Columb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 7       | Mananthvady        | 0.51  | 0.51         | 1.01       | 0.71              | 1.72     | 7.02   | 139.65     | 146.67                         | 4.46                 | 6.18                     |            | 00.0                                    | 0.0      |         | 276.0   | 426.80  | 8.235             | 435.03       |
| aker         0.90         0.90         0.90         1.26         3.06         1.24         0.00         1.24         7.94         11.00         18.94         4.89         153.0         15.87         0.0         172.82           u         3.08         3.08         3.08         3.08         3.08         2.05         4.59         0.00         4.59         5.31         7.36         12.67         0.93         23.1         24.00         98         430.1         440.00         290         870.41         0.00         99         13.34         13.34         13.34         10.50         44.70         82.17         12.68         2.32         2.33         1.87         140.00         2.90         870.1         13.48         13.32         12.67         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <td>∞<br/>∞</td> <td>Kabini</td> <td>6.27</td> <td>6.27</td> <td>12.53</td> <td></td> <td></td> <td>88.51</td> <td>530.40</td> <td>618.91</td> <td>55.23</td> <td>76.56</td> <td></td> <td>9.90</td> <td>845.4</td> <td>852.00</td> <td>202</td> <td>1715.86</td> <td>110.2</td> <td>1826.02</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ∞<br>∞  | Kabini             | 6.27  | 6.27         | 12.53      |                   |          | 88.51  | 530.40     | 618.91                         | 55.23                | 76.56                    |            | 9.90                                    | 845.4    | 852.00  | 202     | 1715.86 | 110.2             | 1826.02      |
| alker         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60         0.60 <t< td=""><td>6</td><td>Taraka</td><td>06.0</td><td>0.30</td><td>08.</td><td>1.26</td><td>1</td><td>1.24</td><td>0.00</td><td>1.24</td><td>7.94</td><td>11.00</td><td></td><td>4.89</td><td>153.0</td><td>157.87</td><td>0</td><td>172.82</td><td>8.29</td><td>181.1</td></t<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 6       | Taraka             | 06.0  | 0.30         | 08.        | 1.26              | 1        | 1.24   | 0.00       | 1.24                           | 7.94                 | 11.00                    |            | 4.89                                    | 153.0    | 157.87  | 0       | 172.82  | 8.29              | 181.1        |
| u         3.08         3.08         6.16         4.34         10.50         44.70         82.17         126.87         27.26         37.78         65.04         9.88         430.1         440.00         290         870.41           carea         11.32         11.32         22.64         15.63         38.27         134.5         1777         452.25         99.07         137.34         23.641         0.00         0.00         0.00         0.00         0.00         99         64.50           26.50         26.50         25.0         15.63         38.27         134.5         11.77         452.25         99.07         137.34         23.641         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2       | Sagardoddakere     | 09.0  | 09:0         | 1.20       | 0.85              |          | 4.59   | 0.00       | 4.59                           | 5.31                 | 7.36                     |            | 0.93                                    | 23.1     |         | 95      | 131.34  | 6.97              | 138.3        |
| Larea 11.32 11.32 22.64 15.63 38.27 134.5 317.77 452.25 99.07 137.34 236.41 0.00 0.00 0.00 0.00 99 664.50 [64.50]  26.50 26.50 53.00 62.00 115.0 506.0 274.7 1006.7 233.0 281.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | =       | Upper Nagu         | 3.08  | 3.08         | 6.16       | 4.34              |          | 44.70  | 82.17      | 126.87                         | 27.26                | 37.78                    |            | 9.88                                    | 430.1    | 440.00  | 290     | 870.41  | 62                | 932.4        |
| Larea         11.32         12.64         15.63         38.27         134.5         317.77         452.25         99.07         137.34         236.41         0.00         0.00         0.00         0.00         99         664.50           26.50         23         46         32         78         1070         1352         202         280         482         26         1712         1738         1151         4438           26.50         26.50         53.00         62.00         115.0         506.0         274.7         1006.7         233.0         381.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 12      | Nugu               | 0.11  | 0.11         | 0.22       | 0.16              |          |        | 00.0       | 0.15                           | 0.98                 | 1.35                     | 2.33       | 1.87                                    | 196.0    | 167.61  | 0       | 198.48  | 2.29              | 200.77       |
| 26.50         26.50         53.00         62.00         115.0         26.50         28.50         48.50         28.50         48.50         28.50         48.50         26.50         17.13         17.34         11.51         44.38           very         8.50         26.50         53.00         62.00         115.0         506.0         274.7         1006.7         233.0         581.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 13      | Kabini s.b.r.area  | 11.32 | 11.32        | 22.64      |                   |          |        | 317.77     | 452.25                         | 70.66                | 137.34                   | 236.41     | 0.00                                    | 0.00     |         | 66      | 664.50  | 161.4             | 825.93       |
| 26.50         26.50         26.50         26.50         26.50         26.50         26.50         26.50         26.50         26.50         27.00         62.00         115.0         27.00         27.00         12.00         27.00         124.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Total k | abini s.b.         | 23    | 23           | 46         | 32                | 78       | 282    | 1070       | 1352                           | 202                  | 280                      | 482        | 26                                      | 1712     | _       | 1151    | 4438    | 363               | 4801         |
| 48.50         48.50         97.00         32.00         129.0         22.5         30.3         52.8         124.0         0.0         0.00         0.00         0.00         0.00         0.00         0.00         20.280           hi         3.50         17.00         18.00         35.0         178.5         1510.0         1688.5         74.0         109.0         183.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 14      | Shimsha.           | 26.50 | 26.50        | 53.00      | 62.00             |          | 506.0  | 274.7      | 1000.7                         | 233.0                | 348.0                    |            | 0.00                                    | 0.00     |         | 0.00    | 882.19  | 594.5             | 1476.69      |
| Nery         8.50         8.50         17.00         18.00         35.0         178.5         1510.0         1688.5         74.0         109.0         183.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 15      | Arkavathi          | 48.50 | 48.50        | 97.00      |                   |          | 22.5   | 30.3       | 52.8                           | 124.0                | 0.0                      |            | 00.00                                   | 0.00     |         | 0.00    | 202.80  | 103               | 305.80       |
| hi         3.50         3.50         7.00         24.00         31.00         36.40         321         321         33         65.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 16      | Middle Cauvery     | 8.50  | 8.50         | 17.00      | 18.00             |          | 178.5  | 1510.0     | 1688.5                         | 74.0                 | 109.0                    |            | 0.00                                    | 0.00     | L_      | 14.00   | 1715.47 | 205               | 1920.47      |
| Tarea 8.86 8.86 17.71 27.23 44.94 124.6 72.97 197.60 0.00 0.00 0.00 0.00 0.00 0.00 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 11      | Suvamavathi        | 3.50  | 3.50         | 7.00       | 24.00             |          | 36.40  | 0.00       | 36.40                          | 32                   | 33                       | 65.00      | 00.0                                    | 0.00     |         | 0.00    | 68.50   | 63.9              | 132.40       |
| 1. Larea         8.86         8.86         17.71         27.23         44.94         124.6         72.97         197.60         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 18      | Palar              | 11.60 | 11.60        | 23.19      | 21.03             | 44.22    |        | 20.80      | 121.30                         | 11.00                | 10.00                    | 21.00      | 0.00                                    | 0.00     | L       | 0.00    | 53.40   | 133.1             | 186.52       |
| 0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <th< td=""><td>19</td><td>Chinnar s.b.r.area</td><td>8.86</td><td>8.86</td><td>17.71</td><td></td><td>44.94</td><td>124.6</td><td>72.97</td><td>197.60</td><td>0.00</td><td>00.0</td><td></td><td>00.00</td><td>0.00</td><td></td><td>0.00</td><td>81.83</td><td>160.7</td><td>242.54</td></th<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 19      | Chinnar s.b.r.area | 8.86  | 8.86         | 17.71      |                   | 44.94    | 124.6  | 72.97      | 197.60                         | 0.00                 | 00.0                     |            | 00.00                                   | 0.00     |         | 0.00    | 81.83   | 160.7             | 242.54       |
| 9 9 18 27 45 125 73 198 78 123 201 0 275 275 5800 6358 154 154 309 282 591 1530 383 <b>5</b> 558 <b>5</b> 966 1228 2194 236 2741 2977 18529                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 20      | Mettur             | 0.00  | 0.00         | 0.00       | 0.00              | 0.00     | 00.00  | 0.00       | 0.00                           | 78.00                | 123.0                    |            | 0.00                                    | 275.0    | 275.00  | 5800.0  | 6276.00 | 0                 | 6276.00      |
| 154 154 309 282 591 1530 3835 5585 966 1228 2194 236 2741 2977 18529                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Total C | hinnar s.b         | 6     | 6            | 18         | 27                | 45       | 125    | 73         | 198                            | 78                   | 123                      | 201        | 0                                       | 275      |         | 5800    | 6358    | 161               | 6519         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Total a | bove Mettur        | 154   | 154          | 309        | 282               | 165      | 1530   | 3835       | 5885                           | 996                  | 1228                     |            | 236                                     | 2741     |         |         | 18529   | 2202              | 20731        |

Table 7.1.1(b) continued...

Table 7.1.1(b) continued...

Table 7.1.1(b): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                              |          |                   |                   |                                              | į       |             |              |                      |           |          |                   |                                                      |             |           |        |                     |         |                   |         |
|------------------------------|----------|-------------------|-------------------|----------------------------------------------|---------|-------------|--------------|----------------------|-----------|----------|-------------------|------------------------------------------------------|-------------|-----------|--------|---------------------|---------|-------------------|---------|
|                              |          |                   |                   |                                              |         |             |              | EXI                  | port From | Mettur R | eservoir          | Export From Mettur Reservoir = 5800 MCM              | CM          |           | İ      |                     |         |                   |         |
|                              |          | U/S wat           | er utiliza        | U/S water utilization from minor and medium  | minor a | nd medi     |              | irrigation projects* | ects*     | D/s wate | r utilizati       | D/s water utilization from major irrigation projects | najor irrig | ation pro | 7      | Exports             | Wat     | Water utilization | ioi     |
| St.No. Sub-basin/<br>Project | L        | lu <sup>m,g</sup> | Iu <sup>m,s</sup> | $Ws_{i,j}^{RH} \ Ws_{i,j}^{RL} \ Iu_{i,j}^m$ | Wski,j  |             | ľuľ.<br>J.j. | Iu <sup>r,s</sup>    | lu,       | Wsij     | WS <sub>I,j</sub> | WSi,j                                                | ص <u>ر</u>  | Ir.       | ĮĘ,    | OE <sup>q.j</sup> e | Surface | Ground            | Total   |
|                              | Ē        | IUMHG II          | IUMHS             | IUMH IUML                                    |         | IOM         | IURG         | IURS                 | IUR       | WSÜ      | WSI               | MSD                                                  | IRG         | IRS       | IRD    | OE                  |         |                   | ,       |
| (1)                          |          | (3)               | <del>(</del> 4)   | (5)                                          | (9)     | (2)         | (8)          | 6)                   | (10)      | (11)     | (12)              | (13)                                                 | (14)        | (15)      | (91)   | (11)                | (18)    | (61)              | (5)     |
| 21 Lower Bhawani             | wani     | 12.44             | 12.44             | 24.88                                        | 21.54   | 46.42       | 84.20        | 250.28               | 334.48    | 109.88   | 156.3             | 266.17                                               | 68.6        | 324.9     | 334.77 | 0                   | 853.77  | 128.1             | 981.8   |
| 22 Bhavani s.b.r.area        | r.area   | 5.79              | 5.79              | 11.57                                        | 10.02   | 10.02 21.59 | 43.79        | 138.72               | 182.51    | 51.12    | 72.71             | 123.83                                               | 0.00        | 0.00      | 0.00   | 408                 | 676.33  | 59.6              | 735.9   |
| Total Bhawani s.b.           |          | 90                | 90                | 36                                           | 32      | 89          | 128          | 389                  | 517       | 191      | 229               | 390                                                  | 10          | 325       | 335    | 408                 | 1530    | 188               | 171     |
| 23 Noyil                     | <br>     | 5.95              | 5.95              | 11.90                                        | 8.25    | 8 25 20 15  | 18.09        | 2.01                 | 20.10     | 123.00   | 0.00              | 123.00                                               | 0.00        | 0.00      | 0.00   | 00.0                | 130.96  | 32.29             | 163.2   |
| 24 Amaravathi                | -        | 2.37              | 2.37              | 4.73                                         | 5.31    | 5.31 10.04  | 23.53        | 43.15                | .89.99    | 20.88    | 30.91             | 51.79                                                | 3.76        | 154.92    | 158.68 | 0.00                | 252.22  | 34.97             | 287.19  |
| 25 Amaravathi                |          | 20.98             | 20.98             | 41.96                                        | 47.07   | 47.07 89.03 | 137.64       | 400.32               | 537.96    | 185.12   | 274.1             | 459.21                                               | 0.00        | 0.00      | 0.00   | 0.00                | 880.51  | 205.7             | 1086.2  |
| S.b.r.area                   |          |                   |                   |                                              |         |             |              |                      |           |          |                   |                                                      |             |           |        |                     |         |                   |         |
| Total Amaravathi s.b.        | <u>.</u> | 23                | 23                | 47                                           | 52      | 66          | 161          | 443                  | 605       | 206      | 305               | 511                                                  | 4           | 155       | 159    | 0                   | 1133    | 241               | 137.    |
| 26 Tirumanimuttar            |          | 109.74            | 109.74            | 219.5                                        | 0.661   | 418.5       | 41.3         | 191.2                | 232.5     | 370.00   | 305.0             | 675.00                                               | 0.00        | 0.00      | 0.00   | 0.00                | 975.95  | 350               | 1325.9  |
| 27 Ponnai Ar                 |          | 8.13              | 8.13              | 16.3                                         | 10.2    | 26.4        | 175.5        | 115.2                | 290.7     | 113.00   | 155.0             | 268.00                                               | 0.00        | 0.00      | 0.00   | 0.00                | 391.34  | 193.8             | 585.13  |
| 28 Upper Colcroon            |          | 10.75             | 10.75             | 21.5                                         | 23.5    | 45.0        | 180.0        | 630.7                | 810.7     | 00.06    | 130.0             | 220.00                                               | 0.00        | 0.00      | 0.00   | 0.00                | 861.40  | 214.3             | 1075.67 |
| 29 Lower Coleroon            | 700n     | 3.05              | 3.05              | 1.9                                          | 4.9     | 11.0        | 105.0        | 536.0                | 641.0     | 63.00    | 83.00             | 146.00                                               | 0.00        | 0.00      | 0.00   | 0.00                | 685.05  | 112.9             | 797.97  |
| 30 Cauvery Delta             |          | 80.82             | 80.82             | 161.6                                        | 133.1   | 294.7       | 11.1         | 3350.4               | 3361.5    | 349      | 461.0             | 810.00                                               | 0.00        | 0.00      | 0.00   | 0.00                | 4241.21 | 225               | 4466.2  |
| Total below Mettur           | <br>     | 260               | 260               | 520                                          | 463     | 983         | 820          | 5658                 | 6478      | 1475     | 1668              | 3143                                                 | 14          | 480       | 493    |                     | 9541    | 1557              | 1109    |
| Gross Total                  |          | 414               | 414               | 829                                          | 745     | 1574        | 2350         | 9493                 | 12063     | 2441     | 2896              | 5337                                                 | 249         | 3221      | 3470   |                     | 28070   | 3759              | 31828   |
|                              |          |                   |                   |                                              |         |             |              |                      |           |          |                   |                                                      |             |           |        |                     |         |                   |         |

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Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15);Col. no. (13) = Col. no.(11) + Col. no.(12); Col. no. (18) = Col. no.(4) + Col. no.(13) + Col. no.(15) + Col. no.(17); Col. no. (19) = Col. no. (3) + Col. no (6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. <u>e</u>

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Table 7.1.1(c): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

| Si.No. Sub-basin/ It. Project It.  (1) (2) (1)  2 Hemavathi 3 Harangi 4 Cauvery 5 KRS Fotal Upper Cauvry s.b. 6 Banasursagar 7 Mananthyady | U/S wat             | 7.1.7             |           |                                                    |               |                 |                   |                    |                   |                   |                                                      | -          |               |               |           |                  |                   |        |
|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------|-----------|----------------------------------------------------|---------------|-----------------|-------------------|--------------------|-------------------|-------------------|------------------------------------------------------|------------|---------------|---------------|-----------|------------------|-------------------|--------|
| Sub-basin/ Project (2) Yagachi Hemavathi Harangi Cauvery KRS Upper Cauvry s.b. Banasursagar Mananthyady                                    |                     | ter Utilizar      | tion from | U/S water utilization from minor and medium irriga | d mediui      | n irrigat       | tion projects*    | cts*               | D/s wate          | r utilizat        | D/s water utilization from major irrigation projects | najor irri | gation pr     |               | Exports [ | Wat              | Water utilization | uo     |
| Yagachi Hemavathi Harangi Cauvery KRS Upper Cauvry s.b. Banasursagar                                                                       | Iu <sup>m,g</sup> I | lu <sup>m,s</sup> | WSij      | WS <sub>i,j</sub>                                  | In E          | Iur'.<br>Iui, j | Iu <sup>r,s</sup> | lu <sup>r</sup> .j | Ws <sub>i,j</sub> | WS <sub>i,j</sub> | Ws <sub>i,j</sub>                                    | Ir.B.      | If            | Ir.           | OEi,jp    | Surface<br>water | Ground            | Total  |
| Yagachi Hemavathi Harangi Cauvery KRS Upper Cauvry s.b. Banasursagar                                                                       | IUMHG II            | IUMHS             | IUMH      | IUML                                               | IUM           | IURG            | IURS              | IUR                | MSU               | WSI               | MSD                                                  | IRG        | IRS           | 8             | OE        |                  | ••                |        |
| 1 Yagachi 2 Hemavathi 3 Harangi 4 Cauvery 5 KRS Total Upper Cauvry s.b. 6 Banasursagar 7 Mananthvady                                       | (3)                 | ( <del>\$</del> ) | (5)       | (9)                                                | $\varepsilon$ | (8)             | (6)               | (01)               | (33)              | (12)              | (13)                                                 | (14)       | (15)          | (91)          | (71)      | (18)             | (61)              | (20)   |
| 2 Hemavathi 3 Harangi 4 Cauvery 5 KRS Total Upper Cauvry s.b. 6 Banasursagar 7 Mananthyady                                                 | 1.24                | 1.24              | 2.48      | 3.42                                               | 5.90          | 25.68           | 17.12             | 42.80              | 10.96             | 16.84             | 27.80                                                | 11.69      | 71.33         | 83.02         | 0         | 117.49           | 42.03             | 159.52 |
| 3 Harangi 4 Cauvery 5 KRS Total Upper Cauvry s.b. 6 Banasursagar 7 Mananthyady                                                             | 5.02                | 5.02              | 10.04     | 13.82                                              | 23.86 92.21   | 92.21           | 148.30            | 240.51             | 44.34             | 68.11             | 112.45                                               | 144.41     | 84.26         | 84.26 228.67  | 1134      | 1484.03          | 255.5             | 1739.5 |
| 5 KRS Total Upper Cauvry s.b. 6 Banasursagar 7 Mananthyady                                                                                 | 1.24                | 1.24              | 2.48      | 3.42                                               | 5.90          | 18.22           | 17.26             | 35.48              | 10.96             | 16.84             | 27.80                                                | 29.17      | 189.23        | 218.40        | 0         | 235.53           | 52.05             | 287.58 |
| 5 KRS Total Upper Cauvry s.b. 6 Banasursagar 7 Mananthvady                                                                                 | 0.63                | 0.63              | 1,25      | 1.72                                               |               | 12.90           | 9.44              | 22.34              | 5.51              | 8.46              | 13.97                                                | 24.24      | 389.11        | 389.11 413.35 | 0         | 413.14           | 39.49             | 452.63 |
| Total Upper Cauvry s.b. 6 Banasursagar 7 Mananthvady                                                                                       | 15.85               | 15.85             | 31.69     | 43.60                                              | 75.29         | 130.0           | 474.59            | 604.60             | 139.92            | 214.90            | 354.82                                               | 0.00       | 0.00          | 0.00          | 1506      | 2351.25          | 189.5             | 2540.7 |
|                                                                                                                                            | 24                  | 24                | 48        | 99                                                 | 114           | 279             | 299               | 946                | 212               | 325               | 537                                                  | 210        | 734           | 943           | 2640      | 4601             | 578               | 5180   |
|                                                                                                                                            | 0.20                | 0.20              | 0.4       | 0.28                                               | 99.0          | 1.52            | 0.00              | 1.52               | 1.76              | 2.44              | 4.20                                                 | 2.09       | 64.31         | 66.40         | 189       | 257.71           | 4.09              | 261.8  |
|                                                                                                                                            | 0.51                | 0.51              | 1.01      | 0.71                                               | 1.72          | 7.02            | 139.65            | 146.67             | 4.46              | 6.18              | 10.64                                                | 0.00       | 0.00          | 0.00          | 276.0     | 426.80           | 8.235             | 435.03 |
| 8 Kabini                                                                                                                                   | 6.27                | 6.27              | 12.53     | 8.79                                               | 21,32         | 88.51           | 530.40            | 16.819             | 55.23             | 76.56             | 131.79                                               | 9.90       | 845.40        | 845.40 852.00 | 202       | 1715.86          | 110.2             | 1826   |
| 9 Taraka                                                                                                                                   | 06.0                | 0.90              | 3.6       | 1.26                                               | 3.06          | 1.24            | 0.00              | 1.24               | 7.94              | 11.00             | 18.94                                                | 4.89       | 141.98        | 146.87        | 0         | 161.82           | 8.29              | 170.1  |
| 10 Sagardoddakerc                                                                                                                          | 09.0                | 09.0              | 1.2       | 0.85                                               | 2.05          | 4.59            | 00.0              | 4.59               | 5.31              | 7.36              | 12.67                                                | 0.93       | 23.07         | 24.00         | 95        | 131.34           | 6.97              | 138.31 |
| 11 Upper Nagu                                                                                                                              | 3.08                | 3.08              | 6.16      | 4.34                                               | 10.50         | 44.70           | 79.35             | 124.05             | 27.26             | 37.78             | 65.04                                                | 98.6       | 430.12 440.00 | 440.00        | 290       | 867.59           | 62                | 929.59 |
| 12 Nugu                                                                                                                                    | 0.11                | 0.11              | 0.22      | 0.16                                               | 0.38          | 0.15            | 0.00              | 0.15               | 0.98              | 1.35              | 2.33                                                 | 1.87       | 175.04        | 176.91        | 0         | 177.48           | 2.29              | 179.77 |
| 13 Kabini s.b.r.area                                                                                                                       | 11.32               | 11.32             | 22.64     | 15.63                                              | 38.27         | 134.5           | 300.77            | 435.25             | 70.66             | 137.34            | 236.41                                               | 0.00       | 0.00          | 0.00          | 66        | 647.50           | 161.4             | 808.93 |
| Total Kabini s.b.                                                                                                                          | 23                  | 23                | 46        | 32                                                 | 78            | 282             | 1050              | 1332               | 202               | 280               | 482                                                  | 26         | 1680          | 1706          | 1151      | 4386             | 363               | 4750   |
| 14 Shimsha.                                                                                                                                | 26.50               | 26.50             | 53        | 62.00                                              | 115.00        | 506.0           | 254.69            | 69:0001            | 233.00            | 348.00            | 581.00                                               | 0.00       | 0.00          | 0.00          | 0.00      | 862.19           | 594.5             | 1456.7 |
| 15 Arkavathi                                                                                                                               | 48.50               | 48.50             | 76        | 32.00                                              | 129.00        | 22.50           | 30.30             | 52.80              | 117.00            | 0.00              | 117.00                                               | 0.00       | 0.00          | 0.00          | 0.00      | 195.80           | 103               | 298.8  |
| 16 Middle Cauvery                                                                                                                          | 8.50                | 8.50              | 17        | 18.00                                              | 35.00         | 178.5           | 409.97            | 1588.47            | 74.00             | 109.00            | 183.00                                               | 0.00       | 0.00          | 0.00          | 14.00     | 1615.47          | 205               | 1820.5 |
| 17 Suvamavathi                                                                                                                             | 3.50                | 3.50              | 7         | 24.00                                              | 31.00         | 36.40           | 0.00              | 36.40              | 32                | 33                | 65.00                                                | 0.00       | 0.00          | 0.00          | 0.00      | 68.50            |                   | 132.4  |
| 18 Palar                                                                                                                                   | 11.60               | 11.60             | 23.19     | 21.03                                              | 44.22         | 100.5           | 20.80             | 121.30             | 11.00             | 14.00             | 25.00                                                | 0.00       | 0.00          | 0.00          | 0.00      | 57.40            | 133.1             | 190.52 |
| 19 Chinnar s.b.r.area                                                                                                                      | 8.86                | 8.86              | 17.71     | 27.23                                              | 44.94         | 124.6           | 62.97             | 187.60             | 00.0              | 0.00              | 0.00                                                 | 0.00       | 40.00         | 40.00         | 0.00      | 111.83           | 160.7             | 272.54 |
| 20 Mettur                                                                                                                                  | 00.0                | 0.00              | 0         | 0.00                                               | 0.00          | 0.00            | 0.00              | 00.0               | 78.00             | 123.00            | 201.00                                               | 0.00       | 275.00 275.00 | 275.00        | 6200.0    | 6676.00          | 0                 | 6676   |
| Total Chinnar s.b                                                                                                                          | 6                   | 6                 | 88        | 27                                                 | 45            | 125             | 63                | 188                | 78                | 123               | 201                                                  | 0          | 315           | 315           | 6200      | 6788             | 161               | 6946   |
| Total above Mettur                                                                                                                         | 154                 | 154               | 309       | 282                                                | 591           | 1530            | 3496              | 5265               | 656               | 1232              | 1617                                                 | 236        | 2729          | 2962          |           | 18575            | 2202              | 20777  |

Table 7.1.1(c) continued...

Table 7.1.1(c) continued...

Table 7.1.1(c): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

| Sub-basin/ Project         US water utilization from minor and medium irrigation projects*         Dis water utilization from minor and medium irrigation projects*         Dis water utilization from minor irrigation projects*         Dis water utilization from major irrigation projects*         Dis water utilization from major irrigation projects*         Dis water utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation projects*         It Major utilization from major irrigation from major utilization from major irrigation from major utilization from from from from from from from from                                                                                                                                                                                                                                                                                                                                                                  |             |                       |        |              |                   |                   |                         |                   | Exi       | oort Fron | Export From Mettur Reservoir = 6200 MCM | eservoir          | = 6200 M   | CM          |            |        |                    |         |                   |        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|-----------------------|--------|--------------|-------------------|-------------------|-------------------------|-------------------|-----------|-----------|-----------------------------------------|-------------------|------------|-------------|------------|--------|--------------------|---------|-------------------|--------|
| Sub-basin/ Project         Lum, 8 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum, 10 Lum,                                 |             |                       | U/S w  | vater utiliz | ation from        | minor and         | d mediu                 | ım irrigal        | ion proje | ects*     | D/s wate                                | r utilizat        | ion from 1 | najor irri  | gation pro |        | Exports            | Wat     | Water utilization | uo     |
| (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (15) (15) (15) (15) (15) (15) (15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | SI.No.      | Sub-basin/<br>Project |        |              | WS <sub>i,j</sub> | WS <sub>i,j</sub> | $\mathrm{Iu}^{m}_{i,j}$ | Iu <sup>r,g</sup> | Iur,s     | lu,       |                                         | Ws <sub>i,j</sub> | WSij       | 50 <u>;</u> |            | , II,  | OE <sup>q.je</sup> | Surface | Ground            | Total  |
| (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14)         (15)           wer Bhawani         12.44         24.88         21.54         46.42         84.20         250.28         334.48         109.88         156.29         145.29         9.89         324.88         33.48         10.80         12.71         182.59         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |             |                       | IUMHG  | IUMHS        | I                 |                   | IUM                     | IURG              | IURS      | IUR       | WSU                                     | WSI               | WSD        | IRG         | IRS        | IRD    | OE                 |         |                   |        |
| wer Bhawani         12.44         12.44         24.88         21.54         46.42         84.20         250.28         334.48         109.88         156.29         145.29         9.89         324.88         3           avanis.b. rarea         5.79         11.57         10.02         21.59         43.79         138.72         182.51         51.12         72.71         182.59         9.00         0.00           vil         36         32         68         12.8         389         517         161         22.9         280         10         0.00           vil         5.95         11.90         8.25         20.15         18.09         2.01         20.10         16.100         0.00         16.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ξ           | (2)                   | (3)    | (4)          | (5)               | (9)               | (7)                     | (8)               | (6)       | (10)      | (11)                                    | (12)              | (13)       | (14)        | (51)       | (16)   | (17)               | (81)    | (61)              | (20)   |
| avani s.b.r.area         5.79         5.79         11.57         10.02         21.59         43.79         138.72         182.51         72.71         182.59         0.00         0.00           ani s.b.         18         36         32         68         128         389         517         161         229         280         10         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 21          | Lower Bhawani         | 12.44  |              |                   | 21.54             | 46.42                   | 84.20             | 250.28    |           | 109.88                                  | 156.29            | 145.29     | 68.6        | 324.88     | 334.77 | 0                  | 732.89  | 128.1             | 860.96 |
| vill         5.95         5.95         11.90         8.25         20.15         18.09         2.01         20.10         123.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         161.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <td>22</td> <td>Bhavani s.b.r.arca</td> <td>5.79</td> <td></td> <td></td> <td>10.02</td> <td>21.59</td> <td>43.7</td> <td>138.72</td> <td>182.51</td> <td>51.12</td> <td></td> <td>182.59</td> <td>00.0</td> <td>00.0</td> <td>0.08</td> <td>408</td> <td>735.09</td> <td>59.6</td> <td>794.69</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 22          | Bhavani s.b.r.arca    | 5.79   |              |                   | 10.02             | 21.59                   | 43.7              | 138.72    | 182.51    | 51.12                                   |                   | 182.59     | 00.0        | 00.0       | 0.08   | 408                | 735.09  | 59.6              | 794.69 |
| yil 5.95 5.95 11.90 8.25 20.15 18.09 2.01 20.10 123.00 0.00 161.00 0.00 0.00 0.00 154.92 15 narayathi 2.37 2.37 4.73 5.31 10.04 23.53 43.15 66.68 20.88 30.91 153.91 3.76 154.92 15 narayathi 20.98 41.96 47.07 89.03 137.64 336.11 473.75 185.12 274.09 294.97 0.00 0.00 0.00 narayathi s.b. 23 23 47 52 99 161 379 540 206 305 490 0.00 0.00 0.00 nai Ar 8.13 8.13 16.25 10.19 26.44 175.5 133.9 309.4 113.00 155.00 525.00 0.00 0.00 norer Coleroon 3.05 6.1 487 10.97 10.50 136.0 641.0 63.00 130.00 243.00 0.00 0.00 0.00 norer Deta 80.82 80.82 161.6 133.08 294.7 11.1 3675.0 631.0 13.40 173.00 0.00 0.00 0.00 norer Deta 80.82 161.6 133.08 294.7 11.1 3675.0 1475 1764 3003 14 480 140 140 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1414 870 1 | Total Bh.   | awani s.b.            | 18     |              |                   | 32                |                         | 128               | 389       |           | 161                                     | 229               | 280        | 10          | 325        | 335    | 408                | 1420    | 188               | 1608   |
| naravathi         2.37         4.73         5.31         10.04         23.53         43.15         66.68         20.88         30.91         153.91         3.76         154.92         1           naravathi         20.98         41.96         47.07         89.03         137.64         336.11         473.75         185.12         274.09         294.97         0.00         0.00           ratea         20.98         41.96         47.07         89.03         161         37.9         540         20.497         0.00         0.00           avathi s.b.         23         23         47         52         99         161         37.9         540         206         305         49.97         0.00         0.00           nmai Ar         8.13         16.25         10.19         26.44         175.5         133.9         309.4         113.00         401.00         607.00         0.00         0.00           wer Coleroon         3.05         6.1         4.87         10.97         10.50         33.0         41.0         63.00         243.00         0.00         0.00         0.00           wer Coleroon         3.05         6.1         4.87         10.97         10.50                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 23          | Noyil                 | 5.95   |              |                   |                   | 20.15                   | 18.09             | 2.01      | 20.10     | 123.00                                  | 0.00              | 161.00     | 0.00        | 0.00       | 0.00   | 0.00               | 96.891  | 32.29             | 201.25 |
| raravathi         20.98         41.96         47.07         89.03         137.64         336.11         473.75         185.12         274.09         294.97         0.00         0.00           raravathis.b.         23         47         52         99         161         379         540         206         305         490         4         155           umai Ar         8.13         16.25         10.19         26.44         175.5         133.9         309.4         113.00         155.00         60.00         0.00         0.00           per Coleroon         10.75         21.49         23.53         45.02         180.0         630.0         641.0         63.00         130.00         243.60         0.00         0.00         0.00           wer Coleroon         3.05         6.1         4.87         10.97         105.0         536.0         641.0         63.00         130.00         130.0         0.00         0.00         0.00           wer Coleroon         3.05         6.1         4.87         10.97         105.0         536.0         641.0         63.00         130.0         0.00         0.00         0.00           wer Coleroon         3.05         4.61         6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 24          | Amaravathi            | 2.37   |              |                   | 5.31              | 10.04                   | 23.5              | 43.15     |           | 20.88                                   | 30.91             | 153.91     |             | 154.92     | 158.68 | 0.00               | 354.34  | 34,97             | 389.31 |
| avathi s.b.         23         23         47         52         99         161         379         540         206         305         490         4         155           umanimuttar         109.74         109.74         219.5         198.98         418.5         41.28         210.32         251.6         370.00         401.00         607.00         0.00         0.00           per Coleroon         10.75         10.75         10.19         26.44         175.5         133.9         309.4         113.00         155.00         525.00         0.00         0.00           per Coleroon         10.75         21.49         23.53         45.02         180.0         630.7         810.7         90.00         130.00         243.00         0.00         0.00           wer Coleroon         3.05         6.1         4.87         10.97         105.0         536.0         641.0         63.00         83.00         173.00         0.00         0.00           uvery Delta         80.82         161.6         133.08         294.7         11.1         365.6         677.6         1475         1764         3003         14         480           All         414         426         520 <td>25,</td> <td>Amaravathi</td> <td>20.98</td> <td></td> <td></td> <td></td> <td></td> <td>137.64</td> <td>336.11</td> <td>473.75</td> <td>185.12</td> <td></td> <td>294.97</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td>00.0</td> <td>652.06</td> <td>205.7</td> <td>857.75</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 25,         | Amaravathi            | 20.98  |              |                   |                   |                         | 137.64            | 336.11    | 473.75    | 185.12                                  |                   | 294.97     | 0.00        | 0.00       | 0.00   | 00.0               | 652.06  | 205.7             | 857.75 |
| avathi s.b.         23         23         47         52         99         161         379         540         206         305         490         41         155           umanimuttar         109.74         109.74         219.5         198.98         418.5         41.28         210.32         251.6         370.00         401.00         607.00         6.00         0.00           mai Ar         8.13         8.13         16.25         10.19         26.44         175.5         133.9         309.4         113.00         525.00         6.00         0.00         0.00           per Coleroon         10.75         21.49         23.53         45.02         180.0         630.7         810.7         90.00         130.00         243.00         0.00         0.00           wer Coleroon         3.05         6.1         4.87         10.97         105.0         536.0         641.0         63.00         83.00         173.00         0.00         0.00         0.00           wer Coleroon         3.05         260         260         260         366.1         349         461.00         524.00         0.00         0.00         0.00           wer Coleroon         260         260 <td>Ψ1</td> <td>s.b.r.area</td> <td></td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ψ1          | s.b.r.area            |        |              |                   |                   |                         |                   |           |           |                                         |                   |            |             |            |        |                    |         |                   |        |
| nmainter         109.74         109.74         219.5         198.98         418.5         41.28         210.32         251.6         370.00         401.00         607.00         0.00         0.00           nnai Ar         8.13         16.25         10.19         26.44         175.5         133.9         309.4         113.00         155.00         525.00         0.00         0.00           per Coleroon         10.75         21.49         23.53         45.02         180.0         630.7         810.7         90.00         130.00         243.00         0.00         0.00         0.00           wer Coleroon         3.05         6.1         4.87         10.97         105.0         536.0         641.0         63.00         83.00         173.00         0.00         0.00           uvery Delta         80.82         161.6         133.08         294.7         11.1         3675.0         3686.1         349         461.00         524.00         0.00         0.00         0.00           Mettur         260         260         260         365         6776         1475         1475         146         3003         14         480                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Total Am    | naravathi s.b.        | 23     |              |                   | 52                |                         | 161               | 379       |           | 206                                     | 305               | 490        | 4           | 155        | 159    | 0                  | 1048    | 147               | 1288   |
| nnai Ar         8.13         8.13         16.25         10.19         26.44         175.5         133.9         309.4         113.00         155.00         525.00         0.00         0.00         0.00           per Coleroon         3.05         3.05         6.1         4.87         10.97         105.0         536.0         641.0         63.00         83.00         173.00         0.00         0.00           uvery Delta         80.82         80.82         161.6         133.08         294.7         11.1         3675.0         3686.1         349         461.00         524.00         0.00         0.00         0.00           Mettur         260         260         520         463         983         820         5956         6776         1475         1764         3003         14         480                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | . 92        | Tirumanimuttar        | 109.74 |              |                   | 198.98            | 418.5                   | 41.28             | 210.32    | 251.6     | 370.00                                  | 401.00            | 00.709     | 0.00        | 00.00      | 0.00   | 00.00              | 927.06  | 350               | 1277.1 |
| per Coleroon         10.75         21.49         23.53         45.02         180.0         630.7         810.7         90.00         130.00         243.60         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 27]         | Ponnai Ar             | 8.13   |              | 16.25             | 10.19             | 26.44                   | 175.5             | Н         | 309.4     | 113.00                                  | 155.00            | 525.00     | 00.0        | 0.00       | 0.00   | 0.00               | 667.03  | 193.8             | 860.83 |
| wer Coleroon         3.05         6.1         4.87         10.97         10.50         536.0         641.0         63.00         83.00         173.00         0.00         0.00         0.00           uvery Delta         80.82         80.82         161.6         133.08         294.7         11.1         3675.0         3686.1         349         461.00         524.00         0.00         0.00           Mettur         260         260         520         463         983         820         5956         6776         1475         1764         3003         14         480           A14         414         820         745         1350         3450         1304         340         340         340         340                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 78 1        | Upper Coleroon        | 10.75  |              | 21.49             | 23.53             | 45.02                   | 180.0             | 630.7     | 810.7     | 90.00                                   |                   | 243.00     | 0.00        | 0.00       | 0.00   | 0.00               | 884.40  | 214.3             | 1098.7 |
| uvery Delta         80.82         161.6         133.08         294.7         11.1         3675.0         3686.1         349         461.00         524.00         0.00         0.00         0.00           Nettur         260         260         520         463         983         820         5956         6776         1475         1764         3003         14         480           A1A         41A         820         745         1360         3450         5194         340         340         340         340                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 29          | Lower Coleroon        | 3.05   |              |                   | 4.87              | 10.97                   | 105.0             | 536.0     |           | 63.00                                   |                   | 173.00     | 0.00        | 0.00       | 0.00   | 00.00              | 712.05  | 112.9             | 824.97 |
| Mettur 260 260 520 463 983 820 5956 6776 1475 1764 3003 14 480                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 30(         | Cauvery Delta         | 80.82  |              |                   | 133.08            | 294.7                   | 1.                | 3675.0    | 3686.1    | 349                                     | 461.00            | 524.00     | 0.00        | 0.00       | 0.00   | 00.00              | 4279.82 | 225               | 4504.8 |
| 010 010 010 000 1240 0001 1200 0210 0210                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Total bel   | ow Mettur             | 260    |              |                   | 463               | 983                     | 820               | 9565      |           | 1475                                    |                   | 3003       | 14          | 480        | 493    |                    | 6696    | 1557              | 11256  |
| 1045 CP4 POTT POTT POTT POTT POTT POTT POTT PO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gross Total | tal                   | 414    | 414          | 829               | 745               | 1574                    | 2350              | 9452      | 12042     | 2434                                    | 2996              | 5194       | 249         | 3209       | 3458   |                    | 28274   | 3759              | 32033  |

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (8) + Col. no. (16) = Col. no. (14) + Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col.Col. no. (13) = Col. no.(11) + Col. no(12); Col. no. (18) = Col. no.(4) + Col. no(13) + Col. no.(15) + Col. no.(17); Col. no. (19) = Col. no.(3) + Col. no.(6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. e

Table 7.1.1(d): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|          |                         |                   |                                                   |                   |         |          |                   | ֚֭֚֚֡֝֝֟֝֟֝֟֝֟<br>֓֓֞֞֞֞֞֓֞֞֞֩֞֞֩֞֞֩֞֞֩֞֞֩֞֞֩֞֞֩֞֞֩ |        | COLUMN TATE OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF | 100000            | 201      |                                                      |               |              |                    | !                |                   |         |
|----------|-------------------------|-------------------|---------------------------------------------------|-------------------|---------|----------|-------------------|-----------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------|------------------------------------------------------|---------------|--------------|--------------------|------------------|-------------------|---------|
|          |                         | U/S w.            | U/S water utilization from minor and medium irrig | tion from         | minor a | nd mediu | m irriga          | ation projects*                                     | cts*   | D/s water                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | er utilizat       | ion from | D/s water utilization from major irrigation projects | gation pr     | <b>-</b>     | Exports            | Wal              | Water utilization | uo      |
| SI.No.   | Sub-basin/<br>Project   | Iu <sup>m,g</sup> | Iu <sup>m,s</sup>                                 | WS <sub>i,j</sub> | WSR     | ľu, m    | ľu <sup>r,g</sup> | lu <sup>r,s</sup>                                   | Iui    | Wsij                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | WS <sub>i,j</sub> | Wsi,j    | [1.5]                                                | II.'s         | - H          | OE <sup>q,je</sup> | Surface<br>water | Ground            | Total   |
|          |                         | IUMIHG            | IUMHS                                             | IUMH              | IUML    | IUM      | IURG              | IURS                                                | IUR    | WSU                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | WSI               | MSD      | IRG                                                  | IRS           | IRD          | OE                 |                  |                   |         |
| ε        | (2)                     | 3                 | (4)                                               | (5)               | (9)     | (7)      | ( <del>8</del> )  | (6)                                                 | (01)   | (11)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | (12)              | (13)     | (14)                                                 | (15)          | (16)         | (11)               | (81)             | (61)              | (20)    |
| -        | Yagachi                 | 1.24              | 1.24                                              | 2.48              | 3.42    | 5.9      | 25.68             | 17.12                                               | 42.80  | 10.96                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 16.84             | 27.80    | 11.69                                                | 71.33         | 83.02        | 0                  | 117.49           | 42.03             | 159.52  |
| 7        | Hemavathi               | 5.02              | 5.02                                              | 10.04             | 13.82   | 23.9     | 23.9 92.21        | 148.30                                              | 240.51 | 44.34                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 68.11             | 112.45   | 144.41                                               | 84.26         | 84.26 228.67 | 1134               | 1484.03          | 255.5             | 1739.49 |
| 3        | Harangi                 | 1.24              | 1.24                                              | 2.48              | 3.42    | 5.9      | 18.22             | 17.26                                               | 35.48  | 96.01                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 16.84             | 27.80    | 29.17                                                | 119.19        | 148.36       | 0                  | 165.49           | 52.05             | 217.54  |
| 4        | Cauvery                 | 0.63              | 0.63                                              | 1.25              | 1.72    | 2.97     | 12.90             | 9.44                                                | 22.34  | 5.51                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 8.46              | 13.97    | 24.24                                                | 389.11        | 413.35       | 0                  | 413.14           | 39.49             | 452.63  |
| 5        | KRS                     | 15.85             | 15.85                                             | 31.69             | 43.60   | 75.3     | 130.0             | 474.59                                              | 604.60 | 139.92                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 214.90            | 354.82   | 00.00                                                | 0.00          | 0.00         | 1506               | 2351.25          | 189.5             | 2540.7  |
| Total Ur | Total Upper Cauvry s.b. | 24                | 24                                                | 48                | 99      | 114      | 279               | 199                                                 | 946    | 212                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 325               | 537      | 210                                                  | 664           | 873          | 2640               | 4531             | 578               | 5110    |
| 9        | Banasursagar            | 0.20              | 0.20                                              | 0.4               | 0.28    | 0.68     | 1.52              | 00'0                                                | 1.52   | 1.76                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2.44              | 4.20     | 2.09                                                 | 64.31         | 66.40        | 189                | 257.71           | 4.09              | 261.80  |
| 7        | Mananthvady             | 0.51              | 0.51                                              | 1.01              | 0.71    | 1.72     | 7.02              | 146.65                                              | 153.67 | 4.46                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6.18              | 10.64    | 00.0                                                 | 0.00          | 0.00         | 276.0              | 433.79           | 8.235             | 442.03  |
| ∞        | Kabini                  | 6.27              | 6.27                                              | 12.53             | 8.79    | 21.3     | 88.51             | 530.40                                              | 16.819 | \$5.23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 76.56             | 131.79   | 6.60                                                 | 845.40 852.00 | 852.00       | 202                | 1715.86          | 110.2             | 1826.02 |
| 6        | Taraka                  | 06.0              | 0.90                                              | <u>~</u>          | 1.26    | 3.06     | 1.24              | 00.0                                                | 1.24   | 7.94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 11.00             | 18.94    | 4.89                                                 | 152.98        | 157.87       | 0                  | 172.82           | 8.29              | 181.1   |
| 01       | Sagardoddakere          | 09.0              | 09.0                                              | 1.2               | 0.85    | 2.05     | 4.59              | 00.0                                                | 4.59   | 5.31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 7.36              | 12.67    | 0.93                                                 | 22.07         | 23.00        | 95                 | 130.34           | 6.97              | 137.31  |
| =        | Upper Nagu              | 3.08              | 3.08                                              | 91.9              | 4.34    | 10.5     | 44.70             | 79.35                                               | 124.05 | 27.26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 37.78             | 65.04    | 9.88                                                 | 430.12 440.00 | 440.00       | 290                | 867.59           | 62                | 929.59  |
| 12       | Nugu                    | 0.11              | 0.11                                              | 0.22              | 0.16    | 0.38     | 0.15              | 00.0                                                | 0.15   | 0.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1.35              | 2.33     | 1.87                                                 | 175.04        | 176.91       | 0                  | 177.48           | 2.29              | 179.77  |
| 13       | Kabini s.b.r.arca       | 11.32             | 11.32                                             | 22.64             | 15.63   | 38.3     | 134.5             | 272.77                                              | 407.25 | 60.04                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 137.34            | 236.41   | 00.00                                                | 00.00         | 0.00         | 66                 | 619.50           | 161.4             | 780.93  |
| Total Ks | Total Kabini s.b.       | 23                | 23                                                | 46                | 32      | 78       | 282               | 1029                                                | 1311   | 202                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 280               | 487      | 26                                                   | 0691          | 1716         | 1151               | 4375             | 363               | 4739    |
| 14       | Shimsha.                | 26.50             | 26.50                                             | 53                | 62.00   | 115      | 506.0             | 244.69                                              | 1000.7 | 233.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 348.00            | 581.00   | 0.00                                                 | 0.00          | 0.00         | 0.00               | 852.19           | 594.5             | 1446.69 |
| 15       | Arkavathi               | 48.50             | 48.50                                             | 97                | 32.00   | 129      | 22.50             | 30.30                                               | 52.80  | 113.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 0.00              | 113.00   | 0.00                                                 | 00.0          | 0.00         | 0.00               | 191.80           | 103               | 294.80  |
| 16       | Middle Cauvery          | 8.50              | 8.50                                              | 17                | 18.00   | 35       | 178.5             | 1310.0                                              | 1488   | 74.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 109.00            | 183.00   | 0.00                                                 | 0.00          | 0.00         | 14.00              | 1515.47          | 205               | 1720.47 |
| 17       | Suvarnavathi            | 3.50              | 3.50                                              | 7                 | 24.00   | 31       | 36.4              | 00.0                                                | 36.40  | 32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 33                | 65       | 0.00                                                 | 0.00          | 0.00         | 0.00               | 68.50            | 63.9              | 132.40  |
| 18       | Palar                   | 11.60             | 11.60                                             | 23.19             | 21.03   | 44.2     | 100.5             | 20.80                                               | 121.3  | 11.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 14.00             | 25.00    | 00.0                                                 | 00.0          | 0.00         | 0.00               | 57.40            | 133.1             | 190.52  |
| 61       | Chinnar s.b.r.area      | 8.86              | 8.86                                              | 17.71             | 27.23   | 44.9     | 124.6             | 52.97                                               | 177.6  | 0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 00.00             | 00.0     | 00.0                                                 | 40.00         | 40.00        | 0.00               | 101.83           | 160.7             | 262.54  |
| 20       | Mettur                  | 0.00              | 0.00                                              | 0                 | 0.00    | 0        | 0.00              | 0.00                                                | 0.00   | 78.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 123.0             | 201.0    | 0.0                                                  | 275.0         | 275.0        | 7200.00            | 7676.00          | 0                 | 7676.00 |
| Total Ch | Total Chinnar s.b       | 6                 | 6                                                 | 18                | 27      | 45       | 125               | 53                                                  | 178    | 78                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 123               | 201      | 0                                                    | 315           | 315          | 7200               | 7778             | 161               | 7939    |
| Tofal ah | Total about Martin      | 154               | 720                                               | 300               | 404     | . 04     |                   |                                                     |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                   |          | 4                                                    | ***           |              |                    | 0000             |                   | -       |

Table 7.1.1(d) continued...

Table 7.1.1(d) continued...

Table 7.1.1(d): Results of LP Model for 75% Water Year Annual Dependable Flow (Maximization of Water Utilization)

| Sub-basiny Project Iu, Sub-basiny Projects Iu, Sub-basiny Projects Iu, Sub-basiny Project Iu, Sub-basiny Project Iu, Sub-basiny Project Iu, Sub-basiny Project Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basiny Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin Robert Iu, Sub-basin |           |                       |        |             |                   |          |                        |           | Exp               | ort From | Export From Mettur Reservoir = 7200 MCM | eservoir :  | = 7200 M  | CM         |                 |        |                      |         | !<br>       | :      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------------|--------|-------------|-------------------|----------|------------------------|-----------|-------------------|----------|-----------------------------------------|-------------|-----------|------------|-----------------|--------|----------------------|---------|-------------|--------|
| $ \begin{array}{c ccccccccccccccccccccccccccccccccccc$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |                       | U/S ₩  | ater utiliz | ation from        | minor an | d mediu                | m irrigat | ion proje         | cts*     | D/s wate                                | r utilizati | on from n | najor irri | gation pr       |        | Exports              | Wa      | er utilizat | ä      |
| TUMHG   TUMH   TUMH   TUML   TUMG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG   TURG     | SI.No.    | Sub-basin/<br>Project |        |             | WS <sub>i,j</sub> | WSIJ     | Iu <sup>m</sup><br>i,j | ľuľ,ĝ     | Iu <sup>r,s</sup> | ľu, j    | Ws.U                                    | Wsij        | Wsij      | L.         | $\Pi_{i,j}^{s}$ | Ir.    | OE <sup>q, j</sup> e |         | Ground      | Total  |
| (2)         (3)         (4)         (5)         (6)         (7)         (8)         (9)         (10)         (11)         (12)         (13)         (14)         (15)         (17)         (18)         (19)           wer Bhawani         12.44         12.44         24.88         21.54         64.22         84.20         256.17         9.89         324.88         334.77         0         813.77         128.1           avani s.b. and s.b.         18         16         21.59         43.79         187.21         18.25         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |                       | IUMHG  | IUMHS       | IUMH              |          | -                      | IURG      | IURS              | IUR      | WSU                                     | WSI         | QSW       | IRG        | IRS             | 35     | OE                   |         | _           |        |
| wer Bhawani         12.44         12.44         2.4.88         21.54         46.42         84.20         25.028         334.48         199.88         156.29         266.17         9.89         324.88         334.77         0         65.79         12.44         12.44         24.88         21.54         46.42         84.20         25.028         334.48         199.88         156.29         266.17         9.89         324.88         334.77         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 </td <td>Ξ</td> <td>(2)</td> <td>(3)</td> <td>(4)</td> <td>(S)</td> <td>(9)</td> <td>(2)</td> <td>(8)</td> <td>(6)</td> <td>(10)</td> <td>(11)</td> <td>(12)</td> <td>(13)</td> <td>(14)</td> <td>(15)</td> <td>(91)</td> <td>(17)</td> <td>(8)</td> <td>(61)</td> <td>(20)</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Ξ         | (2)                   | (3)    | (4)         | (S)               | (9)      | (2)                    | (8)       | (6)               | (10)     | (11)                                    | (12)        | (13)      | (14)       | (15)            | (91)   | (17)                 | (8)     | (61)        | (20)   |
| avaints.b. rates         5.79         5.79         11.57         10.02         21.59         43.79         138.72         182.51         5.1.1         72.71         182.59         0.00         0.00         0.00         0.00         0.00         408         735.09         59.6           anis.b.         18         36         32         68         12.8         36         51.7         161.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 21        | Lower Bhawani         | 12.44  | 12.44       |                   |          |                        | 84.20     |                   | 334.48   | 109.88                                  | 156.29      | 266.17    | 68.6       | 324.88          | 334.77 | 0                    | 853.77  | 128.1       | 981.84 |
| village         35         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         5.95         1.90         8.25         20.15         18.09         2.01         20.10         10.23         0.00         16.100         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 22        | Bhavani s.b.r.area    | 5.79   |             |                   | 10.02    | 21.59                  | 43.79     | 138.72            | 182.51   | 51.12                                   | 72.71       | 182.59    | 00.00      | 0.00            | 0.00   | 408                  | 735.09  |             | 794.69 |
| yii         5.95         5.95         11.90         8.25         20.15         18.09         2.01         20.10         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Total Bh. | awani s.b.            | 18     |             |                   | 32       |                        | 128       | 389               | 517      | 191                                     | 229         | 449       | 10         | 325             | 335    | 408                  | 1589    | 188         | 1777   |
| aravathi         2.37         2.37         4.73         5.31         10.04         23.53         43.15         66.68         20.88         30.91         153.91         3.76         154.92         158.68         0.00         354.34         34.97         20.70           Aravathi         20.98         20.98         41.96         47.07         89.03         137.64         336.11         473.75         185.12         274.09         294.97         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 23        | Noyil                 | 5.95   |             |                   | 8.25     | 20.15                  | 18.09     | 2.01              | 20.10    | 123.00                                  | 0.00        | 161.00    | 0.00       | 0.00            | 0.00   | 0.00                 | 168.96  | 32.29       | 201.25 |
| avathi s.b.         20.98         41.96         47.07         89.03         137.64         336.11         473.75         185.12         274.09         294.97         0.00         0.00         0.00         0.00         652.06         205.7           avathi s.b.         23         47         52         99         161         379         540         206         305         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 24        | Amaravathi            | 2.37   | 2.37        |                   | 5.31     | 10.04                  | 23.53     | 43.15             | 89.99    | 20.88                                   | 30.91       | 153.91    | 3.76       | 154.92          | 158.68 | 0.00                 | 354.34  | 34.97       | 389.31 |
| avathi s.b.         23         23         47         52         99         161         379         540         206         305         449         4         155         159         0         1006         241           umanimutar         109.74         109.74         219.5         198.98         418.5         41.28         231.10         272.38         370.00         530.00         736.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 25,       | Amaravathi            | 20.98  | 20.98       |                   | 47.07    | 89.03                  |           | 336.11            | 473.75   | 185.12                                  | 274.09      | 294.97    | 0.00       | 0.00            | 0.00   | 0.00                 | 652.06  | 205.7       | 857.75 |
| avaithi s.b.         23         47         52         99         161         379         540         206         305         449         4         155         159         0         1006         241           umanimuttar         109.74         109.74         219.5         198.98         411.8         231.10         272.38         370.00         530.00         736.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           | s.b.r.area            |        |             |                   |          |                        |           |                   |          |                                         |             |           | i          |                 |        |                      |         |             |        |
| umanimuttar         109.74         109.74         219.5         198.98         41.85         41.28         231.10         272.38         370.00         530.00         736.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Total Am  | naravathi s.b.        | 23     | 23          | 47                | 52       | 66                     | 191       | 379               | 540      | 206                                     | 305         | 449       | 4          | 155             | 159    | 0                    | 1006    | 241         | 124    |
| nnai Ar         8.13         8.13         16.25         10.19         26.44         175.48         142.36         317.84         113.00         155.00         525.00         0.00         0.00         0.00         0.00         0.00         675.49         193.8           per Coleroon         3.05         10.75         11.49         23.53         45.02         180.00         63.00         130.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <td>56</td> <td>Tirumanimuttar</td> <td>109.74</td> <td>109.74</td> <td></td> <td>198.98</td> <td>418.5</td> <td>1.28</td> <td>231.10</td> <td>272.38</td> <td>370.00</td> <td>530.00</td> <td>736.00</td> <td>00.0</td> <td>0.00</td> <td>0.00</td> <td>0.00</td> <td></td> <td>350</td> <td>1426.8</td>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 56        | Tirumanimuttar        | 109.74 | 109.74      |                   | 198.98   | 418.5                  | 1.28      | 231.10            | 272.38   | 370.00                                  | 530.00      | 736.00    | 00.0       | 0.00            | 0.00   | 0.00                 |         | 350         | 1426.8 |
| per Coleroon         10.75         10.75         21.49         23.53         45.02         180.05         810.65         90.00         130.00         243.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00 <th< td=""><td>27</td><td>Ponnai Ar</td><td>8.13</td><td>8.13</td><td></td><td>10.19</td><td>26.44</td><td>175.48</td><td>142.36</td><td>317.84</td><td>113.00</td><td></td><td>525.00</td><td>0.00</td><td>0.00</td><td>00.0</td><td>00.0</td><td>675.49</td><td>193.8</td><td>869.2</td></th<>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 27        | Ponnai Ar             | 8.13   | 8.13        |                   | 10.19    | 26.44                  | 175.48    | 142.36            | 317.84   | 113.00                                  |             | 525.00    | 0.00       | 0.00            | 00.0   | 00.0                 | 675.49  | 193.8       | 869.2  |
| wer Coleroon         3.05         3.05         6.1         4.87         10.97         105.00         536.00         641.00         63.00         173.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         4479.82         12.9           Nettur         260         250         463         983         820         6185         7005         1475         1893         3260         14         480         493         408         10593         1557           Mettur         260         250         745         1574         2350         9540         12140         2430         3125         5446         249         3149         3398         18549         3759                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 28        | Upper Coleroon        | 10.75  | 10.75       |                   | 23.53    | 45.02                  | 180.00    | 630.65            | 810.65   | 90.00                                   | 130.00      | 243.00    | 00.00      | 0.00            | 0.00   | 00.0                 | 884.40  | 214.3       | 1098   |
| Wettur         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260         260<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 29        | Lower Coleroon        | 3.05   | 3.05        |                   | 4.87     | 10.97                  |           | 536.00            | 641.00   | 63.00                                   |             | 173.00    | 0.00       | 0.00            | 0.00   | 00.00                | 712.05  | 112.9       | 824.9  |
| Mettur         260         260         520         463         983         820         6185         7005         1475         1893         3260         14         480         493         408         10593         1557           414         414         414         829         745         1574         2350         9540         12140         2430         3125         5446         249         3149         3398         18549         3759                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 30        | Cauvery Delta         | 80.82  | 80.82       |                   | 133,08   | 294.7                  | 11.10     |                   | 3886.1   | 349                                     | 461.00      | 524.00    | 0.00       | 0.00            | 0.00   | 0.00                 | 4479.82 | 225         | 4704.8 |
| 414 414 829 745 1574 2350 9540 12140 2430 3125 5446 249 3149 3398 18549 3759                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Total bel | ow Mettur             | 260    | 260         | 920               | 463      |                        | 820       | 6185              | 7005     | 1475                                    | 1893        | 3260      | 14         | 480             | 493    | 408                  | 10593   | 1557        | 12149  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Gross To  | ıtal                  | 414    | 414         | 829               | 745      |                        | 2350      | 9540              | 12140    | 2430                                    | 3125        | 5446      | 249        | 3149            | 3398   |                      | 18549   | 3759        | 3372   |

2 6 E 8 E 8

Col. no. (10) = Col. no.(8) + Col. no (9); Col. no. (16) = Col. no.(14) + Col. no(15); Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (13) = Col. no. (11) + Col. no. (12); Col. no. (18) = Col. no. (4) + Col. no. (13) + Col. no. (15) + Col. no. (15) + Col. no. (17); Col. no. (19) = Col. no. (19) = Col. no. (3) + Col. no. (6) + Col. no. (14). ₹ Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE].  $\widehat{\mathbb{B}}$ 

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Table 7.1.2(a): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                    |                         | _                 |                                                                  |                   |                   |             |            |           | ֡      |          |                    |                                                               |             |                     |              |          |         |                          |         |
|--------------------|-------------------------|-------------------|------------------------------------------------------------------|-------------------|-------------------|-------------|------------|-----------|--------|----------|--------------------|---------------------------------------------------------------|-------------|---------------------|--------------|----------|---------|--------------------------|---------|
|                    |                         | U/S w             | U/S water utilization from minor and medium irrigation projects* | tion from         | minor a           | nd mediu    | im irrigat | ion proje | cts*   | D/s wate | r utilizat         | rejects* D/s water utilization from major irrigation projects | najor irrig | ation pre           |              | Exports  | Wat     | Water utilization        | ion     |
| SI.No.             | Sub-basin/<br>Project   | Iu <sup>m,g</sup> | lu <sup>m,s</sup>                                                | WS <sub>i,j</sub> | WS <sub>1,j</sub> | E.:.        | Iur.ë      | Iu ;      | Iu',   | Wsij     | Ws <sup>1</sup> ,j | WSij                                                          | Ir.         | $I\Gamma_{i,j}^{S}$ | Ir.,         | OE'i,j.p | Surface | Ground                   | Total   |
|                    |                         | IUMHG             | IUMHS                                                            | IUMH              | IUML              | IUM         | IURG       | IURS      | IUR    | WSU      | WSI                | MSD                                                           | IRG         | IRS                 | IRD          | OE       |         |                          |         |
| (1)                | (2)                     | (3)               | (4)                                                              | (5)               | (9)               | (7)         | (8)        | (6)       | (01)   | (E)      | (12)               | (13)                                                          | (14)        | (15)                | (16)         | (11)     | (18)    | (61)                     | (20)    |
| 1 Yi               | Yagachi                 | 1.24              | 1.24                                                             | 2.48              | 3.42              | 5.90        | 25.68      | 117.12    | 142.80 | 10.96    | 16.84              | 27.80                                                         | 11.69       | 112.23 123.92       | 123.92       | 0        | 258.39  | 42.03                    | 300 42  |
| 2 He               | Hemavathi               | 5.02              | 5.02                                                             | 10.04             | 13.82             | 23.86       |            | 248.50    | 340.71 | 44.34    | 68.11              | 112.45                                                        | ###         | 84.26               | 84.26 228.67 | 1134     | 1584.23 | 255.46                   | 1839.69 |
| 3 Hz               | Harangi                 | 1.24              | 1.24                                                             | 2.48              | 3.42              | 5.90        | 18.22      | 21.40     | 39.62  | 10.96    | 16.84              | 27.80                                                         | 29.17       | 216.90 246.07       | 246.07       | 0        | 267.34  | 52.05                    | 319.39  |
| <b>₽</b>           | Cauvery                 | 0.63              | 0.63                                                             | 1.25              | 1.72              | 2.97        | 12.90      | 19.8      | 21.51  | 5.51     | 8.46               | 13.97                                                         | 24.24       | 389.1 413.35        | 413.35       | 0        | 412.31  | 39.49                    | 451.80  |
| 5 K                | KRS                     | 15.85             | 15.85                                                            | 31.69             | 43.60             | 75.29       | 130.01     | 664.60    | 794.61 | 139.92   | 214.90             | 354.82                                                        | 0.00        | 00.0                | 00.0         | 1506     | 2541.26 | 189.45                   | 2730.72 |
| Total Uppe         | Total Upper Cauvry s.b. | 24                | 24                                                               | 84                | 99                | 114         | 279        | 1060      | 1339   | 212      | 325                | 537                                                           | 210         | 802                 | 1012         | 2640     | 5064    | 578                      | 5642    |
| 6 Ba               | Banasursagar            | 0.20              | 0.20                                                             | 0.40              | 0.28              | 0.68        | 1.52       | 0.00      | 1.52   | 1.76     | 2.44               | 4.20                                                          | 2.09        | 64.31               | 66.40        | 681      | 257.71  | 4.09                     | 261.80  |
| ν.                 | Mananthvady             | 0.51              | 0.51                                                             | 1.01              | 0.71              | 1.72        | 7.02       | 139.65    | 146.67 | 4.46     | 6.18               | 10.64                                                         | 0.00        | 0.00                | 0.00         | 276.0    | 426.80  | 8.24                     | 435.03  |
| 8<br>Ka            | Kabini                  | 6.27              | 6.27                                                             | 12.53             | 8.79              | 21.32       | 88.51      | 630.40    | 718.91 | 55.23    | 76.56              | 131.79                                                        | 09.9        | 845.40 852.00       | 852.00       | 202      | 1815.86 | 110.17                   | 1926.02 |
| 9 Ta               | Taraka                  | 06:0              | 06:0                                                             | 1.80              | 1.26              | 3.06        | 1.24       | 0.00      | 1.24   | 7.94     | 11.00              | 18,94                                                         | 4.89        | 169.54 174.43       | 174.43       | 0        | 189.38  | 8.29                     | 197.67  |
| 10 Sa              | Sagardoddakere          | 09.0              | 09.0                                                             | 1.20              | 0.85              | 2.05        | 4.59       | 0.00      | 4.59   | 5.31     | 7.36               |                                                               | 0.93        | 23.07               | 24.00        | 95       | 131.34  | 6.97                     | 138.3   |
| 11                 | Upper Nagu              | 3.08              | 3.08                                                             | 91.9              | 4.34              | 4.34 10.50  | 44.70      | 182.17    | 226.87 | 27.26    | 37.78              | 65.04                                                         | 9.88        | 430.12 440,00       | 440.00       | 290      | 970.41  | 62.00                    | 1032.4  |
| 12 Nr              | Nugu                    | 0.11              | 0.11                                                             | 0.22              | 0.16              | 0.38        | 0.15       | 0.00      | 0.15   | 0.98     | 1.35               | 2.33                                                          | 1.87        | 295.04 296.91       | 296.91       | 0        | 297.48  | 2.29                     | 299.77  |
| 13 Ka              | Kabini s.b.r.area       | 11.32             | 11.32                                                            | 22.64             | 15.63             | 38.27       | 134.48     | 727.77    | 862.25 | 70.66    | 137.34             | 236.41                                                        | 00.00       | 0.00                | 0.00         | 66       | 1074.50 | 161.43                   | 1235.93 |
| Total Kabini s.b.  | ini s.b.                | 23                | 23                                                               | 46                | 32                | 78          | 282        | 1680      | 1967   | 202      | 280                | 482                                                           | 26          | 1827                | 1854         | 1151     | 5163    | 363                      | 5527    |
| 14 Sh              | Shimsha.                | 26.50             | 26.50                                                            | 53.00             | 62.00 115.0       |             | 506.00     | 494.69    | 1000.7 | 233.00   | 348.00             | 581.00                                                        | 00.00       | 0.0                 | 0.0          | 0.00     | 1102.19 | 594.5                    | 1696.69 |
| 15 Ar              | Arkavathi               | 48.50             | 48.50                                                            | 97.00             | 32.00             | 32.00 129.0 | 22.50      | 30.30     | 52.80  | 223.00   | 0.00               | 223.00                                                        | 0.00        | 0.00                | 0.00         | 0.00     | 301.80  | 103.00                   | 404.80  |
| 16 M               | Middle Cauvery          | 8.50              | 8.50                                                             | 17.00             | 18.00             | 18.00 35.00 | 178.50     | 1910.0    | 2088.5 | 74.00    | 109.00             | 183.00                                                        | 0.00        | 0.00                | 0.00         | 14.00    | 2115.47 | 205.00                   | 2320.47 |
| 17 Su              | Suvamavathi             | 3.50              | 3.50                                                             | 7.00              | 24.00             | 31.00       | 36.40      | 0.00      | 36.40  | 32.00    | 63.00              | 95.00                                                         | 0.00        | 0.00                | 00.00        | 0.00     | 98.50   | 63.90                    | 162.40  |
| 18 Pa              | Palar                   | 11.60             | 11.60                                                            | 23,19             | 21.03             | 44.22       | 100.50     | 138.40    | 238.90 | 21.00    | 00.0               | 21.00                                                         | 0.00        | 0.00                | 00.0         | 0.00     | 171.00  | 133.13                   | 304.12  |
| 19<br>Ch           | Chinnar s.b.r.area      | 8.86              | 8.86                                                             | 17.71             | 27.23             | 44.94       | 124.63     | 92.97     | 217.60 | 0.00     | 0.00               | 0.00                                                          | 0.00        | 0.00                | 0.00         | 0.00     | 101.83  | 160.71                   | 262.54  |
| 20 M               | Mettur                  | 00.00             | 0.00                                                             | 0.00              | 0.00              | 0.00        | 0.00       | 0.00      | 0.00   | 78.00    | 123.00             | 201.00                                                        | 0.00        | 275.00 275.00       | 275.00       | 4200.0   | 4676.00 | 0.00                     | 4676.00 |
| Total Chinnar s.b  | nar s.b                 | 6                 | 6                                                                | 18                | 27                | 45          | 125        | 93        | 218    | 78       | 123                | 201                                                           | 0           | 275                 | 275          | 4200     | 4778    | 161                      | 4938.54 |
| Total above Mettur | e Mettur                | 154               | 154                                                              | 309               | 282               | 165         | 1530       | 5407      | 6936   | 1075     | 1248               | 2323                                                          | 236         | 2905                | 3141         |          | 18794   | 2202                     | 20996   |
|                    |                         |                   |                                                                  |                   |                   |             |            |           |        |          |                    |                                                               |             |                     |              | Table    | 7.1.2(  | Table 7.1.2(a) continued | nued    |

Table 7.1.2(a) continued...

Table 7.1.2(a): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                       |                       |                   |                                             |                |                                 |             |                    | Ex                   | port From         | Mettur R          | eservoir    | Export From Mettur Reservoir = 4200 MCM              | <u>S</u>   |                  |        |                     |         |                   |        |
|-----------------------|-----------------------|-------------------|---------------------------------------------|----------------|---------------------------------|-------------|--------------------|----------------------|-------------------|-------------------|-------------|------------------------------------------------------|------------|------------------|--------|---------------------|---------|-------------------|--------|
|                       |                       | U/S w             | U/S water utilization from minor and medium | tion from      | minor a                         | od medi     |                    | irrigation projects* | ects*             | D/s wate          | er utilizat | D/s water utilization from major irrigation projects | major irri | gation pr        | $\Box$ | Exports             | Wa      | Water utilization | ion    |
| SI.No.                | Sub-basin/<br>Project | Iu <sup>m,g</sup> | Iums ,                                      | WS,j WS,j Iu,m | Ws <sub>i,j</sub>               |             | ľuľ,g              | ľu r,s               | lu <sub>i,j</sub> | WS <sub>i,j</sub> | Ws.i.j      | WSi,j                                                | \$ I       | Ir. <sup>S</sup> | - H    | OE <sup>q, je</sup> | Surface | Ground            | Total  |
|                       |                       | IUMHG             | UMHG IUMHS                                  | IUMH           | IUML                            | M           | IURG               | IURS                 | IÇR.              | MSU               | WSI         | MSD                                                  | IRG        | IRS              | IRD    | OE                  |         |                   |        |
| Ξ                     | (2)                   | (3)               | (4)                                         | (5)            | 9)                              | 3           | (8)                | 6                    | (10)              | (11)              | (12)        | (13)                                                 | (14)       | (15)             | (91)   | (11)                | (18)    | (61)              | (20)   |
| 21 Lower              | 21 Lower Bhawani      | 12.44             | 12.44                                       | 24.88          | 21.54                           | 46.42       | 84.20              | 250.28               | 334.48            | 109.88            | 156.29      | 266.17                                               | 68.6       | 324.88           | 334.77 | 0                   | 853.77  | 128.07            | 981.8  |
| 22 Bhava              | 22 Bhavani s.b.r.area | 5.79              | 5.79                                        | 11.57          |                                 | 10.02 21.59 | 43.79              | 138.67               | 182.46            | 51.12             | 72.71       | 123.83                                               | 0.00       | 0.00             | 0.00   | 408                 | 676.28  | 59.60             | 735.8  |
| Total Bhawani s.b.    | s.b.                  | 18                | 18                                          | 36             | 32                              | 89          | 128                | 389                  | 517               | 191               | 229         | 390                                                  | 10         | 325              | 335    | 408                 | 1530    | 188               | Ξ      |
| 23 Noyil              |                       | 5.95              | 5.95                                        | 11.90          |                                 | 8.25 20.15  | 18.09              | 2.01                 | 20.10             | 131,00            | 0.00        | 131.00                                               | 00.0       | 0.00             | 0.00   | 0.00                | 138.96  | 32.29             | 171.2  |
| 24 Amaravathi         | ıvathi                | 2.37              | 2.37                                        | 4.73           |                                 | 5.31 10.04  | 23.53              | 43.15                | 89.99             | 20.88             | 30.91       | 51.79                                                | 3.76       | 198.50           | 202.26 | 00.0                | 295.80  | 34.97             | 330.7  |
| 25 Amaravathi         | ıvathi                | 20.98             | 20.98                                       | 41.96          | 47.07 89.03                     |             | 137.64 262.68      | 262.68               | 400.32            | 185.12            | 274.09      | 459.21                                               | 0.00       | 0.00             | 00.0   | 0.00                | 742.87  | 205.69            | 948.5  |
| Total Amaravathi s.b. | ithi s.b.             | 23                | 23                                          | 47             | 52                              | 66          | 191                | 306                  | 467               | 206               | 305         | 511                                                  | 4          | 199              | 202    | 0                   | 1039    | 241               | 127    |
| 26 Tirumanimuttar     | animuttar             | 109.74            | 109.74                                      | 219.5          |                                 | 199.0 418.5 | 41.28              | 240.00               | 281.28            | 370.00            | 282.00      | 652.00                                               | 0.00       | 0.00             | 0.00   | 00.0                | 1001.74 | 350.00            | 1351.7 |
| 27 Ponnai Ar          | i Ar                  | 8.13              | 8.13                                        | 16.25          | 10.19                           | 26.44       | 10.19 26.44 175.48 | 122.52               | 298.00            | 113.00            | 155.00      | 268.00                                               | 00.0       | 0.00             | 0.00   | 0.00                | 398.64  | 193.80            | 592.4  |
| 28 Upper              | 28 Upper Coleroon     | 10.75             | 10.75                                       | 21.49          | 21.49 23.53 45.02 180.00 630.65 | 45.02       | 180.00             | 630.65               | 810.65            | 90.00             | 130.00      | 220.00                                               | 0.00       | 00.00            | 0.00   | 0.00                | 861.40  | 214.28            | 1075.6 |
| 29 Lower              | 29 Lower Coleroon     | 3.05              | 3.05                                        | 6.10           |                                 | 10.97       | 4.87 10.97 105.00  | 536.00               | 641.00            | 63.00             | 83.00       | 146.00                                               | 0.00       | 00.0             | 00.0   | 0.00                | 685.05  | 112.92            | 797.9  |
| 30 Cauvery Delta      | ry Delta              | 80.82             | 80.82                                       | 9.191          |                                 | 133.1 294.7 | 11.10              | 3310.4               | 3321.5            | 349.00            | 461.00      | 810.00                                               | 0.00       | 0.00             | 0.00   | 00:0                | 4201.21 | 225.00            | 4426.2 |
| Total below Mettur    | ettur                 | 097               | 260                                         | 520            | 463                             | 686         | 820                | 5536                 | 6356              | 1483              | 1645        | 3128                                                 | 14         | 523              | 537    | 408                 | 9826    | 1557              | 1141   |
| Gross Total           |                       | 414               | 414                                         | 829            | 745                             | 1574        | 2350               | 10943                | 13293             | 2558              | 2893        | 5451                                                 | 249        | 3428             | 3678   |                     | 28650   | 3759              | 3240   |

**88 84 71 72 73 88 84** 

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. no. (11) + Col. no. (12); Col. no. (18) = Col. no. (4) + Col. no. (13) + Col. no. (15) + Col. no. (17); Col. no. (19) = Col. no. (3) + Col. no. (4) + Col. no. (18) + Col. no. (18). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. (B)

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Table 7.1.2(b): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|           |                         | MS/N              | U/S water utilization from minor and medium irrig | ation from        | minor a     | nd medi                |        | ation projects* | ects*  | D/s wat- | er utilizat | D/s water utilization from major irrigation projects | major irri         | gation pr         | 1             | Exports | Wat     | Water utilization | uo      |
|-----------|-------------------------|-------------------|---------------------------------------------------|-------------------|-------------|------------------------|--------|-----------------|--------|----------|-------------|------------------------------------------------------|--------------------|-------------------|---------------|---------|---------|-------------------|---------|
| SI.No.    | Sub-basin/<br>Project   | lu <sup>m,g</sup> | Ju <sup>m,s</sup>                                 | WS <sub>i,j</sub> | Wski,       | lu <sup>m</sup><br>jij | lu, g  | lur,s<br>i,j    | Iu,    | WS,j     | Ws.i.j      | Wsij                                                 | Ir. <sup>g</sup> . | $\prod_{i,j}^{S}$ | II. j         | OE4, je | Surface | Ground            | Total   |
|           |                         | IUMHG             | IUMHS                                             | IUMH              | IUML        | IUM                    | IURG   | IURS            | IUR    | NSM      | ISM         | MSD                                                  | IRG                | IRS               | IRD           | 90<br>E |         |                   |         |
| (1)       | (2)                     | (3)               | (4)                                               | (5)               | (9)         | (7)                    | (8)    | 6)              | (10)   | (E)      | (12)        | (13)                                                 | (14)               | (15)              | (91)          | (11)    | (81)    | (61)              | (20)    |
| ı         | Yagachi                 | 1.24              | 1.24                                              | 2.48              | 3.42        | 5.90                   | 25.68  | 107.12          | 132.80 | 10.96    | 16.84       | 27.80                                                | 11.69              | 111.17            | 111.17 122.86 | 0       | 247.33  | 42.03             | 289.36  |
| 2         | Hemavathi               | 5.02              | 5.02                                              | 10.04             | _           | 3.82 23.86             | 92.21  | 231.32          | 323.53 | 44.34    | 68.11       | 112.45                                               | 144.41             | 84.26             | 84.26 228.67  | 1134    | 1567.05 | 255.46            | 1822.51 |
| 3         | Harangi                 | 1.24              | 1.24                                              | 2.48              | 3.42        | 5.90                   | 18.22  | 17.26           | 35.48  | 10.96    | 16.84       | 27.80                                                | 29.17              | 216.86            | 216.86 246.03 | 0       | 263.16  | 52.05             | 315,21  |
| 4         | Cauvery                 | 0.63              | 0.63                                              | 1.25              | 1.72        | 2.97                   | 12.90  | 8.61            | 21,51  | 5.51     | 8,46        | 13.97                                                | 24.24              | 389.1             | 389.1 413.35  | 0       | 412.31  | 39.49             | 451.80  |
| 5         | KRS                     | 15.85             | 15.85                                             | 31.69             | 43.60       | 75.29                  | 130.01 | 604.05          | 734.06 | 139.92   | 214.90      | 354.82                                               | 00.0               | 0.00              | 0.00          | 1506    | 2480.71 | 189.45            | 2670.2  |
| Total Up  | Total Upper Cauvry s.b. | 24                | 24                                                | 48                | 99          | 114                    | 279    | 896             | 1247   | 212      | 325         | 537                                                  | 210                | 801               | 1011          | 2640    | 4971    | 578               | 5549    |
| 9         | Banasursagar            | 0.20              | 0.20                                              | 0.40              | 0.28        | 89.0                   | 1.52   | 0.00            | 1.52   | 1.76     | 2.44        | 4.20                                                 | 2.09               | 64.31             | 66.40         | 189     | 257.71  | 4.09              | 261.80  |
| 7         | Mananthvady             | 0.51              | 0.51                                              | 1.01              | 0.71        | 1.72                   | 7.02   | 139.65          | 146.67 | 4.46     | 6.18        | 10.64                                                | 00.00              | 0.00              | 0.00          | 276.0   | 426.80  | 8.24              | 435.03  |
| 8         | Kabini                  | 6.27              | 6.27                                              | 12.53             | 8.79        | 21.32                  | 88.51  | 620.40          | 16'80' | 55.23    | 76.56       | 131.79                                               | 09.9               | 845.40 852.00     | 852.00        | 202     | 1805.86 | 110.17            | 1916.02 |
| 6         | Taraka                  | 06:0              | 0.90                                              | 1.80              | 1.26        | 3.06                   | 1.24   | 0.00            | 1.24   | 7.94     | 11.00       | 18.94                                                | 4.89               | _                 | 161.54 166.43 | 0       | 181.38  | 8.29              | 189.67  |
| 10        | Sagardoddakere          | 09.0              | 09.0                                              | 1.20              | 0.85        | 2.05                   | 4.59   | 0.00            | 4.59   | 5.31     | 7.36        | 12.67                                                | 0.93               | 23.07             | 24.00         | 95      | 131.34  | 6.97              | 138.31  |
| =         | Upper Nagu              | 3.08              | 3.08                                              | 6.16              | 4.34        | 10.50                  | 44.70  | 172.17          | 216.87 | 27.26    | 37.78       | 65.04                                                | 9.88               |                   | 430.12 440.00 | 290     | 960.41  | 62.00             | 1022.4  |
| 12        | Nugu                    | 0.11              | 0.11                                              | 0.22              | 0.16        | 0.38                   | 0.15   | 0.00            | 0.15   | 0.98     | 1.35        | 2.33                                                 | 1.87               | 185.04            | 186.91        | 0       | 187.48  | 2.29              | 189.77  |
| 13        | Kabini s.b.r.area       | 11.32             | 11.32                                             | 22.64             | 15.63       | 38.27                  | 134.48 | 407.77          | 542.25 | 99.07    | 137.34      | 236.41                                               | 00.00              | 0.00              | 0.00          | 66      | 754.50  | 161.43            | 915.93  |
| Total Ka  | Total Kabini s.b.       | 23                | 23                                                | 46                | 32          | 78                     | 282    | 1340            | 1622   | 202      | 280         | 482                                                  | 97                 | 1709              | 1736          | 1151    | 4705    | 363               | 2069    |
| 14        | Shimsha.                | 26.50             | 26.50                                             | 53.00             | 62.00       | 115.0                  | 506.00 | 494.69          | 10001  | 233.00   | 348.00      | 581.00                                               | 00.00              | 0.00              | 0.00          | 00.00   | 1102.19 | 594.50            | 1696.69 |
| 15        | Arkavathi               | 48.50             | 48.50                                             | 97.00             | 32.00       | 129.0                  | 22.50  | 30.30           | 52.80  | 185.00   | 00.0        | 185.00                                               | 00.0               | 0.00              | 0.00          | 00.0    | 263.80  | 103.00            | 366.80  |
| 16        | Middle Cauvery          | 8.50              | 8.50                                              | 17.00             | 18.00 35.00 | 35.00                  | 178.50 | 1810.0          | 1988.5 | 74.0     | 109.00      | 183.00                                               | 00.00              | 0.00              | 0.00          | 14.00   | 2015.47 | 205.00            | 2220.47 |
| 17        | Suvarnavathi            | 3.50              | 3.50                                              | 7.00              | 24.00       | 31.00                  | 36.40  | 0.00            | 36.40  | 32.00    | 63.00       | 95.00                                                | 00.00              | 0.00              | 0.00          | 00:0    | 98.50   | 63.90             | 162.40  |
|           | Palar                   | 11.60             | 11.60                                             | 23.19             | 21.03       | 44.22                  | 100.50 | 138.40          | 238.90 | 18.00    | 00.0        | 18.00                                                | 00.0               | 0.00              | 0.00          | 00.0    | 168.00  | 133.13            | 301.12  |
| 61        | Chinnar s.b.r.area      | 8.86              | 8.86                                              | 17.71             | 27.23       | 44.94                  | 124.63 | 82.97           | 207.60 | 0.00     | 00.0        | 0.00                                                 | 0.00               | 0.00              | 0.00          | 0.00    | 61.83   | 160.71            | 252.54  |
| 20        | Mettur                  | 00.00             | 0.00                                              | 0.00              | 0.00        | 0.00                   | 00.0   | 0.00            | 0.00   | 78.00    | 123.00      | 201.00                                               | 0.00               |                   | 275.00 275.00 | 4200.00 | 4676.00 | 0.00              | 4676.00 |
| Cotal Ch  | Total Chinnar s.b       | 6                 | 6                                                 | 18                | 27          | 45                     | 125    | 83              | 208    | 78       | 123         | 201                                                  | 0                  | 275               | 275           | 5800    | 8989    | 191               | 6259    |
| Fotal abo | Total above Mettur      | 74                | 100                                               | 000               | 404         | -                      |        |                 |        |          |             |                                                      |                    |                   |               |         |         | 1444              | . 0000  |

Table 7.1.2(b) continued...

Table 7.1.2(b) continued...

Table 7.1.2(b): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                    |                       |             |                                                                  |                                                                                                                               |                          |                                      |           | Ext        | oort From | Mettur R | eservoir    | Export From Mettur Reservoir = 5800 MCM              | J.W.       |           |        |                                        |         |                   |        |
|--------------------|-----------------------|-------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------------|-----------|------------|-----------|----------|-------------|------------------------------------------------------|------------|-----------|--------|----------------------------------------|---------|-------------------|--------|
|                    |                       | M S/N       | U/S water utilization from minor and medium irrigation projects* | ation from                                                                                                                    | minor a                  | nd medi                              | um irriga | tion proje | cts*      | D/s wate | r utilizatı | D/s water utilization from major irrigation projects | ajor irrig | ation pro | Н      | Exports                                | Wat     | Water utilization |        |
| SI.No.             | Sub-basin/<br>Project | Iums<br>i,j | lu <sup>m,s</sup>                                                | $\mathrm{Iu_{i,j}^{m,s}} \ \mathrm{Ws_{i,j}^{RH}} \ \mathrm{Ws_{i,j}^{RL}} \ \mathrm{Iu_{i,j}^{m}} \ \mathrm{Iu_{i,j}^{r,g}}$ | $Ws_{i,j}^{RL}$          | Iu <sup>m</sup><br>Iu <sub>i,j</sub> | lu',g     | lui,j      | lufij     | Wsüj     | Wsli        | Ws <sub>i,j</sub>                                    | 8 1        | Ir,       | - H    | ــــــــــــــــــــــــــــــــــــــ | Surface | Ground            | Total  |
|                    |                       | IUMHG       | IUMHG IUMHS                                                      | IUMH IUML                                                                                                                     |                          | IUM                                  | IURG      | IURS       | IUR       | WSU      | WSI         | MSD                                                  | IRG        | IRS       | 5      | OE                                     |         |                   |        |
| (1)                | (2)                   | (3)         | (4)                                                              | (5)                                                                                                                           | (9)                      | (7)                                  | (8)       | (6)        | (10)      | (11)     | (12)        | (13)                                                 | (14)       | (15)      | (91)   | (17)                                   | (38)    | (61)              | (20)   |
| 21                 | Lower Bhawani         | 12.44       | 12.44                                                            | 24.88                                                                                                                         |                          | 21.54   46.42                        | 84.20     | 250.28     | 334.48    | 88.601   | 156.29      | 266.17                                               | 68.6       | 324.88    | 334.77 | 0                                      | 853.77  | 128.07            | 981.84 |
| 22                 | 22 Bhavani s.b.r.area | 5.79        | 5.79                                                             | 11.57                                                                                                                         |                          | 10.02 21.59                          | 43.79     | 138.72     | 182.51    | 51.12    | 72.71       | 123.83                                               | 0.00       | 0.00      | 0.00   | 408                                    | 676.33  | 59.60             | 735.93 |
| Total Bl           | Total Bhawani s.b.    | 18          | 18                                                               | 36                                                                                                                            | 32                       | 89                                   | 128       | 389        | 517       | 191      | 229         | 390                                                  | 10         | 325       | 335    | 408                                    | 1530    | 188               | 1718   |
| 23                 | 23 Noyil              | 5.95        | 5,95                                                             | 11.90                                                                                                                         |                          | 8.25 20.15                           | 18.09     | 2.01       | 20.10     | 123.00   | 0.00        | 123.00                                               | 0.00       | 0.00      | 0.00   | 0.00                                   | 130.96  | 32.29             | 163.25 |
| 24                 | 24 Amaravathi         | 2.37        | 2.37                                                             | 4.73                                                                                                                          |                          | 5.31 10.04                           | 23.53     | 43.15      | 89.99     | 20.88    | 30.91       | 51.79                                                | 3.76       | 198.50    | 202.26 | 0.00                                   | 295.80  | 34.97             | 330.77 |
| 25                 | 25 Amaravathi         | 20.98       | 20.98                                                            | 41.96                                                                                                                         | 47.07                    | 89.03                                | 137.64    | 400.32     | 537.96    | 185.12   | 274.09      | 459.21                                               | 0.00       | 0.00      | 0.00   | 0.00                                   | 880.51  | 205.69            | 1086.2 |
|                    | s.b.r.area            |             |                                                                  |                                                                                                                               |                          |                                      |           |            |           |          |             |                                                      |            |           |        |                                        |         |                   |        |
| Total A            | Total Amaravathi s.b. | 23          | 23                                                               | 47                                                                                                                            | 25                       | 66                                   | 161       | 443        | 909       | 206      | 305         | 511                                                  | 4          | 199       | 202    | 0                                      | 1176    | 241               | 1417.0 |
| 26                 | 26 Tirumanimuttar     | 109.74      | 109.74                                                           | 219.48                                                                                                                        | 198.98 418.5             | 418.5                                | 41.28     | 250.00     | 291.28    | 370.00   | 379.00      | 749.00                                               | 00.00      | 0.00      | 0.00   | 0.00                                   | 1108.74 | 350.00            | 1458.7 |
| 27                 | 27 Ponnai Ar          | 8.13        | 8.13                                                             | 16.25                                                                                                                         | 16.25 10.19 26.44 175.48 | 26.44                                | 175.48    | 134.81     | 310.29    | 113.00   | 155.00      | 268.00                                               | 00.00      | 0.00      | 0.00   | 0.00                                   | 410.94  | 193.80            | 604.7  |
| 28                 | 28 Upper Colcroon     | 10.75       | 10.75                                                            | 21.49                                                                                                                         |                          | 23.53 45.02 180.00                   | 1         | 630.65     | 810.65    | 90.00    | 130.00      | 220.00                                               | 00.00      | 00.0      | 00.0   | 0.00                                   | 861.40  | 214.28            | 1075.7 |
| 29                 | 29 Lower Coleroon     | 3.05        | 3.05                                                             | 6.10                                                                                                                          |                          | 4.87 10.97 105.00                    | 105.00    | 536.00     | 641.00    | 63.00    | 83.00       | 146.00                                               | 0.00       | 0.00      | 00.0   | 0.00                                   | 685.05  | 112.92            | 798.0  |
| 30                 | 30 Cauvery Delta      | 80,82       | 80.82                                                            | 161.63                                                                                                                        | 161.63 133.08 294.7      | 294.7                                | 11.10     | 3475.0     | 3486.1    | 349.00   | 461.00      | 810.00                                               | 0.00       | 00.00     | 0.00   | 0.00                                   | 4365.82 | 225.00            | 4590.8 |
| Total be           | Total below Mettur    | 360         | 260                                                              | 520                                                                                                                           | 463                      | 983                                  | 820       | 5861       | 6681      | 1475     | 1742        | 3217                                                 | 14         | 523       | 537    |                                        | 10269   | 1557              | 11826  |
| <b>Gross Total</b> | otal                  | 414         | 414                                                              | 829                                                                                                                           |                          | 745 1574                             | 2350      | 10726      | 13075     | 2509     | 2990        | 5499                                                 | 249        | 3309      | 3559   |                                        | 28361   | 3759              | 32120  |
|                    |                       |             |                                                                  |                                                                                                                               |                          |                                      |           |            |           |          |             |                                                      |            |           | 1      |                                        |         |                   | ļ      |

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. no.(11) + Col. no(12); Col. no. (18) = Col. no.(4) + Col. no(13) + Col. no.(15) + Col. no.(17); Col. no. (19) = Col. no.(3) + Col. no (6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19). ₹ Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = IUMHG + IUML + IRG; (6) Total water Utilization = IUMHG + IUML + IRG; (7) Total water Utilization = IUMHG + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IUML + IU <u>B</u>

Table 7.1.2(c): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|          |                         |                   |                                                |                   |                   |              |               | Exp               | Export From Mettur Reservoir = 6200 MCM | Mettur Re | :servoir =        | = 6200 M( | CM                                                   |                    |        |                     |                 |                   |         |
|----------|-------------------------|-------------------|------------------------------------------------|-------------------|-------------------|--------------|---------------|-------------------|-----------------------------------------|-----------|-------------------|-----------|------------------------------------------------------|--------------------|--------|---------------------|-----------------|-------------------|---------|
|          |                         | U/S w             | U/S water utilization from minor and medium in | ation from        | minor an          | d mediui     |               | gation projects*  | cts*                                    | D/s water | r utilizati       | on from n | D/s water utilization from major irrigation projects | ation pro          | $\neg$ | Exports             | Wate            | Water utilization | on      |
| St.No.   | Sub-basin/<br>Project   | Iu <sup>m,g</sup> | Iu <sup>m,s</sup>                              | WS <sub>i,j</sub> | WS <sub>i,j</sub> | Ium<br>Liji  | Iu'.<br>j.juI | Iu <sup>r,s</sup> | Iu <sup>r</sup> .                       | WSuj      | WS <sub>i,j</sub> | WSij      | Ir.                                                  | $\Gamma_{i,j}^{s}$ | Ir. C  | OE <sup>q.,ig</sup> | Surface         | Ground            | Total   |
|          |                         | IUMHG             | IUMHS                                          | IUMH              | TOMIL             | IUM          | IURG          | IURS              | IUR                                     | wsu       | ISM               | MSD       | IRG                                                  | IRS                | IRD    | OE                  |                 | •                 |         |
| Ξ        | (2)                     | (3)               | (4)                                            | (5)               | (9)               | (2)          | (8)           | (6)               | (01)                                    | (II)      | (12)              | (5)       | (14)                                                 | (15)               | (91)   | (17)                | (81)            | (61)              | (20)    |
| -        | Yagachi                 | 1.24              | 1.24                                           | 2.48              | 3.42              | 5.90         | 25.68         | 97.12             | 122.80                                  | 10.96     | 16.84             | 27.80     | 69.11                                                | 93.52 1            | 105.21 | 0                   | 219.68          | 42.03             | 261.71  |
| 2        | Hemavathi               | 5.02              | 5.02                                           | 10.04             | 13.82             | 23.86 92.2   | 92.21         | 163.20            | 255.41                                  | 44.34     | 68.11             | 112.45    | 144.41                                               | 84.26 228.67       | 28.67  | 1134                | 1498.93         | 255.46            | 1754.39 |
| 3        | Harangi                 | 1.24              | 1.24                                           | 2.48              | 3.42              | 5.90         | 18.22         | 17.26             | 35.48                                   | 10.96     | 16.84             | 27.80     | 29.17                                                | 216.86 246.03      | 146.03 | 0                   | 263.16          | \$2.05            | 315.21  |
| 4        | Cauvery                 | 0.63              | 0.63                                           | 1.25              | 1.72              | 2.97         | 12.90         | 8.61              | 23.86                                   | 5.51      | 8.46              | 13.97     | 24.24                                                | 389.11 4           | 413.35 | 0                   | 412.31          | 39.49             | 451.80  |
| \$       | KRS                     | 15.85             | 15.85                                          | 31.69             | 43.60             | 75.29        | 130.0         | 534.04            | 664.05                                  | 139.92    | 214.90            | 354.82    | 0.00                                                 | 0.00               | 0.00   | 1506                | 2410.70         | 189.45            | 2600.2  |
| Total U  | Total Upper Cauvry s.b. | 24                | 24                                             | 48                | 99                | 114          | 279           | 820               | 1102                                    | 212       | 325               | 537       | 210                                                  | 784                | 993    | 2640                | 4805            | 578               | 5383    |
| 9        | Banasursagar            | 0.20              | 0.20                                           | 0.40              | 0.28              | 89.0         | 1.52          | 0.00              | 1.52                                    | 1.76      | 2.44              | 4.20      | 2.09                                                 | 64.31              | 66.40  | 681                 | 257.71          | 4.09              | 261.80  |
| 7        | Mananthvady             | 0.51              | 0.51                                           | 1.01              | 0.71              | 1.72         | 7.02          | 139.65            | 146.67                                  | 4.46      | 6.18              | 10.64     | 00.00                                                | 0.00               | 00.0   | 276.0               | 426.80          | 8.24              | 435.03  |
| <b>∞</b> | Kabini                  | 6.27              | 6.27                                           | 12.53             | 8.79              | 21.32        | 15.88         | 530.40            | 16.819                                  | 57.23     | 76.56             | 133.79    | 9.90                                                 | 845.40 852.00      | 152.00 | 202                 | 1717.86         | 110.17            | 1828.0  |
| 6        | Taraka                  | 06.0              | 06.0                                           | 1.80              | 1.26              | 3.06         | 1.24          | 0.00              | 1.24                                    | 7.94      | 11.00             | 18.94     | 4.89                                                 | 157.54             | 162.43 | 0                   | 177.38          | 8.29              | 185.67  |
| 10       | Sagardoddakere          | 09.0              | 09'0                                           | 1.20              | 0.85              | 2.05         | 4.59          | 0.00              | 4.59                                    | 5.31      | 7.36              | 12.67     | 0.93                                                 | 23.07              | 24.00  | 36                  | 131.34          | 6.97              | 138.31  |
|          | Upper Nagu              | 3.08              | 3.08                                           | 91.9              | 4.34              | 10.50        | 44.70         | 162.17            | 206.87                                  | 27.26     | 37.78             | 65.04     | 88.6                                                 | 430.12 440.00      | 140.00 | 290                 | 950.41          | 62.00             | 1012.41 |
| 12       | Nugu                    | 0.11              | 0.11                                           | 0.22              | 0.16              | 0.38         | 0.15          | 0.00              | 0.15                                    | 0.98      | 1.35              | 2.33      | 1.87                                                 | 265.04 2           | 266.91 | 0                   | 267.48          | 2,29              | 269.77  |
| 13       | Kabini s.b.r.area       | 11.32             | 11.32                                          | 22.64             | 15.63             | 38.27        | 134.5         | 379.77            | 514.25                                  | 50.66     | 137.34            | 236.41    | 0.00                                                 | 00.00              | 00.0   | 66                  | 726.50          | 161.43            | 887.93  |
| Total K  | Fotal Kabini s.b.       | 23                | 23                                             | 46                | 32                | 78           | 282           | 1212              | 1494                                    | 204       | 280               | 484       | 26                                                   | 1785               | 1812   | 1151                | 4655            | 363               | 5019    |
| 4        | Shimsha.                | 26.50             | 26.50                                          | 53.00             | 62.00             | 115.00       | 506.0         | 494.7             | 1000.7                                  | 233.00    | 348.00            | 581.00    | 0.00                                                 | 0.00               | 0.0    | 0.00                | 1102.19         | 594.50            | 1696.7  |
| 13       | Arkavathi               | 48.50             | 48.50                                          | 97.00             | 32.00             | 129.00 22.50 | 22.50         | 30.30             | 52.80                                   | 117.00    | 0.00              | 117.00    | 0.00                                                 | 0.00               | 0.0    | 0.00                | 195.80          | 103.00            | 298.8   |
| 91       | Middle Cauvery          | 8.50              | 8.50                                           | 17.00             | 18.00             | 35.00        | 178.5         | 1710.0            | 1888.5                                  | 74.00     | 109.00            | 183.00    | 0.00                                                 | 0.00               | 0.0    | 14.00               | 1915.47         | 205.00            | 2120.5  |
| 17       | Suvarnavathi            | 3.50              | 3.50                                           | 7.00              | 24.00             | 31.00        | 36.40         | 0.00              | 36.40                                   | 32.00     | 63.00             | 95.00     | 0.00                                                 | 0.00               | 0.00   | 0.00                | 98.50           | 63.90             | 162.40  |
| <u>8</u> | Palar                   | 11.60             | 11.60                                          | 23.19             | 21.03             | 44.22        | 100.5         | 138.40            | 238.90                                  | 17.00     | 00.0              | 17.00     | 0.00                                                 | 0.00               | 0.00   | 0.00                | 167.00          | 133.13            | 300.12  |
| 19       | Chinnar s.b.r.arca      | 8.86              | 8.86                                           | 17.71             | 27.23             | 44.94        | 124.6         | 72.97             | 197.60                                  | 0.00      | 00.0              | 00.00     | 0.00                                                 | 0.00               | 00.0   | 0.00                | 81.83           | 160.71            | 242.54  |
| 20       | Mettur                  | 0.00              | 0.00                                           | 0.00              | 0.00              | 0.00         | 0.00          | 0.00              | 0.00                                    | 78.00     | 123.00            | 201.00    | 0.00                                                 | 275.00 2           | 275.00 | 6200                | <b>9676</b> .00 | 00.0              | 6676.00 |
| Total C  | Fotal Chinnar s.b       | 6                 | 6                                              | 18                | 27                | 45           | 125           | 73                | 861                                     | 78        | 123               | 201       | 0                                                    | 275                | 275    | 6200                | 6757.83         | 161               | 6919    |
| Total ab | Total above Mettur      | 154               | 154                                            | 309               | 282               | 165          | 1530          | 4479              | 6011                                    | 196       | 1248              | 2215      | 236                                                  | 2844               | 3080   |                     | 16961           | 2202              | 21899   |
|          |                         |                   |                                                |                   |                   |              | 1             |                   | -                                       |           |                   |           |                                                      |                    |        |                     |                 |                   |         |

Table 7.1.2(c) continued...

Table 7.1.2(c) continued...

Table 7.1.2(c): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                              |                   |                |                                                    |          |                 |           | Exp            | ort From           | Mettur R | eservoir   | Export From Mettur Reservoir = 6200 MCM              | CM         |                   |         |         |         |                   |        |
|------------------------------|-------------------|----------------|----------------------------------------------------|----------|-----------------|-----------|----------------|--------------------|----------|------------|------------------------------------------------------|------------|-------------------|---------|---------|---------|-------------------|--------|
|                              | U/S w.            | ater utiliza   | U/S water utilization from minor and medium irriga | minor an | d mediu         | m irrigat | tion projects* | cts*               | D/s wate | r utilizat | D/s water utilization from major irrigation projects | najor irri | gation pr         | Н       | Exports | Wat     | Water utilization | on.    |
| Sl.No. Sub-basin/<br>Project | Ju <sup>m,g</sup> | Ium,s<br>Iui,j | Ws, j                                              | Ws, Iu,  | Iu <sup>m</sup> | Iur.g     | lur,s<br>Iu,j  | ľu <sup>r</sup> .j | Wsij     | WS.;       | WS <sub>i,j</sub>                                    | op         | Ir <sub>i,j</sub> | Ir.     | OEq.je  | Surface | Ground            | Total  |
|                              | IUMHG IUMHS       |                | IUMH                                               | IUML     | IUM             | IURG      | IURS           | IUR                | MSU      | WSI        | MSD                                                  | IRG        | IRS               | IRD     | OE      |         |                   |        |
| $(i) \qquad (2)$             | (3)               | (4)            | (5)                                                | (9)      | (7)             | (8)       | (6)            | (10)               | (11)     | (12)       | (13)                                                 | (14)       | (15)              | (91)    | (1)     | (81)    | (61)              | (20)   |
| 21 Lower Bhawani             | 12.44             | 12.44          | 24.88                                              | 21.54    | 21.54 46.42     | 84.20     | 250.3          | 334.5              | 6'601    | 156.3      | 266.17                                               | 68.6       | 324.9             | 334.77  | 0       | 853.77  | 128.07            | 981.84 |
| 22 Bhayani s.b.r.area        | 5.79              | 5.79           | 11.57                                              | 10.02    | 10.02 21.59     | 43.79     | 138.7          | 182.5              | 51.1     | 72.7       | 123.83                                               | 0.00       | 0.00              | 0.00    | 408     | 268.33  | 59.60             | 327.93 |
| Total Bhawani s.b.           | 18                | 18             | 36                                                 | 32       | 89              | 128       | 389.0          | 517.0              | 161.0    | 229.0      | 390                                                  | 10         | 325               | 335     | 408     | 1122    | 188               | 1310   |
| 23 Noyil                     | 5.95              | 5.95           | 11.90                                              | 8.25     | 8.25 20.15      | 18.09     | 2.01           | 20.1               | 129.0    | 0.0        | 129.00                                               | 0.00       | 00.0              | 0.00    | 0.00    | 136.96  | 32.29             | 169.25 |
| 24 Amaravathi                | 2.37              | 2.37           | 4.73                                               | 5.31     | 5.31 10.04      | 23.53     | 43.15          | 66.7               | 20.9     | 30.9       | 51.79                                                | 3.76       | 198.5             | 202.26. | 0.00    | 295.80  | 34.97             | 330.77 |
| 25 Amaravathi                | 20.98             | 20.98          | 41.96                                              | 47.07    | 47.07 89.03     | 137,64    | 400.32         | 538.0              | 185.1    | 274.1      | 459.21                                               | 0.00       | 00.00             | 0.00    | 0.00    | 880.51  | 205.69            | 1086.2 |
| s.b.r.area                   |                   |                |                                                    |          |                 |           |                |                    |          |            |                                                      |            |                   |         |         |         |                   |        |
| Total Amaravathi s.b.        | 23                | 23             | 47                                                 | 52       | 66              | 191       | 443            | 604.6              | 206.0    | 305.0      | 511                                                  | 4          | 199               | 202     | 0       | 1176    | 241               | 1417   |
| 26 Tirumanimuttar            | 109.74            | 109.7          | 219.5                                              | 199.0    | 199.0 418.5     | 41.3      | 295.32         | 336.6              | 370.0    | 453.0      | 823.00                                               | 00.00      | 0.00              | 0.00    | 0.0     | 1228.06 | 350.00            | 1578.1 |
| 27 Ponnai Ar                 | 8.13              | 8.1            | 16.3                                               | 10.2     | 26.4            | 175.5     | 152.32         | 327.8              | 113.0    | 155.0      | 268.00                                               | 00.0       | 0.00              | 0.00    | 0.00    | 428.45  | 193.80            | 622.2  |
| 28 Upper Coleroon            | 10.75             | 10.7           | 21.5                                               | 23.5     | 45.0            | 180.0     | 630.65         | 810.7              | 0.06     | 130.0      | 220.00                                               | 0.00       | 00.00             | 0.00    | 0.00    | 861.40  | 214.28            | 1075.7 |
| 29 Lower Coleroon            | 3.05              | 3.1            | 6.1                                                | 4.9      | 11.0            | 105.0     | 536.00         | 641.0              | 63.0     | 83.0       | 146.00                                               | 0.00       | 00.00             | 0.00    | 0.00    | 685.05  | 112.92            | 798.0  |
| 30 Cauvery Delta             | 80.82             | 80.8           | 161.6                                              | 133.1    | 294.7           | 11.       | 3475.0         | 3486               | 349.0    | 461.0      | 810.00                                               | 0.00       | 00.0              | 0.00    | 0.00    | 4365.82 | 225.00            | 4590.8 |
| Total below Mettur           | 260               | 760            | 520                                                | 463      | 983             | 820       | 5924           | 6744               | 1481     | 1816       | 3297                                                 | 14         | 523               | 537     |         | 10004   | 1557              | 11561  |
| Gross Total                  | 414               | 414            | 829                                                | 745      | 745 1574        | 2350      | 10402          | 12755              | 2470     | 3064       | 5512                                                 | 249        | 3368              | 3617    |         | 19701   | 3759              | 33460  |

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10)  $\approx$  Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. no.(11) + Col. no(12); Col. no. (18) = Col. no.(4) + Col. no(13) + Col. no.(15) + Col. no.(17); Col. no. (19) = Col. no.(3) + Col. no.(6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19). 3 Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE  $\widehat{\mathbf{B}}$ 

Table 7.1.2(d): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                   |                         |                   |                   |                                                      |         |               |           | Exp               | ort From | Export From Mettur Reservoir = 7800 MCM | eservoir =  | = 7800 M | CM                                                   |               |         |         |         |                   |         |
|-------------------|-------------------------|-------------------|-------------------|------------------------------------------------------|---------|---------------|-----------|-------------------|----------|-----------------------------------------|-------------|----------|------------------------------------------------------|---------------|---------|---------|---------|-------------------|---------|
|                   |                         | U/S w             | ater utiliza      | U/S water utilization from minor and medium irrigati | minor a | nd mediu      | m irrigal | tion projects*    | cts*     | D/s wate                                | r utilizatı | on from  | D/s water utilization from major irrigation projects | ation pro     |         | Exports | Watı    | Water utilization | 5       |
| SI.No.            | Sub-basin/<br>Project   | lu <sup>m,g</sup> | Iu <sup>m,s</sup> | WSIN                                                 | WS,i,j  | Tu'ii<br>Liji | lu.'.g    | lu <sup>r,s</sup> | luŗ      | Ws.j.                                   | Wsij        | WSij     | Ir.8                                                 | [F.]          | Ir.     | OEq.je  |         | Ground            | Total   |
|                   |                         | ,                 |                   |                                                      |         |               | -         |                   |          |                                         |             |          |                                                      | 1             |         |         | water   | water             |         |
|                   |                         | IUMHG             | IUMHS             | IUMH                                                 | IUMI,   | IUM           | IURG      | IURS              | IUR      | WSU                                     | MSI         | MSD      | IRG                                                  | IRS           | ES      | 30      |         |                   |         |
| (1)               | (2)                     | (3)               | (4)               | (5)                                                  | (9)     | (7)           | (8)       | (6)               | (01)     | (11)                                    | (12)        | (13)     | (14)                                                 | (15)          | (16)    | (17)    | (18)    | (61)              | (50     |
| _                 | Yagachi                 | 1.24              | 1.24              | 2.48                                                 | 3.42    | 5.90          | 25.68     | 67.12             | 92.80    | 10.96                                   | 16.84       | 27.80    | 11.69                                                | 71.30         | 82.99   | 0       | 167.46  | 42.03             | 209.49  |
| 2                 | Hemavathi               | 5.02              | 5.02              | 10.04                                                | 13.82   | 23.86         | 92.21     | 148.3             | 240.51   | 44.34                                   | 68.11       | 112.45   | 144.41                                               | 84.26 228.67  | 128.67  | 1134    | 1484,03 | 255.46            | 1739.49 |
| 3                 | Harangi                 | 1.24              | 1.24              | 2.48                                                 | 3.42    | 5.90          | 18.22     | 17.26             | 35.48    | 96.01                                   | 16.84       | 27.80    | 29.17                                                | 216.86 246.03 | 46.03   | 0       | 263.16  | 52.05             | 315.21  |
| 4                 | Cauvery                 | 69.0              | 0.63              | 1.25                                                 | 1.72    | 2.97          | 12.90     | 8.61              | 21.51    | 5.51                                    | 8.46        | 13.97    | 24.24                                                | 389.14        | 413.35  | 0       | 412.31  | 39.49             | 451.80  |
| 5                 | KRS                     | 15.85             | 15.85             | 31.69                                                | 43.60   | 75.29         | 130.0     | 564.0             | 694.1    | 139.9                                   | 214.9       | 354.82   | 0.00                                                 | 0.00          | 0.00    | 1506    | 2440.71 | 189.45            | 2630.17 |
| Total Up          | Total Upper Cauvry s.b. | 24                | 24                | 48                                                   | 99      | 114           | 279       | 805               | 1084     | 212                                     | 325         | 537      | 210                                                  | 762           | 126     | 2640    | 4768    | 578               | 5346    |
| 9                 | Banasursagar            | 0.20              | 0.20              | 0.40                                                 | 0.28    | 89.0          | 1.52      | 0.00              | 1.52     | 1.76                                    | 2.44        | 4.20     | 2.09                                                 | 64,31         | 66.40   | 189     | 257.71  | 4.09              | 261.80  |
| 7                 | Mananthyady             | 0.51              | 0.51              | 1.01                                                 | 0.71    | 1.72          | 7.02      | 139.65            | 146.67   | 4.46                                    | 6.18        | 10.64    | 0.00                                                 | 0.00          | 0.00    | 276.0   | 426.80  | 8.24              | 435.03  |
| œ                 | Kabini                  | 6.27              | 6.27              | 12.53                                                | 8.79    | 21.32         | 88.51     | 530.40            | 16.819   | 55.23                                   | 76.56       | 131.79   | 09'9                                                 | 845.40 852.00 | \$52.00 | 202     | 1715.86 | 110.17            | 1826.02 |
| ٥                 | Taraka                  | 06:0              | 06.0              | 1.80                                                 | 1.26    | 3.06          | 1.24      | 0.00              | 1.24     | 7.94                                    | 11.00       | 18.94    | 4.89                                                 | 147.54        | 152.43  | 0       | 167.38  | 8.29              | 175.67  |
| 01                | Sagardoddakere          | 09'0              | 09.0              | 1.20                                                 | 0.85    | 2.05          | 4.59      | 00.0              | 4.59     | 5.31                                    | 7.36        | 12.67    | 0.93                                                 | 23.07         | 24.00   | 95      | 131.34  | 6.97              | 138.31  |
| =                 | Upper Nagu              | 3.08              | 3.08              | 6.16                                                 | 4.34    | 10.50         | 44.70     | 142.17            | 186.87   | 27.26                                   | 37.78       | 65.04    | 9.88                                                 | 430.12 440.00 | 140.00  | 290     | 930.41  | 62.00             | 992.41  |
| 12                | Nugu                    | 0,11              | 0.11              | 0.22                                                 | 0.16    | 0.38          | 0.15      | 0.00              | 0.15     | 0.98                                    | 1.35        | 2.33     | 1.87                                                 | 275.04 276.91 | 76.91   | 0       | 277.48  | 2.29              | 279.77  |
| 13                | Kabini s.b.r.area       | 11.32             | 11.32             | 22.64                                                | 15.63   | 38.27         | 134.5     | 323.8             | 458.3    | 1.66                                    | 137.3       | 236.41   | 0.00                                                 | 0.00          | 0.00    | 66      | 670.50  | 161.43            | 831.93  |
| Total Kabini s.b. | bini s.b.               | 23                | 23                | 46                                                   | 32      | 78            | 282       | 1136              | 1418     | 202                                     | 280         | 482      | 26                                                   | 1785          | 1812    | 1151    | 4577    | 363               | 4941    |
| 14                | Shimsha.                | 26.50             | 26.50             | 53.00                                                | 62.00   | 115.0         | 506.0     | 494.7             | 10001    | 233.0                                   | 348.0       | 581.00   | 0.00                                                 | 0.00          | 0.00    | 00.0    | 1102.19 | 594.50            | 1696.69 |
| 15                | Arkavathi               | 48.50             | 48.50             | 00'26                                                | 32.00   | 129.0         | 22.5      | 30.3              | 52.8     | 53.0                                    | 0.0         | 53.00    | 0.00                                                 | 0.00          | 0.00    | 0.00    | 131.80  | 103.00            | 234.80  |
| 16                | Middle Cauvery          | 8.50              | 8.50              | 17.00                                                | 18.00   | 35.0          | 178.5     | 1410              | 1588.5   | 74.0                                    | 0.601       | 183.00   | 00.00                                                | 0.00          | 0.00    | 14.00   | 1615.47 | 205.00            | 1820.47 |
| 17                | Suvamavathi             | 3.50              | 3.50              | 7.00                                                 | 24.00   | 31.00         | 36.4      | 0.0               | 36.40    | 32.00                                   | 63.00       | 95.00    | 0.00                                                 | 0.00          | 0.00    | 0.00    | 98.50   | 63.90             | 162.40  |
| 18                | Palar                   | 11.60             | 11.60             | 23.19                                                | 21.03   | 44.22         | 100.5     | 138.4             | 238.90   | 11.00                                   | 00.00       | 1.00     | 0.00                                                 | 0.00          | 0.00    | 0.00    | 161.00  | 133.13            | 294.12  |
| 19                | Chinnar s.b.r.area      | 8.86              | 8.86              | 17.71                                                | 27.23   | 44.94         | 124.6     | 53.0              | 177.60   | 00.0                                    | 0.00        | 0.00     | 0.00                                                 | 0.00          | 0.00    | 0.00    | 61.83   | 160.71            | 222.54  |
| 20                | Mettur                  | 0.00              | 0.00              | 0.00                                                 | 0.00    | 0.00          | 0.00      | 0.00              | 00.0     | 78.00                                   | 123.0       | 201.00   | 00.00                                                | 275.00 2      | 275.00  | 7800    | 8276.00 | 0.8               | 8276.00 |
| Total Ch          | Total Chinnar s.b       | 6                 | 6                 | 81                                                   | 27      | 45            | 125       | 53                | 178      | 78                                      | 123         | 201      | 0                                                    | 275           | 275     | 7800    | 8338    | 191               | 8499    |
| Total ab          | Total above Mettur      | 154               | 154               | 309                                                  | 282     | 165           | 1530      | 4068              | 5597     | 895                                     | 1248        | 2143     | 236                                                  | 2822          | 3058    |         | 20792   | 2202              | 22994   |
|                   |                         |                   |                   |                                                      |         |               |           |                   |          |                                         |             |          |                                                      |               |         |         |         |                   |         |

Table 7.1.2(d) continued...

Table 7.1.2(d) continued...

Table 7.1.2(d): Results of LP Model for 50% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|            |                       |                   |                   |                                                                  |              |                    |                   | Ex                | port Fron     | Export From Mettur Reservoir = 7800 MCM | Reservoir   | = 7800 N | <b>VCM</b>                                           |            |        |         | i       |                   |         |
|------------|-----------------------|-------------------|-------------------|------------------------------------------------------------------|--------------|--------------------|-------------------|-------------------|---------------|-----------------------------------------|-------------|----------|------------------------------------------------------|------------|--------|---------|---------|-------------------|---------|
|            |                       | U/S w             | ater utiliz       | U/S water utilization from minor and medium irrigation projects* | minor an     | d mediu            | m irriga          | ion proje         | ects*         | D/s wat                                 | er utilizat | ion from | D/s water utilization from major irrigation projects | igation pi | ojects | Exports | Wa      | Water utilization | ion     |
| SI.No.     | Sub-basin/<br>Project | Iu <sup>m,g</sup> | ľu <sup>m,s</sup> | Iums WskH                                                        | Wsi,j Iuin   | ľu <sup>m</sup>    | lu <sup>r,g</sup> | Iu <sup>r,s</sup> | ľu,j          | Ws <sup>U</sup>                         | Ws.         | Wsi,j    |                                                      | Ir.s.      | H,     | OE4.JE  | Surface | Ground            | Total   |
|            |                       | IUMHG             | IUMHG IUMHS       | IOMH                                                             | IUML         | IUM                | IURG              | IURS              | IUR           | NSM                                     | WSI         | WSD      | IRG                                                  | IRS        | IRD    | OE      | • .     |                   |         |
| ε          | (2)                   | (3)               | (4)               | (5)                                                              | (9)          | (3)                | (8)               | 6)                | (10)          | (11)                                    | (12)        | (13)     | (14)                                                 | (15)       | (16)   | (11)    | (18)    | (61)              | (20)    |
| 21         | 21 Lower Bhawani      | 12.44             | 12.44             | 24.88                                                            | 21.54        | 46.42              | 84.20             | 250.28            | 334.48        | 109.9                                   | 156.29      | 266.17   | 68.6                                                 | 324.88     | 334.77 | 0       | 853.77  | 128.07            | 981.84  |
| 22         | 22 Bhavani s.b.r.area | 5.79              | 5.79              | 11.57                                                            |              | 10.02 21.59        | 43.79             | 138.72            | 182.51        | 51.1                                    | 72.71       | 123.83   | 00.0                                                 | 00.0       | 0.00   | 408     | 676.33  | 59.60             | 735.93  |
| Total Bh   | Total Bhawani s.b.    | 18                | 18                | 36                                                               | 32           | 89                 | 128               | 389               | 517           | 161.0                                   | 229         | 390      | 01 10                                                | 325        | 335    | 408     | 1530    | 188               | 1718    |
| 23         | 23 Novil              | 5.95              | 5.95              | 11.90                                                            | 8.25         | 20.15              | 18.09             | 2.01              | 20.10         | 153.0                                   | 00.0        | 153.00   | 0.00                                                 | 00.00      | 0.00   | 00.0    | 160.96  | 32.29             | 193.25  |
| 24         | 24 Amaravathi         | 2.37.             | 2.37              | 4.73                                                             | 5.31         | 5.31 10.04         | 23.53             | 43.15             | 89.99         | 20.9                                    | 30.91       | 51.79    | 3.76                                                 | 198.50     | 202.26 | 00.0    | 295.80  | 34.97             | 330.77  |
| 25         | 25 Amaravathi         | 20.98             | 20.98             | 41.96                                                            | 47.07        | 89.03              | 137.64            | 400.32            | 537.96        | 185.1                                   | 274.09      | 459.21   | 0.00                                                 | 0.00       | 00.00  | 00.00   | 880.51  | 205.69            | 1086.20 |
|            | s.b.r.area            |                   |                   |                                                                  |              |                    |                   |                   |               |                                         |             |          |                                                      |            |        |         |         |                   |         |
| Total An   | Total Amaravathi s.b. | 23                | 23                | 47                                                               | 52           | 66                 | 191               | 443               | 605           | 206.0                                   | 305         | 511      | 4                                                    | 199        | 202    | 0       | 1176    | 241               | 1417    |
| . 56       | 26 Tirumanimuttar     | 109.7             | 109.74            | 219.48                                                           | 198.98 418.5 |                    | 41.28             | 321.25            | 362.53        | 370.0                                   | 530.00      | 900.00   | 0.00                                                 | 00.0       | 0.00   | 00.0    | 1330.99 | 350.00            | 1680.99 |
| 27         | 27 Ponnai Ar          | 8.13              | 8.13              | 16.25                                                            | 10.19        | 10.19 26.44 175.48 | 175.48            | 169.27            | 344.75        | 113.0                                   | 155.00      | 268.00   | 0.00                                                 | 00.0       | 0.00   | 0.00    | 445.40  | 193.80            | 639.19  |
| 28         | 28 Upper Coleroon     | 10.75             | 10.75             | 21.49                                                            | 23.53        | 23.53 45.02 180.00 | 180.00            | 630.65            | 810.65        | 0.06                                    | 130.00      | 220.00   | 00.00                                                | 0.00       | 0.00   | 00.0    | 861.40  | 214.28            | 1075.67 |
| 29         | 29 Lower Coleroon     | 3.05              | 3.05              | 6.10                                                             |              | 4.87 10.97 105.00  | 105.00            | 536.00            | 536.00 641.00 | 63.0                                    | 83.00       | 146.00   | 00.00                                                | 0.00       | 0.00   | 00.0    | 685.05  | 112.92            | 797.97  |
| 30         | 30 Cauvery Delta      | 80.82             | 80.82             | 161.63                                                           | 133.08 294.7 | 294.7              | 11.10             | 3475.0            | 3486.1        | 349.0                                   | 461.00      | 810.00   | 0.00                                                 | 00.0       | 0.00   | 0.00    | 4365.82 | 225.00            | 4590.81 |
| Total be   | Total below Mettur    | 260               | 260               | 520                                                              | 463          | 983                | 820               | 2962              | 6787          | 1505.0                                  | 1893        | 3398     | 14                                                   | 523        | 537    |         | 10148   | 1557              | 12113   |
| Gross Tota | ital                  | 414               | 414               | 829                                                              |              | 745 1574           | 2350              | 10034             | 12384         | 2470                                    | 3141        | 5541     | 249                                                  | 3345       | 3595   |         | 30940   | 3759              | 35107   |

\* Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. no. (11) + Col. no. (12); Col. no. (18) = Col. no. (4) + Col. no. (13) + Col. no. (15) + Col. no. (17); € Note:

Col. no. (19) = Col. no.(3) + Col. no (6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19).

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE].  $\widehat{\Xi}$ 

Table 7.1.3(a): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|          |                         |                   |                   |                                                   |         |                        |                   | Ext               | Export From Mettur Reservoir = 4200 MCM | Mettur Re | eservoir -   | = 4200 M | CM                                                   |            |            |                    |         |                   |         |
|----------|-------------------------|-------------------|-------------------|---------------------------------------------------|---------|------------------------|-------------------|-------------------|-----------------------------------------|-----------|--------------|----------|------------------------------------------------------|------------|------------|--------------------|---------|-------------------|---------|
|          |                         | U/S w             | ater utiliza      | U/S water utilization from minor and medium irrig | minor a | nd medi                | um irriga         | ation projects*   | scts*                                   | D/s wate  | r utilizat   | ion from | D/s water utilization from major irrigation projects | gation pro |            | Exports [          | Wat     | Water utilization | ou      |
| SI.No.   | Sub-basin/<br>Project   | Iu <sup>m,g</sup> | lu <sup>m,s</sup> | WS <sub>i,j</sub>                                 | WSij    | Iu <sup>m</sup><br>ijj | ľu <sup>r,g</sup> | Iu <sup>r,s</sup> | Iu <sup>r</sup> ,                       | Ws.j      | $Ws^l_{i,j}$ | Wsi,j    | Ir. <sup>8</sup> .                                   | Ir, j      | Ir.,       | OE <sup>q.Je</sup> | Surface | Ground            | Fotal   |
|          |                         | IUMHG             | IUMHS             | IUMH                                              | IUML    | N<br>D                 | IURG              | IURS              | IUR                                     | MSD       | WSi          | WSD      | IRG                                                  | IRS        | IRD<br>IRD | 30                 | water   | water             |         |
| Ξ        | (2)                     | (3)               | (4)               | (5)                                               | (9)     | 3                      | (8)               | 6)                | (01)                                    | (E)       | (12)         | (13)     | (14)                                                 | (15)       | (91)       | (17)               | (18)    | (61)              | (20)    |
| -        | Yagachi                 | 1.24              | 1.24              | 2.48                                              | 3.42    | 5.9                    | 25.68             | 17.12             | 42.8                                    | 10.96     | 16.84        | 27.8     | 11.69                                                | 71.33      | 83.02      | 0                  | 117.49  | 42.03             | 159.52  |
| 2        | Hemavathi               | 5.02              | 5.02              | 10.04                                             | 13.82   | 23.86                  | 92.21             | 48.30             | 140.5                                   | 44.34     | 68.11        | 112.5    | 144.4                                                | 84.3       | 228.7      | 1134               | 1384.03 | 255.5             | 1639.49 |
| 3        | Harangi                 | 1.24              | 1.24              | 2.48                                              | 3.42    | 5.9                    | 18.22             | 0                 | 18.22                                   | 96:01     | 16.84        | 27.8     | 29.2                                                 | 142.8      | 171.9      | 0                  | 171.80  | 52.05             | 223.847 |
| 4        | Cauvery                 | 0.625             | 0.625             | 1.25                                              | 1.72    | 2.97                   | 12.90             | 8.61              | 21.51                                   | 5.51      | 8.46         | 13.97    | 24.2                                                 | 105.6      | 129.9      | 0                  | 128.83  | 39.49             | 168.315 |
| 5        | KRS                     | 15.85             | 15.85             | 31.69                                             | 43.6    | 75.29                  | 130.0             | 474.6             | 604.6                                   | 139.9     | 214.9        | 354.8    | 0                                                    | 0.00       | 00.0       | 1506               | 2351.25 | 189.5             | 2540.71 |
| Total U  | Total Upper Cauvry s.b. | 24                | 24                | 48                                                | 99      | 114                    | 279               | 549               | 828                                     | 212       | 325          | 537      | 210                                                  | 404        | 613        | 2640               | 4153    | 578               | 4732    |
| 9        | Banasursagar            | 0.20              | 0.20              | 0.4                                               | 0.28    | 89.0                   | 1.52              | 00.0              | 1.52                                    | 1.76      | 2.44         | 4.2      | 2.09                                                 | 22.05      | 24.14      | 189                | 215.45  | 4.09              | 219.54  |
| 7        | Mananthvady             | 0.51              | 0.51              | 1.01                                              | 0.71    | 1.72                   | 7.02              | 0.00              | 7.02                                    | 4.46      | 6.18         | 10.64    | 0.00                                                 | 0.00       | 0.00       | 276.0              | 287.15  | 8.235             | 295.38  |
| 8        | Kabini                  | 6.27              | 6.27              | 12,53                                             | 8.79    | 21.32                  | 88.51             | ####              | 530.4                                   | 55.23     | 76.56        | 131.8    | 09.9                                                 | 457.8      | 464.4      | 202                | 1239.77 | 110.2             | 1349.94 |
| 6        | Taraka                  | 06.0              | 06.0              | 8.                                                | 1.26    | 3.06                   | 1.24              | 00.0              | 1.24                                    | 7.94      | 11.00        | 18.94    | 4.89                                                 | 7.76       | 102.6      | 0                  | 117.56  | 8.29              | 125.853 |
| 2        | Sagardoddakere          | 09.0              | 09.0              | 1.2                                               | 0.85    | 2.05                   | 4.59              | 00.00             | 4.59                                    | 5.31      | 7.36         | 12.67    | 0.93                                                 | 23.07      | 24.00      | 95                 | 131.34  | 6.97              | 138.31  |
| =        | Upper Nagu              | 3.08              | 3.08              | 91.9                                              | 4.34    | 5.01                   | 44.70             | 79.30             | 124                                     | 27.26     | 37.78        | 65.04    | 9.88                                                 | 252.4      | 262.3      | 290                | 689.84  | 62                | 751.837 |
| 12       | Nugu                    | 0.11              | 0.11              | 0.22                                              | 0.16    | 0.38                   | 0.15              | 00.0              | 0.15                                    | 0.98      | 1.35         | 2.33     | 1.87                                                 | 75.04      | 16.91      | 0                  | 77.48   | 2.29              | 79.77   |
| 13       | Kabini s.b.r.area       | 11.32             | 11.32             | 22.64                                             | 15.63   | 38.27                  | 134.5             | 227.8             | 362.3                                   | 99.1      | 137.3        | 236.4    | 00.0                                                 | 0.00       | 0.00       | 66                 | 574.50  | 161.4             | 735.93  |
| Total K  | Kabini s.b.             | 23                | 23                | 46                                                | 32      | 78                     | 282               | 749               | 1031                                    | 202       | 280          | 482      | 26                                                   | 928        | 954        | 1151               | 3333    | 363               | 3697    |
| 14       | Shimsha.                | 26.5              | 26.5              | 53.00                                             | 62.00   | 115.0                  | 506.0             | 0.0               | 506.0                                   | 233.0     | 348.0        | 581.0    | 0.00                                                 | 0.00       | 00.0       | 00:0               | 607.50  | 594.5             | 1202    |
| 15       | Arkavathi               | 48.5              | 48.5              | 97.00                                             | 32.00   | 129.0                  | 22.5              | 20.3              | 42.8                                    | 53.0      | 0.0          | 53.0     | 0.00                                                 | 0.00       | 0.00       | 0.00               | 121.80  | 103               | 224.8   |
| 91       | Middle Cauvery          | 8.5               | 8.5               | 17.00                                             | 18.00   | 35.0                   | 178.5             | 1810              | 1988                                    | 74.0      | 109.0        | 183.0    | 0.00                                                 | 0.00       | 00.0       | 14.00              | 2015.47 | 205               | 2220.47 |
| 17       | Suvarnavathi            | 3.5               | 3.5               | 7.00                                              | 24.00   | 31.0                   | 36.4              | 0.0               | 36.4                                    | 32.0      | 7.0          | 39.0     | 0.00                                                 | 0.00       | 00.0       | 00.0               | 42.50   | 63.9              | 106.4   |
| <b>∞</b> | Palar                   | 11.6              | 11.6              | 23.19                                             | 21.03   | 44.2                   | 100.5             | 14.0              | 114.5                                   | 52.0      | 0.0          | 52.0     | 0.00                                                 | 0.00       | 00'0       | 0.00               | 77.60   | 133.1             | 210.72  |
| 19       | Chinnar s.b.r.area      | 8.86              | 8.86              | 17.71                                             | 27.23   | 44.94                  | 124.6             | 72.97             | 9.761                                   | 0.00      | 0.00         | 0        | 0.00                                                 | 0.00       | 00.0       | 00.00              | 81.83   | 160.7             | 242.54  |
| 20       | Mettur                  | 0.00              | 0.00              | 0                                                 | 00'0    | 0                      | 00.00             | 0.00              | 0                                       | 78.00     | 123.0        | 201      | 00.00                                                | 275.0      | 275.0      | 4200               | 4676.00 | 0                 | 4676    |
| Total C  | Total Chinnar s.b       | 6                 | 6                 | 18                                                | 27      | 45                     | 125               | 73                | 198                                     | 78        | 123          | 201      | 0                                                    | 275        | 275        | 4200               | 4758    | 191               | 4919    |
| Total at | Total above Mettur      | 154               | 154               | 309                                               | 282     | 16\$                   | 1530              | 3215              | 4745                                    | 936       | 1192         | 2128     | 236                                                  | 1607       | 1843       |                    | 15109   | 2027              | 17311   |
|          |                         |                   |                   |                                                   |         |                        |                   |                   |                                         |           |              |          |                                                      |            |            | -<br>F             | ,       | `                 | -       |

Table 7.1.3(a) continued...

Table 7.1.3(a) continued...

Table 7.1.3(a): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                    |                       |                   |             |                                                     |               |             |           | Ext            | ort From | Mettur R | eservoir    | Export From Mettur Reservoir = 4200 MCM              | MS.        |            |       |         |         |                   |         |
|--------------------|-----------------------|-------------------|-------------|-----------------------------------------------------|---------------|-------------|-----------|----------------|----------|----------|-------------|------------------------------------------------------|------------|------------|-------|---------|---------|-------------------|---------|
|                    |                       | U/S w             | ater utiliz | U/S water utilization from minor and medium irrigal | minor a       | nd medi     | um irriga | tion projects* | scts*    | D/s wate | r utilizati | D/s water utilization from major irrigation projects | ajor irrig | gation pro |       | Exports | Wat     | Water utilization | E.      |
| SI.No.             | Sub-basin/<br>Project | lu <sup>m,g</sup> | ľum,s<br>L  | WS <sub>i,j</sub>                                   | Wsi,j Iui,j I | Ium<br>Li,  | lu.g.     | lu; s          | Iu, i    | WSU      | WS.I.       | Wsij                                                 | PO T       | Irs        | Ir. ( |         | Surface | Ground            | Total   |
|                    |                       | IUMHG             | IUMHG IUMHS | IUMH                                                | IUML          | IUM         | IURG      | IURS           | IUR      | MSU      | WSI         | MSD                                                  | IRG        | IRS        | ES.   | 30      |         |                   |         |
| Ξ                  | (2)                   | (3)               | (4)         | (5)                                                 | (9)           | (7)         | (8)       | (6)            | (01)     | (11)     | (12)        | (13)                                                 | (14)       | (15)       | (91)  | (17)    | (81)    | (61)              | (20)    |
| 21 Lc              | 21 Lower Bhawani      | 12.44             | 12.44       | 24.88                                               |               | 21.54 46.42 | 84.20     | 250.3          | 334.5    | 109.9    | 156.3       | 266.2                                                | 6.6        | 324.9      | 334.8 | 0       | 853.77  | 128.07            | 981.84  |
| 22 B               | 22 Bhavani s.b.r.area | 5.79              | 5.79        | 11.57                                               |               | 10.02 21.59 | 43.79     | 138.7          | 182.5    | 51.1     | 72.7        | 123.8                                                | 0.0        | 0.0        | 0.0   | 408     | 676.33  | 59.60             | 735.93  |
| Total Bhawani s.b. | wani s.b.             | 81                | 81          | 36                                                  | 32            | 89          | 128       | 389            | 517      | 161      | 229         | 390                                                  | 10         | 325        | 335   | 408     | 1530    | 188               | 1718    |
| 23 Noyil           | oyil                  | 5.95              | 5.95        | 11.90                                               |               | 8.25 20.15  | 18.09     | 2.01           | 20.10    | 103.0    | 00.0        | 103.00                                               | 00.00      | 0.00       | 0.00  | 00.00   | 110.96  | 32.29             | 143.25  |
| 24 Aı              | 24 Amaravathi         | 2.37              | 2.37        | 4.73                                                |               | 5.31 10.04  | 23.53     | 43.15          | 89.99    | 20.88    | 30.91       | 51.79                                                | 3.76       | 154.9      | 158.7 | 0.00    | 252.22  | 34.97             | 287.19  |
| 25 A               | 25 Amaravathi         | 20.98             | 20.98       | 41.96                                               |               | 47.07 89.03 | 137.6     | 262.7          | 400.3    | 185.1    | 274.1       | 459.2                                                | 00.00      | 00.00      | 0.00  | 0.00    | 742.87  | 205.69            | 948.56  |
| s.t                | s.b.r.area            |                   |             |                                                     |               |             |           |                |          |          |             |                                                      |            |            |       |         |         |                   |         |
| Total Ama          | Total Amaravathi s.b. | 23                | 23          | 47                                                  | 52            | 66          | 161.2     | 305.8          | 467.0    | 206.0    | 305.0       | 511.0                                                | . †        | 155        | 159   | 0       | 995     | 241               | 1236    |
| 26 Ti              | 26 Tirumanimuttar     | 109.7             | 109.7       | 219.5                                               |               | 199.0 418.5 | 41.3      | 155.2          | 196.5    | 370.0    | 353.0       | 723.0                                                | 0.00       | 0.00       | 0.00  | 0.00    | 987.95  | 350.00            | 1337.95 |
| 27 Po              | 27 Ponnai Ar          | 8.125             | 8.125       | 16.25                                               |               | 10.19 26.44 | 175.5     | 122.5          | 298.0    | 113.0    | 155.0       | 268.0                                                | 0.00       | 0.00       | 0.00  | 0.00    | 398.64  | 193.80            | 592.44  |
| 28 U <sub>I</sub>  | 28 Upper Coleroon     | 10.75             | 10.75       | 21.49                                               |               | 23.53 45.02 | 180.0     | 630.7          | 810.7    | 0.06     | 130.0       | 220.0                                                | 0.00       | 0.00       | 0.00  | 0.00    | 861.40  | 214.28            | 1075.67 |
| 29 Lc              | 29 Lower Coleroon     | 3.05              | 3.05        | 6.10                                                |               | 4.87 10.97  | 105.0     | 536.0          | 641.0    | 63.0     | 83.0        | 146.0                                                | 0.00       | 00.00      | 00.0  | 0.00    | 685.05  | 112.92            | 797.97  |
| 30 C2              | 30 Cauvery Delta      | 80.82             | 80.82       | 161.6                                               | 133.1  294.7  | 294.7       | 11.1      | 3250           | 3261     | 349.0    | 461.0       | 810.0                                                | 0.00       | 0.00       | 0.00  | 0.00    | 4141.21 | 225.00            | 4366.21 |
| Total below Mettur | w Mettur              | 260               | 260         | 520                                                 | 463           | 983         | 870       | 5392           | 6212     | 1483     | 1716        | 3199                                                 | 14         | 480        | 493   |         | 9330    | 1557              | 11267   |
| Gross Total        | TE.                   | 414               | 414         | 828                                                 | 745 1574      | 1574        | 2350      | 9098           | 10956    | 2470     | 2908        | 5378                                                 | 249        | 2087       | 2336  |         | 24440   | 3759              | 28578   |
|                    |                       |                   |             |                                                     |               |             |           |                |          |          |             |                                                      |            |            |       |         |         |                   |         |

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. no.(11) + Col. no(12); Col. no. (18) = Col. no.(4) + Col. no(13) + Col. no.(15) + Col. no.(17); Col. no. (19) = Col. no. (3) + Col. no (6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. <u>B</u>

Table 7.1.3(b): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|            |                         |                    |             |                                                   |         |            |           | Ex                  | Export From Mettur Reservoir | Mettur R        | eservoir          | = 5800 MCM | CM                                                   |           |          |            |                          |                   |         |
|------------|-------------------------|--------------------|-------------|---------------------------------------------------|---------|------------|-----------|---------------------|------------------------------|-----------------|-------------------|------------|------------------------------------------------------|-----------|----------|------------|--------------------------|-------------------|---------|
|            |                         | M S/N              | ater utiliz | U/S water utilization from minor and medium irrig | minor a | and medi   | um irriga | ation projects*     | ects*                        | D/s wate        | r utilizati       | on from r  | D/s water utilization from major irrigation projects | ation pro | $\vdash$ | Exports    | Wat                      | Water utilization | ดม      |
| SI.No.     | Sub-basin/<br>Project   | Iu <sup>m</sup> ,g | lu,,j       | WS,i                                              | WS; j   | lum<br>Lij | Ĭu.j.     | $ m Iu^{r,s}_{i,j}$ | Iu, j                        | Ws <sup>U</sup> | WS <sub>i,j</sub> | Wsij       | Ir. <sup>g</sup> .                                   | Ir.,      | , Fi     | OE4.Jr     | Surface                  | Ground            | Total   |
|            |                         | IUMHG              | IUMHS       | IUMH                                              | IUML    | IOM        | IURG      | IURS                | IUR                          | wsu             | WSI               | MSD        | IRG                                                  | IRS       | IRD      | OE         |                          |                   |         |
| Ξ          | (2)                     | (3)                | (4)         | (5)                                               | (9)     | (7)        | (8)       | (6)                 | (01)                         | Ξ               | (12)              | (13)       | (14)                                                 | (15)      | (16)     | (17)       | (81)                     | (61)              | (20)    |
| _          | Yagachi                 | 1.24               | 1.24        | 2.48                                              | 3.42    | 5.90       | 25.68     | 17.12               | 42.80                        | 10.96           | 16.84             | 27.80      | 11.69                                                | 71.33     | 83.02    | 0          | 117.49                   | 42.03             | 159.52  |
| 2          | Hemavathi               | 5.02               | 5.02        | 10.04                                             | 13.82   | 23.86      | 92.21     | 48.30               | 140.5                        | 44.34           | 68.11             | 112.5      | 144.4                                                | 84.3      | 228.7    | 1134       | 1384.0                   | 255.46            | 1639.49 |
| 3          | Harangi                 | 1.24               | 1.24        | 2.48                                              | 3,42    | 5.90       | 18.22     | 17.26               | 35.48                        | 96.01           | 16.84             | 27.8       | 29.2                                                 | 127.2     | 1564     | 0          | 173.54                   | \$2.05            | 225.59  |
| 4          | Cauvery                 | 0.63               | 0.63        | 1.25                                              |         | 2.97       | 12.90     | 8.61                | 21.51                        | 5.51            | 8.46              | 14.0       | 24.2                                                 | 105.6     | 129.9    | 0          | 128.83                   | 39.49             | 168.32  |
| 5          | KRS                     | 15.85              | 15.85       | 31.69                                             | 43.60   | 75.29      | 130.0     | 474.6               | 604.6                        | 139.9           | 214.9             | 354.8      | 0.0                                                  | 0.00      | 0.00     | 1506       | 2351                     | 189.45            | 2540.71 |
| Total U    | Total Upper Cauvry s.b. | 24                 | 24          | 48                                                | 99      | 114        | 279       | 995                 | 845                          | 212             | 325               | 537        | 210                                                  | 388       | 865      | 2640       | 4155                     | 578               | 4734    |
| 9          | Banasursagar            | 0.20               | 0.20        | 0.40                                              |         | Û          | 1.52      | 00.0                | 1.52                         | 1.76            | 2.44              | 4.20       | 2.09                                                 | 22.05     | 24.14    | 189        | 215.45                   | 4.09              | 219.54  |
| 7          | Mananthyady             | 0.51               | 0.51        | 1.0.1                                             | 0.71    |            | 7.02      | 00.0                | 7.02                         | 4.46            | 6.18              | 10.64      | 0.00                                                 | 0.00      | 0.00     | 276.0      | 287.15                   | 8.24              | 295.38  |
| ∞          | Kabini                  | 6.27               | 6.27        | 12.53                                             | 8.79    | 21.32      | 88.51     | 441.9               | 530.4                        | 55.2            | 76.6              | 131.8      | 09'9                                                 | 357.8     | 364.4    | 202        | 1139.8                   | 110.17            | 1249.94 |
| 6          | Taraka                  | 06.0               | 06.0        | 1.80                                              | 1.26    |            | 1.24      | 0.00                | 1.24                         | 7.94            | 11.00             | 18.94      | 4.89                                                 | 7.76      | 102.6    | ō          | 117.56                   | 8.29              | 125.85  |
| 0 <b>.</b> | Sagardoddakere          | 09.0               | 09.0        | 1.20                                              | 0.85    | 2.05       | 4.59      | 00.0                | 4.59                         | 5.31            | 7.36              | 12.67      | 0.93                                                 | 23.07     | 24.00    | 95         | 131.34                   | 6.97              | 138.31  |
| =          | Upper Nagu              | 3.08               | 3.08        | 6.16                                              | 4.34    | 10.50      | 44.70     | 79.35               | 124.05                       | 27.26           | 37.78             | 65.04      | 88.6                                                 | 252.4     | 262.3    | 290        | 68689                    | 62.00             | 751.89  |
| 12         | Nugu                    | 0.11               | 0.11        | 0.22                                              |         |            | 0.15      | 0.00                | 0.15                         | 0.98            | 1.35              | 2.33       | 1.87                                                 | 65.04     | 16.99    | 0          | 67.48                    | 2.29              | 69.77   |
| 13         | Kabini s.b.r.arca       | 11.32              | 11.32       | 22.64                                             | 15.63   | 38.27      | 134.5     | 227.8               | 362.3                        | 99.1            | 137.3             | 236.4      | 0.00                                                 | 0.00      | 0.00     | <b>6</b> 6 | 574.50                   | 161.43            | 735.93  |
| Total K.   | Total Kabini s.b.       | 23                 | 23          | 94                                                | 32      | 78         | 282       | 749                 | 1031                         | 202             | 280               | 482        | 26                                                   | 818       | 844      | 1151       | 3223                     | 363               | 3587    |
| 14         | Shimsha.                | 26.50              | 26.50       |                                                   |         | 115.0      | 506.0     | 0.0                 | 506.0                        | 233.0           | 348.0             | 581.0      | 0.00                                                 | 0.00      | 0.00     | 0.00       | 607.50                   | 594.50            | 1202.00 |
| 15         | Arkavathi               | 48.5               | 48.5        | 97.00                                             | 32.00   | 129.0      | 22.5      | 20.3                | 42.8                         | 23.0            | 0.0               | 23.0       | 00.0                                                 | 0.00      | 0.00     | 0.00       | 91.80                    | 103.00            | 194.80  |
| 16         | Middle Cauvery          | 8.5                | 8.5         | 17.00                                             |         | 35.0       | 178.5     | 1510                | 1688                         | 74.0            | 109.0             | 183.0      | 00'0                                                 | 00.0      | 0.00     | 14.00      | 1715.5                   | 205.00            | 1920.47 |
| 17         | Suvarnavathi            | 3.5                | 3.5         | 7.00                                              | 24.00   | 31.0       | 36.4      | 0.0                 | 36.4                         | 32.0            | 7.0               | 39.0       | 0.00                                                 | 00.0      | 0.00     | 00.0       | 42.50                    | 63.90             | 106.40  |
| <u>~</u>   | Palar                   | 11.6               | 11.6        | 23.19                                             | 21.03   | 44.2       | 100.5     | 14.0                | 114.5                        | 41.0            | 0.0               | 41.0       | 00.0                                                 | 00.0      | 0.00     | 0.00       | 09.99                    | 133.13            | 199.72  |
| 61         | Chinnar s.b.r.arca      | 8.86               | 8.86        | 17.71                                             | 27.23   | 44.9       | 124.6     | 63.0                | 187.6                        | 0.0             | 0.0               | 0.0        | 00.0                                                 | 0.00      | 0.00     | 0.00       | 71.83                    | 160.71            | 232.54  |
| 2          | Mettur                  | 0.00               | 0.00        | 00:0                                              | 0.00    | 0.0        | 0.0       | 0.0                 | 0.0                          | 78.0            | 123.0             | 201.0      | 0.00                                                 | 275.0     | 275.0    | 5800.0     | 6276.0                   | 00.00             | 6276.0  |
| Total CI   | Total Chinnar s.b       | 6                  | 6           | 18                                                | 27      | 45         | 125       | 63                  | 188                          | 78              | 123               | 201        | 0                                                    | 275       | 275      | 2800       | 6348                     | 191               | 6059    |
| Total ab   | Total above Mettur      | 154                | 154         | 309                                               | 282     | 591        | 1530      | 2922                | 4452                         | 895             | 1192              | 2087       | 236                                                  | 1482      | 1717     |            | 16250                    | 2202              | 18452   |
|            |                         |                    |             |                                                   |         | 7          |           | 닏                   | ď                            | Ć,              | 4                 | ė.         |                                                      |           |          | Table      | Table 7.1.3(b) continued | o) conti          | nued    |
|            |                         |                    |             |                                                   |         |            |           |                     |                              |                 |                   |            |                                                      |           |          |            |                          |                   |         |

Table 7.1.3(b) continued...

Table 7.1.3(b) continued...

Table 7.1.3(b): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|             |                       |        |             |                                                    |             |             |           | FXF             | nort From | Mettur R | SPETUDIE  | Export From Metrur Reservoir = 5800 MCM            | Z           |            |                 |         |         |                   |         |
|-------------|-----------------------|--------|-------------|----------------------------------------------------|-------------|-------------|-----------|-----------------|-----------|----------|-----------|----------------------------------------------------|-------------|------------|-----------------|---------|---------|-------------------|---------|
|             |                       | w 2/11 | ater utiliz | 11/5 water utilization from minor and medium irrig | minor ar    | d medii     | m irrigal | ation projects* | cts*      | D/s wate | rufilizat | D/s water utilization from major impation projects | naior irrig | ration pro | ┢               | Exports | Nay.    | Water utilization | 5       |
|             | Cb. hacin/            |        |             |                                                    | 10          | <br>        |           | -               |           |          |           |                                                    |             | -          | T               | · · ·   |         |                   |         |
| SI.No.      | Project               | lum,g  | Iu,m,s      | WSii                                               | WSij lum    | lu E        | lu 'é     | lu.'.s          | lu'.      | WS       | WS        | WS                                                 | 89.         | IT.5.      | <u>.</u><br>L'. | OE's. E | Surface | Ground            | Tete    |
|             |                       | ,      | (4,         |                                                    |             | ?           | ?         | 7               | ?         |          |           | 7.                                                 |             | Ç.         |                 |         | water   | water             | lotal   |
|             |                       | IUMHG  | IUMHS       | IUMH                                               | IUML        | IUM         | IURG      | IURS            | IUR       | WSU      | WSI       | MSD                                                | IRG         | IRS        | IRD             | OE      | i       | į                 |         |
| (E)         | (2)                   | (3)    | (4)         | (5)                                                | (9)         | (2)         | (8)       | (6)             | (10)      | (11)     | (12)      | (13)                                               | (14)        | (15)       | (19)            | (17)    | (18)    | (61)              | (20)    |
| 21          | 21 Lower Bhawani      | 12,44  | 12.44       | 24.88                                              | 21.54 46.42 | 46.42       | 84.20     | 250.3           | 334.5     | 6.601    | 156.3     | 266.2                                              | 9.90        | 334.8      | 344.7           | 0       | 863.66  | 128.08            | 991.74  |
| 22          | 22 Bhavani s.b.r.area | 5.785  | 5.785       | 11.57                                              | 10.02       | 10.02 21.59 | 43.79     | 138.7           | 182.51    | 51.12    | 72.71     | 123.8                                              | 0.00        | 0.00       | 0.00            | 408     | 676.33  | 29.60             | 735.93  |
| Total B     | Fotal Bhawani s.b.    | 18     | 18          | 36                                                 | 32          | 89          | 128       | 389             | 517       | 161      | 229       | 390                                                | 10          | 335        | 345             | 408     | 1540    | 188               | 1728    |
| 23          | 23 Noyil              | 5.95   | 5.95        | 6.11                                               | 8.25        | 8.25 20.15  | 18.09     | 2.01            | 20.10     | 113.0    | 0.00      | 113                                                | 0.00        | 0.00       | 0.00            | 0.00    | 120.96  | 32.29             | 153.25  |
| 24          | 24 Amaravathi         | 2.37   | 2.37        | 4.73                                               | 5.31        | 5.31 10.04  | 23.53     | 43.15           | 89.99     | 20.88    | 30.91     | 51.79                                              | 3.76        | 154.9      | 158.7           | 0.00    | 252.22  | 34.97             | 287.19  |
| 25          | 25 Amaravathi         | 20.98  | 20.98       | 41.96                                              | 47.07 89.03 | 89.03       | 137.6     | 231.0           | 368.7     | 185.1    | 274.1     | 459.2                                              | 0.00        | 0.00       | 0.00            | 0.00    | 711.21  | 205.69            | 916.90  |
|             | s.b.r.area            |        |             |                                                    |             |             |           |                 |           |          |           |                                                    |             |            |                 |         |         |                   | ,       |
| Total A     | Total Amaravathi s.b. | 23     | 23          | 47                                                 | 52          | 66          | 191       | 274             | 435       | 206      | 305       | 511                                                | 4           | 155        | 159             | 0       | 696     | 241               | 1204    |
| 26          | 26 Tirumanimuttar     | 109.7  | 109.7       | 219.5                                              | 199         | 199 418.5   | 41.28     | 162.0           | 203.3     | 370.0    | 402.0     | 772.0                                              | 0.00        | 0.00       | 0.00            | 0.00    | 1043.74 | 350.00            | 1393.74 |
| 27          | 27 Ponnai Ar          | 8.125  | 8.125       | 16.25                                              | 10.19       | 10.19 26.44 | 175.5     | 122.5           | 298.0     | 113.0    | 155.0     | 268.0                                              | 0.00        | 0.00       | 0.00            | 0.00    | 398.64  | 193.80            | 592.44  |
| 28          | 28 Upper Coleroon     | 10.75  | 10.75       | 21.49                                              | 23.53 45.02 | 45.02       | 180.0     | 630.7           | 810.7     | 0.06     | 130.0     | 220.0                                              | 0.00        | 0.00       | 0.00            | 0.00    | 861.40  | 214.28            | 1075.67 |
| 29          | 29 Lower Coleroon     | 3.05   | 3.05        | 6.1                                                | 4.87        | 4.87 10.97  | 105.0     | 536.0           | 641.0     | 63.0     | 83.0      | 146.0                                              | 0.00        | 0.00       | 0.00            | 00.00   | 685.05  | 112.92            | 797.97  |
| 30          | 30 Cauvery Delta      | 80.82  | 80.82       | 161.6                                              | 133.1       | 294.7       | 11.6      | 3575            | 3586      | 349.0    | 461.0     | 810.0                                              | 0.00        | 0.00       | 0.00            | 0.00    | 4465.82 | 225.00            | 4690.81 |
| Total be    | Total below Mettur    | 260    | 260         | 520                                                | 463         | 983         | 820       | 1695            | 6511      | 1483     | 1765      | 3248                                               | 14          | 490        | 503             |         | 6896    | 1557              | 11636   |
| Gross Total | otal                  | 414    | 414         | 829                                                | 745         | 1574        | 2350      | 8613            | 10963     | 2470     | 2957      | 5427                                               | 249         | 1971       | 2221            | !       | 25939   | 3759              | 30088   |
|             |                       |        |             |                                                    |             |             |           |                 |           |          |           |                                                    |             |            |                 |         |         |                   |         |

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. no. (11) + Col. no. (12); Col. no. (18) = Col. no. (4) + Col. no. (13) + Col. no. (15) + Col. no. (15) + Col. no. (15) + Col. no. (16) = Col. no. (18) + Col. no. (19). € Note:

(1) 1UM = 1UMH + 1UML; (2) 1UR = 1URG + 1URS; (3) 1RD = 1RG + 1RS; (4) Total surface water utilization = 1UMHS + 1RS + WSD + 1RD + OE (5) Total ground water utilization = 1UMHG + 1UML + 1RG; (6) Total water Utilization = [1UM + 1UR] + [WSD + 1RD] + [OE]. <u>e</u>

Table 7.1.3(c): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|          |                       |                   | į                                                                |                   |                   |             |           | Exp(              | Export From Mettur Reservoir = 6200 MCM | Mettur Re           | servoir 3         | = 6200 M                                             | SM<br>CM           |                  |            |                     |                  |                   |         |
|----------|-----------------------|-------------------|------------------------------------------------------------------|-------------------|-------------------|-------------|-----------|-------------------|-----------------------------------------|---------------------|-------------------|------------------------------------------------------|--------------------|------------------|------------|---------------------|------------------|-------------------|---------|
|          |                       | U/S w             | U/S water utilization from minor and medium irrigation projects* | tion from         | minor an          | d mediun    | n irrigat | ion projec        | cts*                                    | D/s water           | utilizatı         | D/s water utilization from major irrigation projects | najor irrig        | ation pro        | Sjeets     | Exports             | Wat              | Water utilization | ПO      |
| SI.No.   | Sub-basin/<br>Project | Iu <sup>m,8</sup> | Iu <sup>m,s</sup>                                                | Ws <sub>i,j</sub> | WS <sub>i,j</sub> | Ium I       | lu '.g    | Iu <sup>r,s</sup> | Iu <sup>r</sup> ,                       | WS <sub>i,j</sub> V | Ws <sup>l</sup> , | WSi,j                                                | Ir. <sup>g</sup> . | IT. <sup>S</sup> | - <u>i</u> | OE <sup>q, Je</sup> | Surface<br>water | Ground            | Total   |
|          | ,                     | IUMHG             | IUMHS                                                            | IUMH              | IOML              | IOM         | IURG      | IURS              | IUR                                     | wsu                 | MSI               | WSD                                                  | IRG                | IRS              | 8          | OE                  |                  |                   |         |
| Ξ        | (2)                   | (3)               | (4)                                                              | (5)               | (9)               | (7)         | (8)       | 6)                | (01)                                    | (H)                 | (12)              | (13)                                                 | (14)               | (15)             | (91)       | (11)                | (81)             | (61)              | (20)    |
| _        | Yagachi               | 1.24              | 1,24                                                             | 2.48              | 3.42              | 5.90        | 25.68     | 17.12             | 42.80                                   | 10.96               | 16.84             | 27.80                                                | 11.69              | 71.33            | 83.02      | 0                   | 117.49           | 42.03             | 159.52  |
| 5        | Нстаvathi             | 5.02              | 5.02                                                             | 10.04             | 13.82             | 23.86       | 92.21     | 48.30             | 140.5                                   | 44.34               | 68.11             | 112.5                                                | 144.4              | 84.3             | 228.7      | 1134                | 1384.0           | 255.46            | 1639.49 |
| ~        | Harangi               | 1.24              | 1.24                                                             | 2.48              | 3.42              | 5.90        | 18.22     | 17.26             | 35.48                                   | 10.96               | 16.84             | 27.8                                                 | 29.2               | 127.2            | 156.4      | 0                   | 173.54           | 52.05             | 225.59  |
| 4        | Cauvery               | 0.63              | 0.63                                                             | 1.25              | 1.72              |             | 12.90     | 8.61              | 21.51                                   | 5.51                | 8.46              | 13.97                                                | 24.24              | 105.6            | 129.9      | 0                   | 128.83           | 39.49             | 168.32  |
| Ş        | KRS                   | 15.85             | 15.85                                                            | 31.69             | 43.60             | 75.29       | 130.0     | 474.6             | 604.6                                   | 139.9               | 214.9             | 354.8                                                | 0.0                | 0.00             | 00.00      | 1506                | 2351.3           | 189.45            | 2540.71 |
| Total Up | Upper Cauvry s.b.     | 24                | 24                                                               | 48                | 99                | 114         | 279       | 999               | 845                                     | 212                 | 325               | 537                                                  | 210                | 388              | 865        | 2640                | 4155             | 878               | 4734    |
| 9        | Banasursagar          | 0.20              | 0.20                                                             | 0.40              | 0.28              | 89.0        | 1.52      | 00.0              | 1.52                                    | 1.76                | 2.44              | 4.20                                                 | 2.09               | 22.05            | 24.14      | 189                 | 215.45           | 4.09              | 219.54  |
| 7        | Mananthvady           | 0.51              | 0.51                                                             | 10.1              | 0.71              | 1.72        | 7.02      | 0.00              | 7.02                                    | 4.46                | 6.18              | 10.64                                                | 00.0               | 0.00             | 0.00       | 276.0               | 287.15           | 8.24              | 295.38  |
| ∞        | Kabini                | 6.27              | 6.27                                                             | 12.53             | 8.79              | 21.32       | 1         | 441.89            | 530.40                                  | 55.23               | 76.56             | 131.8                                                | 09.9               | 357.8            | 364.4      | 202                 | 1139.8           | 110.17            | 1249.94 |
| 6        | Taraka                | 06:0              | 0.90                                                             | 1.80              | 1.26              | 3.06        | 1.24      | 0.00              | 1.24                                    | 7.94                | 11,00             | 18.94                                                | 4.89               | 7.76             | 102.6      | 0                   | 117.56           | 8.29              | 125.85  |
| 10       | Sagardoddakere        | 09'0              | 09.0                                                             | 1.20              | 0.85              | 2.05        | 4.59      | 00.0              | 4.59                                    | 5.31                | 7.36              | 12.67                                                | 0.93               | 23.07            | 24.00      | 62                  | 131.34           | 6.97              | 138.31  |
| -        | Upper Nagu            | 3.08              | 3.08                                                             | 6.16              | 4.34              | 10.50       | 44.70     | 79.35             | 124.05                                  | 27.26               | 37.78             | 65.04                                                | 9.88               | 252.4            | 262.3      | 290                 | 686.89           | 62.00             | 751.89  |
| 12       | Nugu                  | 0.11              | 0.11                                                             | 0.22              | 0.16              | 0.38        | 0.15      | 0.00              | 0.15                                    | 0.98                | 1.35              | 2.33                                                 | 1.87               | 55.04            | 16.95      | 0                   | 57.48            | 2.29              | 59.77   |
| 13       | Kabini s.b.r.area     | 11.32             | 11.32                                                            | 22.64             | 15.63             | 38.27       | 134.5     | 227.8             | 362.3                                   | 1.66                | 137.3             | 236.4                                                | 00.00              | 0.00             | 0.00       | 66                  | 574.50           | 161.43            | 735.93  |
| Total K. | Total Kabini s.b.     | 23                | 23                                                               | 94                | 32                | 78          | 282.2     | 749.0             | 1031.2                                  | 202.0               | 280.0             | 482.0                                                | 26                 | 808              | 834        | 1151                | 3213             | 363               | 3577    |
| 14       | Shimsha.              | 26.50             | 26.50                                                            | 53.00             | 62.00             | 115.0 506   | 506.0     | 0.0               | 506.0                                   | 233.0               | 348.0             | 581.0                                                | 00.00              | 0.00             | 0.00       | 0.00                | 607.50           | 594.50            | 1202.00 |
| 15       | Arkavathi             | 48.50             | 48.50                                                            | 97.00             | 32.00             | 129.0 22.50 | 22.50     | 20.30             | 42.80                                   | 00.0                | 0.00              | 00.0                                                 | 00.00              | 0.00             | 0.00       | 0.00                | 68.80            | 103.00            | 171.80  |
| 16       | Middle Cauvery        | 8.50              | 8.50                                                             | 17.00             | 18,00             | 35.00       | 178.5     | 1410              | 1588                                    | 74.0                | 109.0             | 183.0                                                | 0.00               | 0.00             | 0.00       | 14.00               | 1615.5           | 205.00            | 1820.47 |
| 17       | Suvarnavathi          | 3.50              | 3.50                                                             | 7.00              | 24.00             | 31.00       | 36.4      | 0.0               | 36.4                                    | 32.0                | 7.0               | 39.0                                                 | 0.00               | 0.00             | 0.00       | 0.00                | 42.50            | 63.90             | 106.40  |
| 8        | Palar                 | 11.60             | 11.60                                                            | 23.19             | 21.03             | 44.22       | 100.5     | 14.0              | 114.5                                   | 31.0                | 0.0               | 31.0                                                 | 00.0               | 0.00             | 0.00       | 0.00                | 26.60            | 133.13            | 189.72  |
| 61       | Chinnar s.b.r.area    | 8.86              | 8.86                                                             | 17.71             | 27.23             | 44.94       | 124.6     | 53.0              | 177.6                                   | 0.0                 | 0.0               | 0.0                                                  | 0.00               | 0.00             | 0.00       | 0.00                | 61.83            | 160.71            | 222.54  |
| 20       | Mettur                | 00.00             | 0.00                                                             | 0.00              | 0.00              | 0.00        | 0.0       | 0.0               | 0.0                                     | 78.0                | 123.0             | 201.0                                                | 0.00               | 275.0            | 275.0      | 6200                | 9299             | 0.00              | 9676.00 |
| Total C  | Total Chinnar s.b     | 6                 | 6                                                                | 18                | 27                | 45          | 125       | 53                | 178                                     | 78                  | 123               | 201                                                  | 0                  | 275              | 275        | 6200                | 6738             | 161               | 6899    |
| Total ab | Total above Mettur    | 154               | 154                                                              | 309               | 282               | 165         | 1530      | 2812              | 4342                                    | 862                 | 1192              | 2054                                                 | 236                | 1472             | 1707       |                     | 16497            | 2202              | 18699   |
|          |                       |                   |                                                                  |                   |                   |             |           |                   |                                         |                     |                   |                                                      |                    |                  |            |                     |                  |                   |         |

Table 7.1.3(c) continued...

Table 7.1.3(c) continued...

Table 7.1.3(c): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                              |             |              |                                                                  |                    |             | i          | Exp               | ort From | Mettur R  | eservoir    | Export From Mettur Reservoir = 6200 MCM              | CM         |           |        |         |         |                   |         |
|------------------------------|-------------|--------------|------------------------------------------------------------------|--------------------|-------------|------------|-------------------|----------|-----------|-------------|------------------------------------------------------|------------|-----------|--------|---------|---------|-------------------|---------|
|                              | W S/N       | ater utiliz  | U/S water utilization from minor and medium irrigation projects* | minor an           | mediu       | n irrigati | on proje          | :cts*    | D/s water | er utilizat | D/s water utilization from major irrigation projects | najor irri | gation pr | ojects | Exports | Wat     | Water utilization | ion     |
| Sl.No. Sub-basin/<br>Project | lum,g       | Ium,s<br>i.j | Ws.i.j                                                           | $W_{S_{i,j}}^{RL}$ | Iu"         | luf, je    | Iu <sup>r,s</sup> | Jul.     | Wsij      | WSi,j       | WSi,j                                                | 9.1        | II.'s     | Ţ,     | OEq.je  | Surface | Ground            | Total   |
|                              | IUMHG IUMHS | IUMHS        | IUMH                                                             | IUML               | IUM         | IURG       | IURS              | IUR      | wsn       | WSI         | WSD                                                  | IRG        | IRS       | IRD    | OE      |         |                   |         |
| (1) (2)                      | (3)         | (4)          | (5)                                                              | (9)                | (2)         | (8)        | (6)               | (01)     | (11)      | (12)        | (13)                                                 | (14)       | (15)      | (91)   | (71)    | (81)    | (61)              | (20)    |
| 21 Lower Bhawani             | 12.44       | 12.44        | 24.88                                                            | 21.54              | 21.54 46.42 | 84.20      | 250.3             | 334.5    | 6.601     | 156.3       | 266.2                                                | 6.6        | 334.8     | 344.7  | 0.0     | 863.66  | 128.08            | 991.74  |
| 22 Bhavani s.b.r.area        | 5.79        | 5.79         | 11.57                                                            | 10.02              | 21.59       | 43.79      | 138.7             | 182.5    | 51.1      | 72.7        | 123.8                                                | 0.0        | 0.0       | 0.0    | 408.0   | 676.33  | 59.60             | 735.93  |
| Total Bhawani s.b.           | 18          | 18           | 36                                                               | 32                 | 68          | 128        | 389               | 517      | 191       | 229         | 390                                                  | 10         | 335       | 345    | 408     | 1540    | 188               | 1728    |
| 23 Noyil                     | 5.95        | 5.95         | 11.90                                                            | 8.25               | 8.25 20.15  | 18.09      | 2.01              | 20.10    | 113.0     | 00.0        | 113.00                                               | 0.00       | 0.00      | 00.0   | 0.00    | 120.96  | 32,29             | 153.25  |
| 24 Amaravathi                | 2.37        | 2.37         | 4.73                                                             | 5.31               | 5.31 10.04  | 23.53      | 43.15             | 89.99    | 20.88     | 30.91       | 51.79                                                | 3.76       | 47.82     | 51.58  | 000     | 145.12  | 34.97             | 180.09  |
| 25 Amaravathi                | 20.98       | 20.98        | 41.96                                                            | 47.07              | 47.07 89.03 | 137.6      | 231.0             | 368.7    | 185.1     | 274.1       | 459.2                                                | 0.00       | 0.00      | 0.00   | 0.00    | 711.21  | 205 69            | 916.90  |
| s.b.r.area                   |             |              |                                                                  |                    | Ī           |            | I                 |          |           |             |                                                      |            |           |        |         |         |                   |         |
| Total Amaravathi s.b.        | 23          | 23           | 47                                                               | 52                 | 66          | 191        | 274               | 435      | 206       | 305         | 511                                                  | 4          | 48        | 52     | 0       | 856     | 241               | 1097    |
| 26 Tirumanimuttar            | 109.7       | 109.7        | 219.5                                                            | 199.0              | 199.0 418.5 | 41.3       | 195.0             | 236.3    | 370.0     | 473.0       | 843.0                                                | 0.00       | 0.00      | 0.00   | 0.00    | 1147.7  | 350.00            | 1497.74 |
| 27 Ponnai Ar                 | 8.1         | 8.1          | 16.3                                                             | 10.2               | 26.4        | 175.5      | 122.5             | 298.0    | 113.0     | 155.0       | 268.0                                                | 0.00       | 0.00      | 0.00   | 0.00    | 398.64  | 193.80            | 592.44  |
| 28 Upper Coleroon            | 10.7        | 10.7         | 21.5                                                             | 23.5               | 45.0        | 180.0      | 630.7             | 810.7    | 0.06      | 130.0       | 220.0                                                | 0.00       | 00.0      | 0.00   | 0.00    | 861.40  | 214.28            | 1075.67 |
| 29 Lower Coleroon            | 3.1         | 3.1          | 6.1                                                              | 4.9                | 0.11        | 105.0      | 536.0             | 641.0    | 63.0      | 83.0        | 146.0                                                | 0.00       | 00.0      | 0.00   | 0.00    | 685.05  | 112.92            | 797.97  |
| 30 Cauvery Delta             | 80.8        | 80.8         | 161.6                                                            | 133.1              | 294.7       | 11.1       | 3675              | 3686     | 349.0     | 461.0       | 810.0                                                | 0.00       | 0.00      | 0.0    | 0.00    | 4566    | 225.00            | 4790.8  |
| Total below Mettur           | 260         | 260          | 520                                                              | 463                | 983         | 820        | 5824              | 6644     | 1483      | 1836        | 3319.00                                              | 14         | 383       | 396    |         | 9826    | 1557              | 11733   |
| Gross Total                  | 414         | 414          | 829                                                              | 745                | 1574        | 2350       | 8636              | 10986    | 2470      | 3028        | 5497.9                                               | 249        | 1854      | 2104   |         | 26283   | 3759              | 30437   |

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (14) + Col. no. (15) + Col. no. (15) = Col. no. (17); Col. no. (18) = Col. no. (18) = Col. no. (18) + Col. no. (18) + Col. no. (18) + Col. no. (19) + Col. no. (19); Col. no. (19) = Col. no. (14). Col. no. (14). Col. no. (14). Col. no. (15) + Col. no. (16). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. <u>B</u>

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Table 7.1.3(d): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|          |                         |       |                    |                                             |            |          |           | Fyn                  | Export From Mettur Reservoir = 6900 MCM | Mettur R          | Servoir     | = 6900 Mg         | 2                                                    |               |          |         |                           |                   |         |
|----------|-------------------------|-------|--------------------|---------------------------------------------|------------|----------|-----------|----------------------|-----------------------------------------|-------------------|-------------|-------------------|------------------------------------------------------|---------------|----------|---------|---------------------------|-------------------|---------|
|          |                         | U/S w | ater utiliza       | U/S water utilization from minor and medium | i minor ar | nd mediu |           | irripation projects* | cts*                                    | D/s water         | r utilizati | on from n         | D/s water utilization from major irrigation projects | ation pro     | $\vdash$ | Exports | Wate                      | Water utilization | 16      |
| SI.No.   | Sub-basin/              | g,m,  | s'm'.1             | W. RH                                       | WSRL       | (1       |           | 5 1                  | 1                                       | n in              | 1 / 1       |                   | D.                                                   | S             |          |         | ,                         |                   |         |
|          | rojeci<br>-             | -     | Iu <sub>i, j</sub> |                                             |            | i?<br>N  | ll<br>j.j | i.                   | Iu;<br>j                                | WS <sub>i,j</sub> |             | wS <sub>i,j</sub> | F                                                    |               | <u> </u> |         | Surface water             | Ground            | Total   |
|          |                         | IUMHG | IUMHS              | IUMH                                        | IUMIL      | IUM      | IURG      | IURS                 | IUR                                     | NSM               | WSI         | WSD               | IRG                                                  | IRS           | IRD      | OE      |                           |                   |         |
| Ξ        | (2)                     | (3)   | (4)                | (5)                                         | (9)        | (7)      | (8)       | 6)                   | (01)                                    | (11)              | (12)        | (13)              | (14)                                                 | (15)          | (16)     | (17)    | (18)                      | (19)              | (20)    |
| _        | Yagachi                 | 1.24  | 1.24               | 2.48                                        | 3.42       | 5.90     | 25.68     | 17.12                | 42.80                                   | 10.96             | 16.84       | 27.80             | 11.69                                                | 71.33         | 83.02    | 0       | 117.49                    | 42.03             | 159.52  |
| 7        | Hemavathi               | 5.02  | 5.02               | 10.04                                       | 13.82      | 23.86    | 92.21     | 48.30                | 140.5                                   | 44.3              | 68.1        | 112.5             | 144.4                                                | 84.3          | 228.7    | 1134    | 1384.03                   | 255.46            | 1639.49 |
| 3        | Harangi                 | 1.24  | 1.24               | 2.48                                        | 3.42       |          | 18.22     | 00.0                 | 18.2                                    | 0.11              | 16.8        | 27.8              | 29.2                                                 | 120.0         | 149.2    | 0       | 149.04                    | \$2.0\$           | 201.09  |
| 4        | Cauvery                 | 0.63  | 0.63               | 1,25                                        | 1.72       | 2.97     | 12.90     | 8.61                 | 21.5                                    | 5.5               | 8.5         | 14.0              | 24.2                                                 | 105.6         | 129.9    | 0       | 128.83                    | 39.49             | 168.32  |
| \$       | KRS                     | 15.85 | 15.85              | 31.69                                       | 43.60      | 75.29    | 130.0     | 474.6                | 604.6                                   | 139.9             | 214.9       | 354.8             | 0.0                                                  | 0.0           | 0.00     | 1506    | 2351.25                   | 189.45            | 2540.71 |
| Total U  | Total Upper Cauvry s.b. | 24    | 24                 | 48                                          | 99         | 114      | 279       | 549                  | 828                                     | 212               | 325         | 537               | 210                                                  | 381           | 165      | 2640    | 4131                      | 578               | 4709    |
| 9        | Banasursagar            | 0.20  | 0.20               | 0.40                                        | 0.28       | 89.0     | 1.52      | 00.00                | 1.52                                    | 1.76              | 2.44        | 4.20              | 2.09                                                 | 22.05         | 24.14    | 681     | 215.45                    | 4.09              | 219.54  |
| 7        | Mananthvady             | 0.51  | 0.51               | 1.01                                        | 0.71       | 1.72     | 7.02      | 0.00                 | 7.02                                    | 4.46              | 6.18        | 10.64             | 0.00                                                 | 0.00          | 0.00     | 276.0   | 287.15                    | 8.24              | 295.38  |
| ∞        | Kabini                  | 6.27  | 6.27               | 12.53                                       | 8.79       | 21.32    | 88.51     | 15.88                | 341.89                                  | 55.23             | 76.56       | 131.8             | 9.9                                                  | 307.8         | 314.4    | 202     | 989.75                    | 110.17            | 1636601 |
| 6        | Taraka                  | 0.00  | 06.0               | 1.80                                        | 1.26       | 3.06     | 1.24      | 00.00                | 1.24                                    | 7.94              | 11.00       | 18.94             | 4.89                                                 | 67.7          | 102.6    | 0       | 117.56                    | 8.29              | 125.85  |
| 0        | Sagardoddakerc          | 09.0  | 09.0               | 1.20                                        | 0.85       | 2.05     | 4.59      | 00.0                 | 4.59                                    | 5.31              | 7.36        | 12.67             | 0.93                                                 | 23.1          | 24.0     | 95      | 131.34                    | 6.97              | 138.31  |
| =        | Upper Nagu              | 3.08  | 3.08               | i                                           | 4.34       | 10.50    | 44.70     | 0.00                 | 44.70                                   | 27.26             | 37.78       | 65.04             | 9.88                                                 | 252.4         | 262.3    | 290     | 610.54                    | 62.00             | 672.54  |
| 15       | Nugu                    | 0.11  | 0.11               | 0.22                                        | 0.16       | 0.38     | 0.15      | 00.0                 | 0.15                                    | 86.0              | 1.35        | 2.33              | 1.87                                                 | 45.04         | 16.91    | 0       | 47.48                     | 2.29              | 49.77   |
| 2        | Kabini s.b.r.area       | 11.32 | 11.32              | 22.64                                       | 15.63      | 38.27    | 134.5     | 227.8                | 362.3                                   | 1.66              | 137.3       | 236.4             | 0.0                                                  | 0.0           | 00.0     | 66      | 574.50                    | 161.43            | 735.93  |
| Total K  | Kabini s.b.             | 23    | 23                 | 46                                          | 32         | 78       | 282       | 570                  | 852                                     | 202               | 280         | 482               | 56                                                   | 748           | 774      | 1151    | 2974                      | 363               | 3337    |
| 4        | Shimsha.                | 26.50 | 26.50              | 53.00                                       | 62.00      | 115.0    | 506.0     | 0.0                  | 506.0                                   | 233.0             | 348.0       | 581.0             | 0.00                                                 | 0.00          | 0.00     | 0.00    | 607.50                    | 594.50            | 1202.00 |
| 13       | Arkavathi               | 48.50 | 48.50              | 97.00                                       | 32.00      | 129.0    | 22.5      | 20.3                 | 42.8                                    | 0.0               | 0.0         | 0.0               | 0.00                                                 | 0.00          | 0.00     | 0.00    | 68.80                     | 103.00            | 171.80  |
| 91       | Middle Cauvery          | 8.50  | 8.50               | 17.00                                       | 18.00      | 35.0     | 178.5     | 1260                 | 1438                                    | 74.0              | 0.601       | 183.0             | 0.00                                                 | 00.0          | 0.00     | 14.00   | 1465.5                    | 205.00            | 1670.47 |
| 17       | Suvamavathi             | 3.50  | 3.50               | 7.00                                        | 24.00      | 31.0     | 36.4      | 0.0                  | 36.4                                    | 32.0              | 7.0         | 39.0              | 0.00                                                 | 0.00          | 0.00     | 0.00    | 42.5                      | 63.90             | 106.40  |
| <b>2</b> | Palar                   | 11.60 | 11.60              | 23.19                                       | 21.03      | 44.2     | 100.5     | 14.0                 | 114.5                                   | 0.11              | 0.0         | 0.11              | 0.00                                                 | 0.00          | 0.00     | 0.00    | 36.6                      | 133.13            | 169.72  |
| 19       | Chinnar s.b.r.area      | 8.86  | 8.86               | 17.71                                       | 27.23      | 44.9     | 124.6     | 43.0                 | 167.6                                   | 0.0               | 0.0         | 0.0               | 0.00                                                 | 0.00          | 0.00     | 0.00    | \$1.8                     | 160.71            | 212.54  |
| 70       | Mettur                  | 0.00  | 0.00               | 0.00                                        | 00.0       | 0.0      | 0.0       | 0.0                  | 0.0                                     | 78.0              | 123.0       | 201.0             | 0.00                                                 | 275.00 275.00 | 175.00   | 0069    | 7376.0                    | 0.00              | 7376.00 |
| Total C  | Total Chinnar s.b       | 6     | 6                  | 81                                          | 27         | 45       | 125       | 43                   | 168                                     | 78                | 123         | 201               | 0                                                    | 275           | 275      | 6900    | 7428                      | 191               | 7589    |
| Total al | Total above Mestur      | 154   | 154                | 309                                         | 282        | 591      | 1530      | 2456                 | 3985                                    | 842               | 1192        | 2034              | 236                                                  | 1404          | 1640     |         | 16753                     | 2202              | 18955   |
|          |                         |       |                    |                                             |            | ç        |           |                      | d                                       | Ć,                | 4           |                   |                                                      |               |          | Table   | Table 7.1.3(d) continued. | l) contin         | ned     |
|          |                         |       |                    |                                             |            |          |           |                      |                                         |                   |             |                   |                                                      |               |          |         | •                         |                   |         |

Table 7.1.3(d) continued...

Table 7.1.3(d) continued...

Table 7.1.3(d): Results of LP Model for 90% Water Year Annual Dependable Flow (Maximization of Water Utilization)

| Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iumse   Iums | ssin/ Iu                          | U/S water U/S water U/S water U/S Water U/S U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/S Water U/ | r utilizat                                     | tion from | minor and         | mediu           | m irrigati | Droip             | cts*              | 100      | 1           |           |            |           | Ի     | - Stock C | 10/1    |                   |         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|-----------|-------------------|-----------------|------------|-------------------|-------------------|----------|-------------|-----------|------------|-----------|-------|-----------|---------|-------------------|---------|
| Iuing   Iuing   WSi,   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   WSi,   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing   Iuing  | sin/<br>ct<br>wani<br>b.r.area    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | , s, m, u, u, u, u, u, u, u, u, u, u, u, u, u, |           |                   |                 |            | 12 12 150         |                   | U/S watt | er utilizat | on from 1 | najor irri | gation pr | 7     |           | 14 61   | Water utilization | uo      |
| 10MHG   10MHS   10MH   10ML   10MG   10RS   10R   WSU     13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | wani<br>b.r.area                  | 3)<br>12.44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                | WskH      | WS <sub>i,j</sub> | Iu <sup>m</sup> | luí, g     | Iu <sup>r,s</sup> | Iu <sup>c</sup> . | Wsij     | Ws.i.j      | Wsij      | 8.1        | III       | II,   | OE4,jp    | Surface | Ground            | Total   |
| ni 12.44 12.44 24.88 21.54 46.42 84.20 250.3 334.5 109.9 area 5.79 5.79 11.57 10.02 21.59 43.79 138.7 182.5 51.1 161.2 20.3 5.95 5.95 11.90 8.25 20.15 18.09 2.01 20.10 101.0 20.37 2.37 4.73 5.31 10.04 23.53 43.15 66.68 20.88 20.98 41.96 47.07 89.03 137.6 221.0 358.6 185.1 2.3 47 52 89 161 264 425 20.6 370.0 n. 10.7 219.5 199.0 418.5 41.3 211.3 252.6 370.0 n. 10.7 10.7 21.5 23.5 45.0 180.0 630.7 810.7 90.0 s.0 8.1 8.0 8.15 6.1 4.9 11.0 105.0 536.0 641.0 63.0 386.1 34.9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | iwani<br>b.r.area                 | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                | IUMH      | _                 |                 | IURG       | IURS              | IUR               | WSU      | WSI         | MSD       | IRG        | IRS       | JRD   | OE        |         | -                 |         |
| ni         12.44         12.44         12.44         12.44         24.88         21.54         46.42         84.20         250.3         334.5         109.9           area         5.79         5.79         11.57         10.02         21.59         43.79         138.7         182.5         51.1           5.95         5.95         11.90         8.25         20.15         18.09         2.01         20.10         101.0           2.37         2.37         4.73         5.31         10.04         23.53         43.15         66.68         20.88           2.0.98         20.98         41.96         47.07         89.03         137.6         221.0         358.6         185.1           3         109.7         109.7         219.5         199.0         418.5         41.3         211.3         252.6         370.0           3         8.1         8.1         16.3         10.2         26.4         175.5         122.5         298.0         113.0           3         3.1         3.1         6.1         4.9         11.0         105.0         536.0         641.0         63.0           4         8.0         8.0         16.1         13.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | b.r.area                          | 12.44                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (4)                                            | (5)       | (9)               | (2)             | (8)        | (6)               | (10)              | (1)      | (12)        | (13)      | (14)       | (15)      | (91)  | (17)      | (81)    | (61)              | (20)    |
| area         5.79         5.79         11.57         10.02         21.59         43.79         138.7         182.5         51.1           5.95         5.95         11.90         8.25         20.15         18.09         2.01         20.10         101.0           2.37         2.37         4.73         5.31         10.04         23.53         43.15         66.68         20.88           20.98         20.98         41.96         47.07         89.03         137.6         221.0         358.6         185.1           37         109.7         219.5         199.0         418.5         41.3         211.3         252.6         370.0           38         8.1         16.3         10.2         26.4         175.5         122.5         298.0         113.0           30         3.1         3.1         6.1         4.9         11.0         105.0         536.0         641.0         63.0           31         3.1         6.1         4.9         11.0         105.0         536.0         641.0         63.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Bhavani s.b.r.area<br>hawani s.b. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 12.44                                          | 24.88     |                   | 46.42           | 84.20      | 250.3             | 334.5             | 6.601    | 156.3       | 2992      | 6.6        | 334.8     | 344.7 | 0         | 863.66  | 128.1             | 991.74  |
| 18         36         32         68         128         389         517         161           5.95         5.95         11.90         8.25         20.15         18.09         2.01         20.10         101.0           20.98         20.98         41.96         47.07         89.03         137.6         221.0         358.6         185.1           10         23         23         47         52         99         161         264         425         206           10         109.7         219.5         199.0         418.5         41.3         211.3         252.6         370.0           10         10.7         21.5         23.5         45.0         180.0         630.7         810.7         90.0           20         31         31         6.1         4.9         11.0         105.0         536.0         641.0         63.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | hawani s.b.                       | 5.79                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5.79                                           | 11.57     | 10.02             | 21.59           | 43.79      | 138.7             | 182.5             | 51.1     | 72.7        | 123.8     | 0.0        | 0.0       | 0.0   | 408       | 676.33  | 59.6              | 735.93  |
| 5.95         5.95         11.90         8.25         20.15         18.09         2.01         20.10         101.0           2.37         2.37         4.73         5.31         10.04         23.53         43.15         66.68         20.88           20.98         20.98         41.96         47.07         89.03         137.6         221.0         358.6         185.1           10         23         23         47         52         99         161         264         425.         20.8           10         8.1         8.1         16.3         199.0         418.5         41.3         211.3         252.6         370.0           10         10.7         21.5         23.5         45.0         180.0         630.7         810.7         90.0           10         3.1         3.1         6.1         4.9         11.0         105.0         536.0         641.0         63.0           8.0         8.0         161.6         133.1         204.7         111         3850         3861         349                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Novil                             | 18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 18                                             | 36        | 32                | 89              | 128        | 389               | 517               | 191      | 229         | 390       | 10         | 335       | 345   | 408       | 1540    | 188               | 1728    |
| 20.98 20.98 41.96 47.07 89.03 137.6 221.0 358.6 185.1 20.98 20.98 41.96 47.07 89.03 137.6 221.0 358.6 185.1 23 23 23 47 52 99 161 264 425. 206 20 20 20 20 20 20 20 20 20 20 20 20 20                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                   | 5.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 5.95                                           | 11.90     | 8.25              | 20.15           |            | 2.01              | 20.10             | 101.0    | 0.0         | 101.0     | 0.00       | 0.00      | 0.00  | 0.00      | 108.96  | 32,29             | 141.25  |
| 20.98 20.98 41.96 47.07 89.03 137.6 221.0 358.6 185.1 at 109.7 109.7 219.5 199.0 418.5 41.3 211.3 252.6 370.0 at 10.7 10.7 21.5 23.5 45.0 180.0 630.7 810.7 90.0 at 3.1 3.1 6.1 4.9 11.0 105.0 536.0 641.0 63.0 at 10.7 21.6 13.1 294.7 111 3850 3861 349                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Amaravathi                        | 2.37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 2.37                                           | 4.73      | 5.31              | 10.04           |            | 43.15             | 89.99             | 20.88    | 30.91       | 51.79     | 3.76       | 47.82     | 51.58 | 0.00      | 145.12  | 34.97             | 180.086 |
| 23 23 47 52 99 161 264 425 206  or 109.7 109.7 219.5 199.0 418.5 41.3 211.3 252.6 370.0  on 10.7 10.7 21.5 23.5 45.0 180.0 630.7 810.7 90.0  on 3.1 3.1 6.1 4.9 11.0 105.0 536.0 641.0 63.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                   | 30.98                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 20.98                                          | 41.96     | 47.07             | 89.03           | 137.6      | 221.0             | 358.6             | 185.1    | 274.1       | 459.2     | 0.00       | 0.00      | 0.00  | 00.0      | 701.19  | 205.7             | 906.883 |
| 23         23         47         52         99         161         264         425         206           nr         109.7         219.5         199.0         418.5         41.3         211.3         252.6         370.0           nr         8.1         16.3         10.2         26.4         175.5         122.5         298.0         113.0           nr         10.7         21.5         23.5         45.0         180.0         630.7         810.7         90.0           nr         3.1         6.1         4.9         11.0         105.0         536.0         641.0         63.0           s0.8         80.8         161.6         133.1         204.7         11.1         3850         3861         349                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | s.b.r.area                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                |           |                   |                 |            |                   |                   |          |             |           |            |           |       |           | i       |                   |         |
| 8.1 8.1 16.3 10.2 26.4 175.5 122.5 298.0 113.0 10.7 10.7 21.5 23.5 45.0 180.0 630.7 810.7 90.0 3.1 6.1 4.9 11.0 105.0 536.0 641.0 63.0 80.8 161.6 133.1 294.7 11.1 3850 3861 349                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | maravathi s.b.                    | 23                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 23                                             | 47        | 52                | 66              | 191        | 264               | 425.              | 206      | 305         | 511       | 4          | 48        | 52    | 0         | 846     | 241               | 1087    |
| 8.1 8.1 16.3 10.2 26.4 175.5 122.5 298.0 113.0 10.7 21.5 23.5 45.0 180.0 630.7 810.7 90.0 3.1 3.1 6.1 4.9 11.0 105.0 536.0 641.0 63.0 80.8 161.6 1331 294.7 11.1 3850 3861 349                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <u> </u>                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 109.7                                          | 219.5     | 0.661             | 418.5           | 41.3       | 211.3             | 252.6             | 370.0    | 530.0       | 0.006     | 0.00       | 00.00     | 0.00  | 0.00      | 1221.1  | 350               | 1571.06 |
| 10.7         21.5         23.5         45.0         180.0         630.7         810.7         90.0           3.1         3.1         6.1         4.9         11.0         105.0         536.0         641.0         63.0           8.0         8.0         161.6         133.1         294.7         11.1         3850         3861         349                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ponnai Ar                         | 8.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                | 16.3      | 10.2              | 26.4            | 175.5      | 122.5             | 298.0             | 113.0    | 155.0       | 268.0     | 0.00       | 0.00      | 0.00  | 0.00      | 398.64  | 193.8             | 592.44  |
| 3.1 3.1 6.1 4.9 11.0 105.0 536.0 641.0 63.0 80.8 161.6 133.1 294.7 11.1 3850 3861 349                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Upper Coleroon                    | 10.7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 10.7                                           | 21.5      | 23.5              | 45.0            | 180.0      | 630.7             | 810.7             | 90.0     | 130.0       | 220.0     | 0.00       | 0.00      | 0.00  | 0.00      | 861.40  | 214.3             | 1075.67 |
| 808 808 1515 1331 2947 1111 3850 3851                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Lower Coleroon                    | 3.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 3.1                                            | 6.1       | 4.9               | 11.0            | 105.0      | 536.0             | 641.0             | 63.0     | 83.0        | 146.0     | 0.00       | 0.00      | 0.00  | 0.00      | 685.05  | 112.9             | 797.97  |
| 1000 0000 1:11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 30 Cauvery Delta                  | 80.8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 80.8                                           | 9.191     | 133.1             | 294.7           | 11.1       | 3850              | 3861              | 349      | 461.0       | 810.0     | 0.00       | 00.00     | 0.00  | 0.00      | 4741.2  | 225               | 4966.21 |
| 260 260 520 463 983 820 6006 6826 1453                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | slow Mettur                       | 260                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 260                                            | 520       | 463               | 983             | 820        | 9009              | 6826              | 1453     | 1893        | 3346      | 14         | 383       | 396   |           | 9995    | 1557              | 11959   |
| Gross Total 414 414 829 745 1574 2350 8462 10811 2295 3085                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | otal                              | 414                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 414                                            | 829       |                   | 1574            | 2350       | 8462              | 10811             | 2295     | 3085        | 5380      | 249        | 1787      | 2036  | <br> <br> | 26748   | 3759              | 30915   |

\* includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (10) = Col. no. (10) = Col. no. (11) + Col. no. (12); Col. no. (18) = Col. no. (13) + Col. no. (15) + Col. no. (15) + Col. no. (17); Col. no. (19) = Col. no. (19) = Col. no. (19) = Col. no. (19) = Col. no. (19) = Col. no. (19). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. (B)

Table 7.1.4(a): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|          |                         |        |              |                                                                  |                   |              |                           | LAN        | Event From Motter Peservoir = 4200 MCM | Mottur P.  | SCALVAIR.         | - 4200 NA                                            | SE SE       |                  |            |         |                                         |                   |         |
|----------|-------------------------|--------|--------------|------------------------------------------------------------------|-------------------|--------------|---------------------------|------------|----------------------------------------|------------|-------------------|------------------------------------------------------|-------------|------------------|------------|---------|-----------------------------------------|-------------------|---------|
| -        |                         | 9      |              |                                                                  | 1                 |              |                           |            | 110111                                 | T INTERIOR |                   | 14 CO 14                                             | -<br> -     |                  | t          |         |                                         |                   |         |
|          |                         | U/S ₩  | ater utiliz  | U/S water utilization from minor and medium irrigation projects* | minor a           | nd medit     | um irriga                 | tion proje | cts                                    | D/s wate   | r utilizat        | D/s water utilization from major irrigation projects | najor irrig | ation pro        |            | Exports | Wate                                    | Water utilization | 딩       |
| SI.No.   | Sub-basin/<br>Project   | Iu,m,g | Ium,s<br>i,j | WS <sub>i,j</sub>                                                | WS <sub>i,j</sub> | lu m<br>Li,  | Iu <sup>r,</sup> ë<br>Lij | ľuľ,s      | ľu <sub>i, j</sub>                     | Wsij       | WS <sub>i,j</sub> | WS <sub>i,j</sub>                                    | Ir.g.       | Ir. <sup>S</sup> | - <u> </u> | OEq.je  | Surface                                 | Ground            | Total   |
|          |                         | IUMHG  | IUMHS        | IUMH                                                             | IUML              | MU.          | IURG                      | IURS       | IUR                                    | MSU        | MSI               | MSD                                                  | IRG         | IRS              | <u>8</u>   | JO E    |                                         |                   |         |
| (1)      | (2)                     | (3)    | (4)          | (5)                                                              | (9)               | 6            | (8)                       | (6)        | (10)                                   | (E)        | (12)              | (13)                                                 | (14)        | (15)             | (91)       | (17)    | (18)                                    | (61)              | (50)    |
| _        | Yagachi                 | 1.24   | 1.24         | 2.48                                                             | 3.42              | 5.90         | 25.68                     | 0.00       | 25.68                                  | 96:01      | 16.84             | 27.80                                                | 69.11       | 71.33            | 83.02      | 0       | 100.37                                  | 42.03             | 142.40  |
| 2        | Hemavathi               | 5.02   | 5.02         | 10.04                                                            | 13.82             | 23.86        | 92.21                     | 48:30      | 140.51                                 | 44.34      | 68.11             | 112.45                                               | [44.41      | 84.26 228.67     | 228.67     | 1134    | 1384.03                                 | 255.46            | 1639.49 |
| 3        | Harangi                 | 1.24   | 1.24         | 2.48                                                             | 3.42              | 5.90         | 18.22                     | 0.00       | 18.22                                  | 96.01      | 16.84             | 27.80                                                | 29.17       | 111.10           | 140.27     | 0       | 140.14                                  | \$2.05            | 192.19  |
| 4        | Cauvery                 | 0.63   | 0.63         | 1.25                                                             | 1.72              | 2.97         | 12.90                     | 0.00       | 12.90                                  | 5.51       | 8.46              | 13.97                                                | 24.24       | 69.43            | 93.67      | 0       | 84.02                                   | 39.49             | 123.51  |
| 5        | KRS                     | 15.85  | 15.85        | 31.69                                                            | 43.60             | 75.29        | 130.01                    | 474.59     | 604.60                                 | 139.92     | 214.90            | 354.82                                               | 0.00        | 0.00             | 0.00       | 1506    | 2351.25                                 | 189.45            | 2540.7  |
| Total U  | Total Upper Cauvry s.b. | 24     | 24           | 48                                                               | 99                | 114          | 279                       | 523        | 802                                    | 212        | 325               | 537                                                  | 210         | 336              | 246        | 2640    | 4060                                    | 578               | 4638    |
| •        | Banasursagar            | 0.20   | 0.20         | 0.40                                                             | 0.28              | 0.68         | 1.52                      | 0.00       | 1.52                                   | 1.76       | 2.44              | 4.20                                                 | 2.09        | 13.11            | 15.20      | 681     | 206.51                                  | 4.09              | 210.60  |
| 7        | Mananthvady             | 0.51   | 0.51         | 101                                                              | 0.71              | 1.72         | 7.02                      | 0.00       | 7.02                                   | 4.46       | 6.18              | 10.64                                                | 0.00        | 0.00             | 0.00       | 276.0   | 287.15                                  | 8.24              | 295.38  |
| 8        | Kabini                  | 6.27   | 6.27         | 12.53                                                            | 8.79              | 21.32        | 88.51                     | 0.00       | 88.51                                  | 55.23      | 76.56             | 131.79                                               | 9.90        | 474.17           | 480.77     | 202     | 814.23                                  | 110.17            | 924.39  |
| 6        | Taraka                  | 06.0   | 06.0         | 1.80                                                             | 1.26              | 3.06         | 1.24                      | 0.00       | 1.24                                   | 7.94       | 11.00             | 18.94                                                | 4.89        | 21.29            | 26.18      | 0       | 41.13                                   | 8.29              | 49.42   |
| 01       | Sagardoddakere          | 09:0   | 09.0         | 1.20                                                             | 0.85              | 2.05         | 4.59                      | 0.00       | 4.59                                   | 5.31       | 7.36              | 12.67                                                | 0.93        | 23.07            | 24.00      | 95      | 131.34                                  | 6.97              | 138.31  |
| =        | Upper Nagu              | 3.08   | 3.08         | 91.9                                                             | 4.34              | 10.50        | 44.70                     | 0.00       | 44.70                                  | 27.26      | 37.78             | 65.04                                                | 88.6        | 99.23            | 109.11     | 290     | 457.35                                  | 62.00             | 519.35  |
|          | Nugu                    | 0.11   | 0.11         | 0.22                                                             | 0.16              | 0.38         | 0.15                      | 0.00       | 0.15                                   | 86.0       | 1.35              | 2.33                                                 | 1.87        | 75.04            | 76.91      | 0       | 77.48                                   | 2.29              | 79.77   |
| 13       | Kabini s.b.r.area       | 11.32  | 11.32        | 22.64                                                            | 15.63             | 38.27        | 134.48                    | 327.77     | 462.25                                 | 99.07      | 137.34            | 236.41                                               | 0.00        | 0.00             | 0.00       | 66      | 674.50                                  | 161.43            | 835.93  |
| Total K  | Total Kabini s.b.       | 23     | 23           | 46                                                               | 32                | 78           | 282                       | 328        | 019                                    | 202        | 280               | 482                                                  | 26          | 206              | 732        | 1151    | 2690                                    | 363               | 3053    |
| 4        | Shimsha.                | 26.50  | 26.50        | 53.00                                                            | 62.00             | 115.0        | 206.00                    | 0.00       | 506.00                                 | 233.00     | 348.00            | 581.00                                               | 0.00        | 0.00             | 0.00       | 0.00    | 607.50                                  | 594.50            | 1202.0  |
| 15       | Arkavathi               | 48.50  | 48.50        | 97.00                                                            | 32.00             | 129.0        | 22.50                     | 30.30      | 52.80                                  | 17.00      | 0.00              | 17.00                                                | 0.00        | 0.00             | 0.00       | 0.00    | 95.80                                   | 103.00            | 198.80  |
| 92       | Middle Cauvery          | 8.50   | 8.50         | .17.00                                                           | 18.00             | 35.00        | 178.50                    | 1610.0     | 1788.5                                 | 74.00      | 109.00            | 183.00                                               | 00'0        | 0.00             | 0.00       | 14.00   | 1815.47                                 | 205.0             | 2020.5  |
| $\neg$   | Suvarnavathi            | 3.50   | 3.50         |                                                                  | 24.00             | 24.00  31.00 | 36.40                     | 0.00       | 36.40                                  | 32.00      | 0.00              | 32.00                                                | 0.00        | 0.00             | 0.00       | 0.00    | 35.50                                   | 63.90             | 99.40   |
| _ i      | Palar                   | 11.60  | 11.60        | 23.19                                                            | 21.03             | 44.22        | 100.53                    | 0.00       | 100.53                                 | 11.00      | 10.00             | 21.00                                                | 0.00        | 0.00             | 0.00       | 00.0    | 32.60                                   | 133,16            | 165.75  |
|          | Chinnar s.b.r.area      | 8.86   | 8.86         | 17.71                                                            | 27.23             | 44.94        | 124.63                    | 52.97      | 177.6                                  | 0.00       | 0.00              | 0.00                                                 | 0.00        | 0.00             | 0.00       | 0.00    | 61.83                                   | 160.71            | 222.54  |
| 22       | Mettur                  | 00:00  | 0.00         | 0.00                                                             | 0.00              | 0.00         | 00.0                      | 0.00       | 00.00                                  | 78.00      | 123.00            | 201.00                                               | 0.00        | 275.00 275.00    | 275.00     | 4200    | 4676.00                                 | 00.00             | 4676.0  |
| Total Ct | Total Chinnar s.b       | 6      | 6            | 18                                                               | 27                | 45           | 125                       | 53         | 178                                    | 78         | 123               | 201                                                  | 0           | 275              | 275        | 4200    | 4738                                    | 191               | 4899    |
| Total ab | Total above Mettur      | 154    | 154          | 309                                                              | 282               | 165          | 1530                      | 2544       | 4074                                   | 859        | 1195              | 2054                                                 | 236         | 1317             | 1553       |         | 14074                                   | 2202              | 16276   |
|          |                         |        |              |                                                                  |                   |              |                           |            |                                        |            |                   |                                                      |             |                  |            | Ę       | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, |                   | 1       |

Table 7.1.4(a) continued...

Table 7.1.4(a): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|             |                       |        |              |                                                                  |                     |             |               | Ex             | Export From Mettur Reservoir = 4200 MCM | Mettur R      | eservoir =  | = 4200 M                                             | CM         |            | ,      |         |         |                   |        |
|-------------|-----------------------|--------|--------------|------------------------------------------------------------------|---------------------|-------------|---------------|----------------|-----------------------------------------|---------------|-------------|------------------------------------------------------|------------|------------|--------|---------|---------|-------------------|--------|
|             |                       | U/S w  | ater utiliz  | U/S water utilization from minor and medium irrigation projects* | minor at            | id medi     | um irriga     | tion proje     | ects*                                   | D/s wate      | r utilizatı | D/s water utilization from major irrigation projects | najor irri | gation pro | Н      | Exports | Wat     | Water utilization | u.     |
| SI.No.      | Sub-basin/<br>Project | Ium's  | lum,s<br>Lij | $W_{S_{i,j}}^{RH} W_{S_{i,j}}^{RL} Iu_{i,j}^{m}$                 | WS <sub>i,j</sub>   | Iu.         | lu.           | Iur,s          | ľuť                                     | Wsu           | Ws.i.j      | WS <sub>i,j</sub>                                    | 50         | F          | - H    | OE4.je  | Surface | Ground            | Total  |
|             |                       | IUMHG  | IUMHG IUMHS  | IUMH                                                             | IUML                | IUM         | IURG          | IURS           | IUR                                     | MSU           | WSI         | MSD                                                  | IRG        | IRS        | IRD    | OE      |         |                   |        |
| (I)         | (2)                   | (3)    | (4)          | (5)                                                              | (9)                 | (7)         | (8)           | (6)            | (01)                                    | (11)          | (12)        | (13)                                                 | (14)       | (15)       | (91)   | (17)    | (81)    | (61)              | (20)   |
| 21 1        | 21 Lower Bhawani      | 12.44  | 12.44        | 24.88                                                            | 21.54               | 46.42       | 84.20         | 250.28         | 334.48                                  | 109.88        | 156.29      | 266.17                                               | 68.6       | 324.88     | 334.77 | 0       | 853.77  | 128.07            | 981.8  |
| 22 1        | 22 Bhavani s.b.r.area | 5.79   | 5.79         | 11.57                                                            |                     | 10.02 21.59 | 43.79         | 79.12          | 122.91                                  | 51.12         | 72.71       | 123.83                                               | 0.00       | 0.00       | 0.00   | 408     | 616.74  | 59.60             | 676.3  |
| Total Bh    | Total Bhawani s.b.    | 18     | 18           | 36                                                               | 32                  | 89          | 128           | 329            | 457                                     | 191           | 229         | 390                                                  | 01         | 325        | 335    | 408     | 1471    | 188               | 165    |
| 23          | 23 Noyil              | 5.95   | 5.95         | 11.90                                                            |                     | 8.25 20.15  | 18.09         | 2.01           | 20.10                                   | 93.00         | 00.0        | 93.00                                                | 0.00       | 0.00       | 0.00   | 0.00    | 100.96  | 32.29             | 133.2  |
| 24 /        | 24 Amaravathi         | 2.37   | 2.37         | 4.73                                                             |                     | 5.31 10.04  | 23.53         | 0.00           | 23.53                                   | 20.88         | 30.91       | 51.79                                                | 3.76       | 36.21      | 39.97  | 0.00    | 90.36   | 34.97             | 125.3  |
| 25/         | 25 Amaravathi         | 20.98  | 20.98        | 41.96                                                            | 47.07 89.03         | 89.03       | 137.64        | 231.00         | 368.64                                  | 185.12        | 274.09      | 459.21                                               | 0.00       | 0.00       | 0.00   | 0.00    | 711.19  | 205.69            | 916.8  |
| <u></u>     | s.b.r.area            |        |              |                                                                  |                     |             |               |                |                                         |               |             |                                                      |            |            |        |         |         |                   |        |
| Total Am    | Total Amaravathi s.b. | 23     | 23           | 47                                                               | 52                  | 66          | 191           | 231            | 392                                     | 206           | 305         | 511                                                  | 4          | 36         | 40     | 0       | 802     | 241               | 104    |
| 26          | 26 Tirumanimuttar     | 109.74 | 109.74       | 219,48                                                           | 198.98 418.4        | 418.4       | 41.28         | 129.21         | 170.49                                  | 370.00        | 350.00      | 720.00                                               | 0.00       | 0.00       | 0.00   | 0.00    | 958.95  | 350.00            | 1308   |
| 27 1        | 27 Ponnai Ar          | 8.13   | 8.13         |                                                                  | 16.25 10.19 26.44   | 26.44       | 175.48 125.32 | 125.32         | 300.80                                  | 113.00 155.00 | 155.00      | 268.00                                               | 0.00       | 00.00      | 00.0   | 0.00    | 401.45  | 193.80            | \$95.2 |
| 28 1        | 28 Upper Coleroon     | 10.75  | 10.75        | 21.49                                                            | 23.53 45.02         | 45.02       | 180.00        | 630.65         | 810.65                                  | 90.00         | 130.00      | 220.00                                               | 0.00       | 0.00       | 0.00   | 0.00    | 861.40  | 214.28            | 1075.  |
| 29 1        | 29 Lower Coleroon     | 3.05   | 3.05         | 6.10                                                             | 4.87                | 4.87 10.97  | 105.001       | 05.00   536.00 | 641.00                                  | 63.00         | 83.00       | 146.00                                               | 0.00       | 0.00       | 0.00   | 0.00    | 685.05  | 112.92            | 797.9  |
| 30/0        | 30 Cauvery Delta      | 80.82  | 80.82        | 161.63                                                           | 161,63 133.08 294.7 | 294.7       | 11.10         | 3250.4         | 3261.5                                  | 349.00        | 461.00      | 810.00                                               | 0.00       | 0.00       | 0.00   | 0.00    | 4141.21 | 225.00            | 4366.  |
| Total belo  | Total below Mettur    | 260    | 260          | 520                                                              | 463                 | 983         | 820           | 5234           | 6054                                    | 1483          | 1713        | 3158                                                 | 14         | 361        | 375    |         | 9013    | 1557              | 1097   |
| Gross Total | tal                   | 414    | 414          | 829                                                              | 745                 | 1574        | 2350          | 1778           | 10128                                   | 2470          | 2908        | 5212                                                 | 249        | 1678       | 1928   |         | 23087   | 3759              | 2775   |
|             |                       |        |              |                                                                  |                     |             |               |                |                                         |               |             |                                                      |            |            |        |         |         |                   |        |

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7)  $\approx$  Col. no. (5) + Col. no. (6); Col. no. (10)  $\approx$  Col. no. (8) + Col. no. (8) + Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. no. (11) + Col. no. (12); Col. no. (18) = Col. no. (4) + Col. no. (13) + Col. no. (15) + Col. no. (17); Col. no. (19) = Col. no. (3) + Col. no. (6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. (B)

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Table 7.1.4(b): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|         |                         |       |                   |                                                |                   |                         |           | Exp                | Export From Mettur Reservoir | Mettur R | cscrvoir    | = 5800 MCM                                           | CM         |            |        |          |         | •                 |         |
|---------|-------------------------|-------|-------------------|------------------------------------------------|-------------------|-------------------------|-----------|--------------------|------------------------------|----------|-------------|------------------------------------------------------|------------|------------|--------|----------|---------|-------------------|---------|
|         |                         | W S/D | ater utiliz       | U/S water utilization from minor and medium in | minor a           | nd medi                 | ım irriga | rigation projects* | ects*                        | D/s wate | er utilizat | D/s water utilization from major irrigation projects | major irri | gation pre | ojects | Exports  | Wat     | Water utilization | uo      |
| SI.No.  | Sub-basin/<br>Project   | Ium,g | Iu <sup>m,s</sup> | WSRH                                           | WS <sub>i,j</sub> | lu m                    | lu '. g   | ľuľ,               | Iui                          | Ws       | Wsi         | WS                                                   | E.         | Ir.s       | , H    | OEt, j.p | Surface | Ground            | Total   |
|         |                         | 7     |                   | 2                                              |                   | _                       | 2         |                    | 2                            |          | 2           |                                                      | ,          | ŧ.         | ,      |          | water   | water             |         |
|         |                         | IUMHG | IUMHS             | IUMH                                           | IUMIL             | IUM                     | IURG      | IURS               | IUR                          | WSU      | WSI         | WSD                                                  | IRG        | IRS        | RD     | OE       |         |                   |         |
| Ξ       | (2)                     | (3)   | (4)               | (S)                                            | (9)               | $\widehat{\mathcal{L}}$ | <u>8</u>  | 6)                 | (01)                         | (11)     | (12)        | (13)                                                 | (14)       | (15)       | (16)   | (17)     | (18)    | (61)              | (20)    |
| _       | Yagachi                 | 1.24  | 1.24              | 2.48                                           | 3.42              | 5.90                    | 25.68     | 0.00               | 25.68                        | 96.01    | 16.84       | 27.80                                                | 11.69      | 71.33      | 83.02  | 0        | 100.37  | 42.03             | 142.4   |
| 7       | Hemavathi               | 5.02  | 5.02              | 10.04                                          | 13.82;            | 23.86                   | 92.21     | 48.30              | 140.51                       | 44.34    | 68.11       | 112.45                                               | 144.41     | 84.26      | 228.67 | 1134     | 1384.03 | 255.46            | 1639.49 |
| ~       | Harangi                 | 1.24  | 1.24              | 2.48                                           | 3.42              | 5.90                    | 18.22     | 0.00               | 18.22                        | 10.96    | 16.84       | 27.80                                                | 29.17      | 111.10     | 140.27 | 0        | 140.14  | 52.05             | 192.193 |
| 4       | Cauvery                 | 0.63  | 0.63              | 1.25                                           | 1.72              | 2.97                    | 12.90     | 00.0               | 12.90                        | 5.51     | 8.46        | 13.97                                                | 24.24      | 69.43      | 93.67  | 0        | 84.02   | 39.485            | 123.507 |
| 5       | KRS                     | 15.85 | 15.85             | 31.69                                          | 43.60             | 75.29                   | 130.01    | 474.59             | 604.60                       | 139.92   | 214.90      | 354.82                                               | 00.00      | 0.00       | 0.00   | 1506     | 2351.25 | 189.455           | 2540.71 |
| Total C | Total Upper Cauvry s.b. | 24    | 24                | 48                                             | 99                | 114                     | 279       | 523                | 802                          | 212      | 325         | 537                                                  | 210        | 336        | 546    | 2640     | 4060    | 578               | 4638    |
| 9       | Banasursagar            | 0.20  | 0.20              | 0.40                                           | 0.28              | 89.0                    | 1.52      | 00.0               | 1.52                         | 1.76     | 2.44        | 4.20                                                 | 2.09       | 13.11      | 15.20  | 189      | 206.51  | 4.09              | 210.595 |
| 7       | Mananthyady             | 0.51  | 0.51              | 10.1                                           | 0.71              | 1.72                    | 7.02      | 0.00               | 7.02                         | 4.46     | 6.18        | 10.64                                                | 00.0       | 0.00       | 0.00   | 276.0    | 287.15  | 8.235             | 295.38  |
| ∞       | Kabini                  | 6.27  | 6.27              | 12.53                                          | 8.79              | 21.32                   | 88.51     | 00.0               | 88.51                        | \$5.23   | 70.56       | 125.79                                               | 09.9       | 263.17     | 269.77 | 202      | 597.23  | 110.165           | 707.394 |
| ٥       | Taraka                  | 06.0  | 06:0              | 1.80                                           | 1.26              | 3.06                    | 1.24      | 00.0               | 1.24                         | 7.94     | 11.00       | 18.94                                                | 4.89       | 21.29      | 26.18  | 0        | 41.13   | 8.29              | 49.4206 |
| 10      | Sagardoddakere          | 09'0  | 09.0              | 1.20                                           | 0.85              | 2.05                    | 4.59      | 0.00               | 4.59                         | 5.31     | 7.36        | 12.67                                                | 0.93       | 23.07      | 24.00  | 95       | 131.34  | 6.97              | 138.31  |
| =       | Upper Nagu              | 3.08  | 3.08              | 6.16                                           | 4.34              | 10.50                   | 44.70     | 00.0               | 44.70                        | 27.26    | 37.78       | 65.04                                                | 9.88       | 99.23      | 109.11 | 290      | 457.35  | 62                | 519.353 |
| 2       | Nugu                    | 0.11  | 0.11              | 0.22                                           | 91.0              | 0.38                    | 0.15      | 00.0               | 0.15                         | 0.98     | 1.35        | 2,33                                                 | 1.87       | 65.04      | 16.99  | 0        | 67.48   | 2.29              | 69.77   |
| 13      | Kabini s.b.r.arca       | 11.32 | 11.32             | 22.64                                          | 15.63             | 38.27                   | 134.48    | 127.77             | 362.25                       | 20.66    | 137.34      | 236.41                                               | 00.0       | 0.00       | 0.00   | 66       | 574.50  | 161.43            | 735.93  |
| Total K | Fotal Kabini s.b.       | 23    | 23                | 46                                             | 32                | 78                      | 282       | 228                | 510                          | 202      | 274         | 476                                                  | 26         | 485        | 511    | 1151     | 2363    | 363               | 2726    |
| 14      | Shimsha.                | 26.50 | 26.50             | 53.                                            | 62.00             | 115.0                   | 506.00    | 00.0               | 506.00                       | 233.00   | 348.00      | 581.00                                               | 00.0       | 0.00       | 0.00   | 0.00     | 607.50  | 594.5             | 1202    |
| 15      | Arkavathi               | 48.50 | 48.50             | 97.00                                          | 32.00             | 129.0                   | 22.50     | 30.30              | 52.80                        | 10.00    | 00.0        | 10.00                                                | 00.00      | 0.00       | 0.00   | 0.00     | 88.80   | 103               | 191.8   |
| 16      | Middle Cauvery          | 8.50  | 8.50              | 17.00                                          | 00.81             | 35.00                   | 178.50    | 1509.97            | 1688.47                      | 74.00    | 109.00      | 183.00                                               | 0.00       | 0.00       | 0.00   | 14.00    | 1715.47 | 205               | 1920.47 |
| 17      | Suvarnavathi            | 3.50  | 3.50              | 7.00                                           | 24.00             | 31.00                   | 36.40     | 0.00               | 36.40                        | 32.00    | 00.0        | 32.00                                                | 0.00       | 0.00       | 0.00   | 0.00     | 35.50   | 63.9              | 99.4    |
| 8       | Palar                   | 11.60 | 11.60             | 23.19                                          | 21.03             | 44.22                   | 100.50    | 0.00               | 100.50                       | 11.00    | 10.00       | 21.00                                                | 0.00       | 0.00       | 0.00   | 0.00     | 32.60   | 133.125           | 165.72  |
| 61      | Chinnar s.b.r.area      | 8.86  | 8.86              | 17.71                                          | 27.23             | 44.94                   | 124.63    | 52.97              | 177.6                        | 0.00     | 0.00        | 0.00                                                 | 00.00      | 0.00       | 0.00   | 0.00     |         | 160.714           | 222.54  |
| 50      | Mettur                  | 0.00  | 0.00              | 00.00                                          | 00.00             | 0.00                    | 0.00      | 0.00               | 0.00                         | 78.00    | 123.00      | 201.00                                               | 0.00       | 275.00     | 275.00 | 2800     | 6276.00 | Õ                 | 6276    |
| Total C | Total Chinnar s.b       | 6     | 6                 | 18                                             | 27                | 45                      | 125       | 53                 | 178                          | 78       | 123         | 107                                                  | 0          | 275        | 275    | 2800     | 6338    | 161               | 6499    |
| Totala  | Total above Mettur      | 154   | 152               | 309                                            | 282               | 168                     | 1530      | 2344               | 3874                         | 852      | 1189        | 2041                                                 | 236        | 1096       | 1332   |          | 15240   | 2022              | 17442   |
|         |                         |       |                   |                                                |                   |                         |           |                    | No. of Contrasts             |          |             |                                                      |            |            |        |          |         |                   |         |

Table 7.1.4(b) continued...

Table 7.1.4(b) continued...

Table 7.1.4(b): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                                       |                       |                   |             |                                             |                     |                 |        | Exi                      | Export From Mettur Reservoir = 5800 MCM | Mettur R | eservoir   | - 5800 M                                             | S.         |            |          |         |                  |                   |         |
|---------------------------------------|-----------------------|-------------------|-------------|---------------------------------------------|---------------------|-----------------|--------|--------------------------|-----------------------------------------|----------|------------|------------------------------------------------------|------------|------------|----------|---------|------------------|-------------------|---------|
|                                       |                       | U/S w             | ater utiliz | U/S water utilization from minor and medium | minor a             | nd medi         |        | тigation projects*       | ects*                                   | D/s wate | r utilizat | D/s water utilization from major irrigation projects | najor irri | gation pre | ד־וֹ     | Exports | Wat              | Water utilization | on      |
| Sl.No.                                | Sub-basin/<br>Project | Iu <sup>m,g</sup> | Iu.m.s      | Wsi,j Wsi,j Ium                             | WS,j                |                 | lui',  | Iu <sup>r,s</sup><br>i,j | Iu, j                                   | Wsu      | Wsij       | Wsij                                                 | 89         | Sil        | Į,<br>į, | OE4.JE  | Surface<br>water | Ground            | Total   |
|                                       |                       | IUMHG IUMHS       | IUMHS       | IUMH                                        | IUML                | IUM             | IURG   | IURS                     | IUR                                     | MSU      | WSI        | MSD                                                  | IRG        | IRS        | IRD      | OE      | _                | _                 |         |
| (1)                                   | (2)                   | (3)               | (4)         | (5)                                         | (9)                 | (7)             | (8)    | (6)                      | (10)                                    | (11)     | (12)       | (13)                                                 | (14)       | (15)       | (91)     | (11)    | (SE)             | (61)              | (50)    |
| $\begin{bmatrix} 21 \end{bmatrix}$ Lc | 21 Lower Bhawani      | 12.44             | 12.44       | 24.88                                       |                     | 21.54 46.42     | 84.20  | 250.3                    | 334.5                                   | 6.601    | 156.3      | 266.2                                                | 6.6        | 324.9      | 334.8    | ਰ       | 853.77           | 128.07            | 981.84  |
| 22 Bi                                 | 22 Bhavani s.b.r.area | 5.79              | 5.79        | 11.57                                       |                     | 10.02 21.59     | 43.79  | 79.10                    | 122.9                                   | 51.1     | 72.7       | 123.8                                                | 0.00       | 00.00      | 0.00     | 408     | 616.71           | 59.60             | 676.31  |
| Total Bhawani s.b.                    | wani s.b.             | 18                | 18          | 36                                          | 32                  | 89              | 128    | 329                      | 457                                     | 161      | 229        | 390                                                  | 10         | 325        | 335      | 408     | 1470             | 188               | 1658    |
| 23 Noyil                              | oyil                  | 5.95              | 5.95        | 11.90                                       |                     | 8.25 20.15      | 18.09  | 2.01                     | 20.10                                   | 81.00    | 0.00       | 81.00                                                | 0.00       | 0.00       | 0.00     | 00.0    | 98.96            | 32.29             | 121.25  |
| 24 AI                                 | 24 Amaravathi         | 2.37              | 2.37        | 4.73                                        | 5.31                | 5.31 10.04      | 23.53  | 0.00                     | 23.53                                   | 20.88    | 30.91      | 51.79                                                | 3.76       | 29.30      | 33.06    | 0.00    | 83.45            | 34.97             | 118.42  |
| 25 Ar                                 | 25 Amaravathi         | 20.98             | 20.98       | 41.96                                       | 47.07               | 89.03           | 137.64 | 262.32                   | 399.96                                  | 185.12   | 274.09     |                                                      | 0.00       | 00.0       | 0.00     | 0.00    | 283.30           | 205.69            | 488.99  |
| ls.b                                  | s.b.r.area            |                   |             |                                             |                     |                 |        |                          |                                         |          |            |                                                      |            |            |          |         |                  | •                 |         |
| Total Ama                             | Total Amaravathi s.b. | 23                | 23          | 47                                          | 52                  | 66              | 161    | 292                      | 423                                     | 206      | 305        | 52                                                   | 4          | 29         | 33       | 0       | 367              | 241               | 607     |
| 26 Ti                                 | 26 Tirumanimuttar     | 109.74            | 109.74      |                                             | 219.48 198.98 418.4 |                 | 41.28  | 142.65                   | 183.93                                  | 370.00   | 350.00     | 720.00                                               | 0.00       | 0.00       | 0.00     | 0.00    | 972.39           | 350.00            | 1322.4  |
| 27 Po                                 | 27 Ponnai Ar          | 8.13              | 8.13        | 16.25                                       |                     | 10.19 26.44     | 175.48 | 126.32                   | 301.80                                  | 113.00   | 155.00     | 268.00                                               | 0.00       | 0.00       | 0.00     | 0.00    | 402.45           | 193.80            | 596.24  |
| 28 Ur                                 | 28 Upper Coleroon     | 10.75             | 10.75       | 21.49                                       |                     | 23.53 45.02 180 | 180.00 | 630.65                   | 810.65                                  | 90.00    | 130.00     | 220.00                                               | 0.00       | 0.00       | 00.0     | 0.00    | 861.40           | 214.28            | 1075.67 |
| 29 Lo                                 | 29 Lower Coleroon     | 3.05              | 3.05        | 6.10                                        |                     | 4.87 10.97 105  | 105.00 | 536.00                   | 641.00                                  | 63.00    | 83.00      | 146.00                                               | 0.00       | 0.00       | 0.00     | 0.00    | 685.05           | 112.92            | 797.97  |
| 30 Ca                                 | 30 Cauvery Delta      | 80.82             | 80.82       | - 1                                         | 161.63 133.08       | 294.7           | 11.10  | 3475.0                   | 3486.1                                  | 349.00   | 461.00     | 810.00                                               | 0.00       | 00.00      | 0.00     | 0.00    | 4366             | 225.0             | 4590.8  |
| Total below Mettur                    | * Mettur              | 790               | 260         | 520                                         | 463                 | 983             | 820    | 5504                     | 6324                                    | 1483     | 1713       | 2687                                                 | 14         | 354        | 368      |         | 8805             | 1557              | 10770   |
| Gross Total                           |                       | 414               | 414         | 829                                         | 745                 | 1574            | 2350   | 7848                     | 10198                                   | 2470     | 2902       | 4728                                                 | 249        | 1450       | 1700     |         | 24045            | 3759              | 28212   |
|                                       |                       |                   |             |                                             |                     |                 |        |                          |                                         |          |            |                                                      |            |            |          |         |                  |                   |         |

\* Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (6) + Col. no. (10) = Col. no. (10) = Col. no. (10) = Col. no. (10) = Col. no. (11) + Col. no. (12); Col. no. (13) = Col. no. (13) = Col. no. (13) + Col. no. (14) + Col. no. (15) + Col. no. (15) + Col. no. (17); Col. no. (17); Col. no. (17) + Col. no. (18) + Col. no. (19) = Col. no. (19) = Col. no. (19). € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. <u>@</u>

Table 7.1.4(c): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

| WS <sup>U</sup> WS <sup>I</sup> , WS <sup>I</sup> , II <sup>R</sup> , II <sup>R</sup> , II <sup>S</sup> , II <sup>I</sup> , II <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS <sup>I</sup> , WS 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  5.02         10.04         13.82         23.86           1.24         2.48         3.42         5.90           0.63         1.25         1.72         2.97           15.85         31.69         43.60         75.29           0.20         0.40         0.28         6.68           0.21         1.01         0.71         1.72           6.27         1.253         8.79         21.32           0.20         1.80         1.26         3.06           0.20         1.80         1.26         3.06                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   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                                                                                                                                                                                                                                                                          | 2 2 2                                    | 44.70 27.26<br>0.15 0.98<br>362.25 99.07 13<br>510 202<br>506.00 233.00 3<br>42.80 0.00<br>1688.47 74.00 10<br>36.40 32.00<br>177.6 0.00<br>0.00 78.00 13<br>178 78 | 0.00     44.70     27.26       0.00     0.15     0.98       227.77     362.25     99.07     15       228     \$10     202       20.00     \$0.60     233.00     3       20.30     42.80     0.00     10       1509.97     1688.47     74.00     10       0.00     36.40     32.00     0       52.97     177.6     0.00     78.00     12       53     178     78       2334     3864     843                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10.50     44.70     0.00     44.70     27.26       0.38     0.15     0.00     0.15     0.98       38.27     134.4     227.77     362.25     99.07     15       115.00     506.0     0.00     506.0     233.00     3       129.00     22.50     20.30     42.80     0.00     10       35.00     178.5     1509.97     1688.47     74.00     11       31.00     36.40     0.00     36.40     32.00     12.00       44.94     124.6     52.97     177.6     0.00     12       6.00     0.00     0.00     0.00     78.00     17       45     125     53     178     78       591     1530     2334     3864     843 | 4.34         10.50         44.70         0.00         44.70         27.26           0.16         0.38         0.15         0.00         0.15         0.98           15.63         38.27         134.4         227.77         362.25         99.07         15           32         78         282         228         510         202           62.00         115.00         506.0         0.00         506.0         233.00           32.00         129.00         22.50         20.30         42.80         0.00           18.00         35.00         178.5         1509.97         1688.47         74.00         10           24.00         31.00         36.40         0.00         36.40         32.00         22.00           21.03         44.22         100.5         0.00         100.53         12.00           27.23         44.94         124.6         52.97         177.6         0.00           0.00         0.00         0.00         0.00         78.00         12           27         45         125         53         178         78           282         591         1530         2334         3864         843                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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99.07         13           46         32         78         282         228         510         202         32           53.00         62.00         115.00         506.0         0.00         506.0         233.00         233.00         33.00         178.5         1509.97         1688.47         74.00         10           17.00         18.00         35.00         178.5         1509.97         1688.47         74.00         10           7.00         24.00         31.00         36.40         0.00         36.40         32.00         22.00           23.19         21.03         44.22         100.5         0.00         100.5         12.00           23.19         21.03         44.24         124.6         52.97         177.6         0.00           0.00         0.00         0.00         0.00         0.00         0.00         12.00           18 | 3.08         6.16         4.34         10.50         44.70         0.00         44.70         27.26           0.11         0.22         0.16         0.38         0.15         0.00         0.15         0.98           11.32         22.64         15.63         38.27         134.4         227.77         362.25         99.07         15           26.50         53.00         62.00         115.00         506.0         0.00         506.0         233.00           48.50         97.00         32.00         129.00         22.50         20.30         42.80         0.00           8.50         17.00         18.00         35.00         178.5         1509.97         1688.47         74.00         10           8.50         17.00         18.00         35.00         178.5         1509.97         1688.47         74.00         10           8.86         17.71         27.23         44.94         124.6         52.97         177.6         0.00           9         18         0.00         0.00         0.00         0.00         0.00         20.00         10.00         12.00           9         18         27         45         123         23.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

Table 7.1.4(c) continued...

Table 7.1.4(c) continued...

Table 7.1.4(c): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                              |        |              |                                             |                |               |         | Ex                  | ort Fron               | Mettur F          | eservoir     | Export From Mettur Reservoir = 6200 MCM              | CM         |           |        |                      |         |                   |        |
|------------------------------|--------|--------------|---------------------------------------------|----------------|---------------|---------|---------------------|------------------------|-------------------|--------------|------------------------------------------------------|------------|-----------|--------|----------------------|---------|-------------------|--------|
|                              | U/S w  | ater utiliz  | U/S water utilization from minor and medium | minor and      | mediu         |         | rrigation projects* | cts*                   | D/s wat           | er utilizat  | D/s water utilization from major irrigation projects | najor irri | gation pr | ojects | Exports              | Wai     | Water utilization | ion    |
| Sl.No. Sub-basin/<br>Project | Ium.g  | Ium,s<br>i,i | WS.RH                                       | Wski, Ium      |               | Iu. i.s | lu <sup>r,s</sup>   | Iu <sup>r</sup><br>Lij | Ws <sub>i,j</sub> | $Ws_{i,j}^l$ | WS <sub>i,j</sub>                                    | on:        | Ir.       | - H    | OE <sup>q, j</sup> e | Surface | Ground            | Total  |
|                              | IUMHG  | IUMHS        | IUMH                                        | IUML           | IUM           | IURG    | IURS                | IUR                    | WSU               | WSI          | WSD                                                  | IRG        | IRS       | IRD    | OE                   |         |                   |        |
| (1) (2)                      | (3)    | (4)          | (5)                                         | (9)            | (7)           | (8)     | (6)                 | (10)                   | (11)              | (12)         | (13)                                                 | (14)       | (15)      | (91)   | (17)                 | (81)    | (61)              | (20)   |
| 21 Lower Bhawani             | 12.44  | 12.44        | 24.88                                       | 21.54          | 21.54 46.42   | 84.20   | 250.3               | 334.5                  | 109.9             | 156.3        | 266.2                                                | 68.6       | 324.88    | 334.77 | 0                    | 853.77  | 128.07            | 981.84 |
| 22 Bhavani s.b.r.area        | а 5.79 | 5.79         | 11.57                                       | 10.02          | 10.02 21.59   | 43.79   | 79.12               | 122.91                 | 51.12             | 72.71        | 123.83                                               | 0.00       | 0.00      | 0.00   | 408                  | 616.74  | 29.60             | 676.33 |
| Total Bhawani s.b.           | 18     | 18           | 36                                          | 32             | 89            | 128     | 329                 | 457                    | 161               | 229          | 390                                                  | 10         | 325       | 335    | 408                  | 1471    | 188               | 8591   |
| 23 Noyil                     | 5.95   | 5.95         | 11.90                                       | 8.25           | 20.15         | 18.09   | 2.01                | 20.10                  | 69.00             | 0.00         | 00.69                                                | 0.00       | 0.00      | 0.00   | 0.00                 | 76.96   | 32.29             | 109.25 |
| 24 Amaravathi                | 2.37   | 2.37         | 4.73                                        | 5.31           | 5.31 10.04    | 23.53   | 0.00                | 23.53                  | 20.88             | 30.91        | 51.79                                                | 3.76       | 26.30     | 30.06  | 0.00                 | 80.46   | 34.97             | 115.42 |
| 25 Amaravathi                | 20.98  | 20.98        | 41.96                                       | 47.07          | 89.03         | 137.64  | 289.45              | 427.09                 | 185.12            | 274.09       | 459.21                                               | 0.00       | 0.00      | 0.00   | 0.00                 | 769.64  | 205.69            | 975.33 |
| s.b.r.area                   |        |              |                                             |                |               |         |                     |                        |                   |              |                                                      |            |           |        |                      |         |                   |        |
| Total Amaravathi s.b.        | 23     | 23           | 47                                          | 52             | 66            | 161     | 289                 | 451                    | 206               | 305          | 511                                                  | 4          | 26        | 30     | 0                    | 850     | 241               | 1001   |
| 26 Tirumanimuttar            | 109.74 | 109.74       | 219.48                                      | 198.98 418.4   | 118.4         | 41.28   | 159.65              | 200.93                 | 370.00            | 350.00       | 720.00                                               | 0.00       | 00.0      | 0.00   | 00.00                | 989.39  | 350.00            | 1339.4 |
| 27 Ponnai Ar                 | 8.13   | 8.13         | 16.25                                       | 10.19 26.44 17 | 26.44         | 175.48  | 158.21              | 333.69                 | 113.00            | 155.00       | 268.00                                               | 0.00       | 0.00      | 0.00   | 0.00                 | 434.34  | 193.80            | 628.13 |
| 28 Upper Coleroon            | 10.75  | 10.75        | 21.49                                       | 23.53          | 23.53 45.02   | 180.00  | 630.65              | 810.65                 | 00.06             | 130.00       | 220.00                                               | 0.00       | 0.00      | 00.0   | 0.00                 | 861.40  | 214.28            | 1075.7 |
| 29 Lower Coleroon            | 3.05   | 3.05         | 01.9                                        | 4.87           | 4.87 10.97 10 | 105.00  | 536.00              | 641.00                 | 63.00             | 83.00        | 146.00                                               | 0.00       | 0.00      | 0.00   | 0.00                 | 685.05  | 112.92            | 797.97 |
| 30 Cauvery Delta             | 80.82  | 80.82        | 161.63                                      | 133.08 294.7   | 294.7         | 11.10   | 3450.4              | 3461.5                 | 349.00            | 461.00       | 810.00                                               | 0.00       | 0.00      | 0.00   | 0.00                 | 4341    | 225.00            | 4566.2 |
| Total below Mettur           | 260    | 760          | 520                                         | 463            | 983           | 820     | 5556                | 6376                   | 1483              | 1713         | 3134                                                 | 14         | 351       | 365    |                      | 9301    | 1557              | 11266  |
| Gross Total                  | 414    | 414          | 829                                         | 745            | 1574          | 2350    | 7890                | 10240                  | 2470              | 2898         | 5162                                                 | 249        | 1439      | 1689   |                      | 24910   | 3759              | 29077  |

<sup>\*</sup> Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (14) + Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (15) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no. (16) = Col. no € Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. <u>e</u>

Table 7.1.4(d): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|          |                         |                   |                   |                                             |                   |                       |                   | Exc                  | ort From | Mettur R          | eservoir   | Export From Mettur Reservoir = 6700 MCM              | CM          |              |          |                     |         |                   |         |
|----------|-------------------------|-------------------|-------------------|---------------------------------------------|-------------------|-----------------------|-------------------|----------------------|----------|-------------------|------------|------------------------------------------------------|-------------|--------------|----------|---------------------|---------|-------------------|---------|
|          |                         | U/S w.            | ater utiliza      | U/S water utilization from minor and medium | minor at          | nd medit              | ит іттіда         | irrigation projects* | cts*     | D/s wate          | r utilizat | D/s water utilization from major irrigation projects | major irrig | gation pro   | $\vdash$ | Exports             | Wate    | Water utilization | u       |
| SI.No.   | Sub-basin/<br>Project   | Iu <sup>m,g</sup> | Ιυ <sup>m,s</sup> | Wsi.j                                       | WS <sub>1,j</sub> | lu <sup>m</sup><br>ij | Iu <sup>r,g</sup> | lu <sup>r, s</sup>   | lu', j   | Ws <sub>i,j</sub> | WS,        | WSi,j                                                | Ir.         | Ir.s         | - 1      | OE <sup>q. je</sup> | Surface | Ground            | Total   |
|          |                         | IUMHG IUMHS       | IUMHS             | IUMH                                        | IUML              | IUM                   | IURG              | IURS                 | IUR      | MSU               | ISM        | WSD                                                  | IRG         | IRS          | IRD      | 30                  |         |                   |         |
| Ξ        | (2)                     | (3)               | (4)               | (5)                                         | (9)               | (7)                   | (8)               | (6)                  | (01)     | (H)               | (12)       | (13)                                                 | (14)        | (15)         | (91)     | (13)                | (81)    | (61)              | (20)    |
| -        | Yagachi                 | 1.24              | 1.24              | 2.48                                        | 3.42              | 5.90                  | 25.68             | 0.00                 | 25.68    | 96.01             | 16.84      | 27.80                                                | 11.69       | 71.33        | 83.02    | 9                   | 100.37  | 42.03             | 142.40  |
| 2        | Hemavathi               | 5.02              | 5.02              | 10.04                                       | 13.82             | 23.86                 | 92.21             | 48.30                | 140.51   | 44.34             | 68.11      | 112.45                                               | 144,41      | 84.26 228.67 | 228.67   | 1134                | 1384.03 | 255.46            | 1639.49 |
| ~        | Harangi                 | 1.24              | 1.24              | 2.48                                        | 3.42              | 5.90                  | 18.22             | 0.00                 | 18.22    | 10.96             | 16.84      | 27.80                                                | 29.17       | 111.10       | 140.27   | 0                   | 140.14  | 52.05             | 192.19  |
| 4        | Cauvery                 | 0.63              | 0.63              | 1.25                                        | 1.72              | 2.97                  | 12.90             | 00.0                 | 12.90    | 5.51              | 8.46       | 13.97                                                | 24.24       | 69.43        | 93.67    | 0                   | 84.02   | 39.49             | 123.51  |
| >        | KRS                     | 15.85             | 15.85             | 31.69                                       | 43.60             | 75.29                 | 130.0             | 474.59               | 604.60   | 139.92            | 214.90     | 354.82                                               | 00.0        | 0.00         | 0.00     | 1506                | 2351.25 | 189 45            | 2540.71 |
| Total U  | Total Upper Cauvry s.b. | 24                | 24                | 48                                          | 99                | 114                   | 279               | \$23                 | 802      | 212               | 325        | 537                                                  | 210         | 336          | 546      | 2640                | 4059.82 | 578               | 4638    |
| 9        | Banasursagar            | 0.20              | 0.20              | 0.40                                        | 0.28              | 99.0                  | 1.52              | 0.00                 | 1.52     | 1.76              | 2.44       | 4.20                                                 | 2.09        | 13.11        | 15.20    | 681                 | 206.51  | 4.09              | 210.60  |
| 7        | Mananthvady             | 0.51              | 0.51              | 10.1                                        | 0.71              | 1.72                  | 7.02              | 00.0                 | 7.02     | 4.46              | 6.18       | 10.64                                                | 00.00       | 0.00         | 0.00     | 276.0               | 287.15  | 8.24              | 295.38  |
| ∞        | Kabini                  | 6.27              | 6.27              | 12.53                                       | 8.79              | 21.32                 | 88.51             | 00.0                 | 88.51    | 55.23             | 76.56      | 131.79                                               | 09.9        | 263.17       | 269.77   | 202                 | 603.23  | 110.17            | 713.39  |
| 6        | Taraka                  | 0.90              | 06.0              | 1.80                                        | 1.26              | 3.06                  | 1.24              | 0.00                 | 1.24     | 7.94              | 11.00      | 18.94                                                | 4.89        | 21.29        | 26.18    | 0                   | 41.13   | 8.29              | 49.42   |
| 01       | Sagardoddakere          | 09.0              | 09.0              | 1.20                                        | 0.85              | 2.05                  | 4.59              | 00'0                 | 4.59     | 5.31              | 7.36       | 12.67                                                | 0.93        | 23.07        | 24.00    | 95                  | 131.34  | 6.97              | 138.31  |
| =        | Upper Nagu              | 3.08              | 3.08              | 6.16                                        | 4.34              | 10.50                 | 44.70             | 0.00                 | 44.70    | 27.26             | 37.78      | 65.04                                                | 88.6        | 99.23        | 11.601   | 290                 | 457.35  | 62.00             | 519.35  |
| 12       | Nugu                    | 0.11              | 0.11              | 0.22                                        | 0.16              | 0.38                  | 0.15              | 0.00                 | 0.15     | 0.98              | 1.35       | 2.33                                                 | 1.87        | 42.04        | 16.91    | 0                   | 47.48   | 2.29              | 49 77   |
| 13       | Kabini s.b.r.area       | 11.32             | 11.32             | 22.64                                       | 15.63             | 38.27                 | 134.4             | 227.77               | 362.25   | 69.07             | 137.34     | 236.41                                               | 00.0        | 0.00         | 0.00     | 66                  | 574.50  | 161.43            | 735.93  |
| Total K  | Total Kabini s.b.       | 23                | 23                | 46                                          | 32                | 78                    | 282               | 228                  | 210      | 202               | 280        | 482                                                  | 26          | 465          | 164      | 1151                | 2348.68 | 363               | 2712    |
| 14       | Shimsha.                | 26.50             | 26.50             | 53.00                                       | 62                | 115.00                | 506.0             | 0.00                 | 506.00   | 233.00            | 348.00     | 581.00                                               | 00.0        | 0.00         | 0.00     | 0.0                 | 607.50  | 594.50            | 1202.00 |
| 15       | Arkavathi               | 48.50             | 48.50             | 97.00                                       | 32.00             | 129.00                | 22.50             | 20.30                | 42.80    | 0.00              | 0.00       | 00.0                                                 | 00.0        | 00.00        | 0.00     | 0.00                | 68.80   | 103.00            | 171.80  |
| 16       | Middle Cauvery          | 8.50              | 8.50              | 17.00                                       | 18.00             | 35.00                 | 178.5             | 1410.0               | 1588.5   | 74.00             | 109.00     | 183.00                                               | 0.00        | 0.00         | 0.00     | 14.00               | 1615.47 | 205.00            | 1820.47 |
| 17       | Suvarnavathi            | 3.50              | 3.50              | 7.00                                        | 24.00             | 31.00                 | 36.40             | 0.00                 | 36.40    | 32.00             | 00.0       | 32.00                                                | 0.00        | 0.00         | 0.00     | 0.00                | 35.50   | 63.90             | 99.40   |
| 18       | Palar                   | 11.60             | 11.60             | 23.19                                       |                   | 44.22                 | 100.5             | 0.00                 | 100.53   | 0.00              | 0.00       | 00.0                                                 | 00.00       | 0.00         | 0.00     | 0.00                | 11.60   | 133.16            | 144.75  |
| 19       | Chinnar s.b.r.area      | 98.8              | 8.86              | 17.71                                       | 27.23             | 44.94                 | 124.6             | 52.97                | 177.60   | 0.00              | 0.00       | 0.00                                                 | 00.0        | 0.00         | 0.00     | 0.00                | 61.83   | 160.71            | 222.54  |
| 20       | Mettur                  | 00.0              | 0.00              | 0.00                                        | 0.00              | 0.00                  | 00.0              | 00.0                 | 0.00     | 78.00             | 123.00     | 201.00                                               | 00.0        | 275.00       | 275.00   | 0029                | 7176.00 | 0.00              | 7176.00 |
| Total C! | Fotal Chinnar s.b       | 6                 | 6                 | 18                                          | 27                | 45                    | 125               | 53                   | 178      | 78                | 123        | 201                                                  | 0           | 275          | 275      | 6700                | 7237.8  | 191               | 7399    |
| Total ab | Total above Mettur      | 154               | 154               | 309                                         | 282               | 169                   | 1530              | 2234                 | 3764     | 831               | 1185       | 2016                                                 | 236         | 9201         | 1312     |                     | 15985   | 2202              | 18187   |
|          |                         |                   |                   |                                             |                   |                       |                   |                      |          |                   |            |                                                      |             |              |          |                     |         |                   |         |

Table 7.1.4(d) continued...

Table 7.1.4(d) continued...

Table 7.1.4(d): Results of LP Model for 100% Water Year Annual Dependable Flow (Maximization of Water Utilization)

|                              |                   |                   |                                                 |              |                 |                    | CX                | TOT From      | Mettur I          | eservoir    | Export From Mettur Reservoir = 6700 MCM              | Š          |            |        |         |                  |                   |        |
|------------------------------|-------------------|-------------------|-------------------------------------------------|--------------|-----------------|--------------------|-------------------|---------------|-------------------|-------------|------------------------------------------------------|------------|------------|--------|---------|------------------|-------------------|--------|
|                              | U/S w             | ater utiliza      | U/S water utilization from minor and medium irr | minor and    | 1 mediu         |                    | igation projects* | cts*          | D/s wat           | er utilizat | D/s water utilization from major irrigation projects | najor irri | gation pro |        | Exports | Wai              | Water utilization | ion    |
| Sl.No. Sub-basin/<br>Project | lu <sup>m,g</sup> | Iu <sup>m,s</sup> | Iums WskH Wskij Ium                             | WSRL         |                 | lu'.g              | Iui's             | lu.<br>j.     | Ws <sub>i,j</sub> | WSL         | Wsi,j                                                | 10 T       | II,        | H.     | OEq.je  | Surface<br>water | Ground            | Total  |
|                              | IUMHG             | IUMHG IUMHS       | IUMH                                            | IUMIL        | IUM             | IURG               | IURS              | IUR           | MSU               | ISM         | MSD                                                  | IRG        | IRS        | ES C   | 30      |                  |                   |        |
| (1) (2)                      | (3)               | (4)               | (5)                                             | (9)          | (7)             | (8)                | (6)               | (10)          | (E)               | (12)        | (13)                                                 | (14)       | (15)       | (91)   | (1)     | (81)             | (61)              | (20)   |
| 21 Lower Bhawani             | 12.44             | 12.44             | 24.88                                           | 21.54        | 21.54 46.42     | 84.20              | 250.28            | 334.48        | 109.88            | 56.29       | 166.17                                               | 68.6       | 324.88     | 334.77 | 0       | 753.77           | 128.07            | 881.84 |
| 22 Bhavani s.b.r.area        | 5.79              | 5.79              | 11.57                                           | 10.02        | 10.02 21.59     | 43.79              | 79.12             | 122.91        | 51.12             | 72.71       | 123.83                                               | 0.00       | 0.00       | 00.0   | 408     | 616.74           | 59.60             | 676.33 |
| Total Bhawani s.b.           | 18                | 18                | 36                                              | 32           | 89              | 128                | 329               | 457           | 191               | 129         | 290                                                  | 10         | 325        | 335    | 80*     | 1371             | 188               | 1558   |
| 23 Noyil                     | 5.95              | 5.95              | 11.90                                           | 8.25         | 8.25 20.15      | 18.09              | 2.01              | 20.10         | 61.00             | 00.00       | 61.00                                                | 0.00       | 00.0       | 0.00   | 0.00    | 96.89            | 32.29             | 101.25 |
| 24 Amaravathi                | 2.37              | 2.37              | 4.73                                            | 5.31         | 5.31 10.04      | 23.53              | 00.0              | 23.53         | 20.88             | 30.91       | 51.79                                                | 3.76       | 26.30      | 30.06  | 0.0     | 80.46            | 34.97             | 115.42 |
| 25 Amaravathi                | 20.98             | 20.98             | 41.96                                           | 47.07        | 47.07 89.03 137 | \$                 | 312.21            | 449.85        | 185,12            | 274.09      | 459.21                                               | 0.00       | 0.00       | 0.00   | 0.00    | 792.40           | 205.69            | 998.09 |
| s.b.r.area                   |                   |                   |                                                 |              |                 |                    |                   |               |                   |             |                                                      |            |            |        |         |                  |                   |        |
| Total Amaravathi s.b.        | 23                | 23                | 47                                              | 52           | 66              | 191                | 312               | 473           | 206               | 305         | 511                                                  | 4          | 26         | 30     | 0       | 872.9            | 241               | 1114   |
| 26 Tirumanimuttar            | 109.74            | 109.74            | 219.48                                          | 198.98       | 198.98 418.4    | 41.28              | 169.87            | 211.15        | 370.00            | 350.00      | 720.00                                               | 00.0       | 00.0       | 0.00   | 0.00    | 19.666           | 350.00            | 1349.6 |
| 27 Ponnai Ar                 | 8.13              | 8.13              | 16.25                                           | 10.19        | 26.44           | 10.19 26.44 175.48 | 169.32            | 344.80        | 113.00            | 155.00      | 268.00                                               | 0.00       | 00.0       | 0.00   | 000     | 445.45           | 193.80            | 639.24 |
| 28 Upper Coleroon            | 10.75             | 10.75             | 21.49                                           | 23.53        | 45.02           | 23.53 45.02 180.00 |                   | 830.65 1010.7 | 00.06             | 130.00      | 220.00                                               | 0.00       | 00.0       | 0.00   | 0.00    | 1061.40          | 214.28            | 1275.7 |
| 29 Lower Coleroon            | 3.05              | 3.05              | <b>6.1</b> 0                                    | 4.87         | 4.87 10.97 105  | 105.00             |                   | 536.00 641.00 | 00.69             | 83.00       | 146.00                                               | 0.00       | 0.00       | 0.00   | 0.00    | 685.05           | 112.92            | 797.97 |
| 30 Cauvery Delta             | 80.82             | 80.82             | 161.63                                          | 133.08 294.7 | 294.7           | 11.10              | 3475.0 3486.1     | 3486.1        | 349.00            | 461.00      | 810.00                                               | 0.00       | 0.00       | 0.00   | 0.00    | 4365.82          | 225.00            | 4590.8 |
| Total below Mettur           | 260               | 260               | \$20                                            | 463          | 983             | 820                | 5824              | 6645          | 1483              | 1613        | 3026                                                 | 14         | 351        | 365    |         | 9461.6           | 1557              | 11018  |
| Gross Total                  | 414               | 414               | 829                                             | 745          | 1574            | 2350               | 8058              | 10408         | 2470              | 2798        | 5042                                                 | 249        | 1427       | 1677   |         | 14942            | 3759              | 29206  |

Includes sub-basin remaining areas (s.b.r.areas)

Col. no. (5) = Col. no. (3) + Col. no. (4); Col. no. (7) = Col. no. (5) + Col. no. (6); Col. no. (10) = Col. no. (8) + Col. no. (9); Col. no. (16) = Col. no. (14) + Col. no. (15); Col. no. (13) = Col. .no. (11) + Col. no. (12); Col. no. (18) = Col. no. (4) + Col. no. (13) + Col. no. (15) + Col. no. (17); Col. no. (19) = Col. no. (3) + Col. no. (6) + Col. no. (14). Col. no. (20) = Col. no. (18) + Col. no. (19).  $\mathfrak{S}$ Note:

(1) IUM = IUMH + IUML; (2) IUR = IURG + IURS; (3) IRD = IRG + IRS; (4) Total surface water utilization = IUMHS + IRS + WSD + IRD + OE (5) Total ground water utilization = IUMHG + IUML + IRG; (6) Total water Utilization = [IUM + IUR] + [WSD + IRD] + [OE]. æ

Table 7.1.5(a): Results of LP Model for 50%, 75%, 90%, 100% Water Year Annual Dependable Flows with Various Exports from Mettur to the Sub-Basins Below Mettur Reservoir (Above Mettur)

|              | on                                                   | Total                              |             | (20)                 | 19690 | 12237 | 11889 | 11436 | 11582 | 11036 | 10714  | 10503 | 9280  | 8852 | 8722  | 8288 | 8222 | 7802 | 7772      | 7652 |
|--------------|------------------------------------------------------|------------------------------------|-------------|----------------------|-------|-------|-------|-------|-------|-------|--------|-------|-------|------|-------|------|------|------|-----------|------|
|              | Water utilization                                    | Ground                             | water       | (61)                 | 2202  | 2202  | 2202  | 2202  | 2199  | 2199  | 2202   | 2202  | 2202  | 2202 | 2202  | 2202 | 2202 | 2202 | 2202      | 2202 |
|              | M                                                    | Surface                            | water       | (81)                 | 9483  | 10035 | 2896  | 9234  | 6382  | 8837  | 8512   | 8301  | 8202  | 0599 | 0259  | 9809 | 6020 | 2600 | 5570      | 5404 |
|              | Exports                                              | $OE_{i,j,p}^{q,j_{\underline{g}}}$ | OE          | (17)                 | •     | _     |       |       |       |       |        |       | •     |      |       | •    | •    |      |           |      |
|              | projects                                             | Ir <sub>i,j</sub>                  | RD          | (91)                 | 2990  | 3022  | 3080  | 3058  | 2966  | 2956  | 2976   | 2906  | 1843  | 1717 | 1707  | 1640 | 1540 | 1330 | 1320      | 1310 |
|              | igation                                              | $\Pi_{i,j}^{s}$                    | IRS         | (45)                 | 2754  | 2786  | 2844  | 2822  | 2730  | 2720  | 2740   | 2670  | 1607  | 1482 | 1472  | 1404 | 1304 | 1094 | 1084      | 1074 |
|              | najor in                                             | [r.8]                              | RG          | (14)                 | 236   | 236   | 236   | 236   | 236   | 236   | 236    | 236   | 236   | 236  | 236   | 236  | 236  | 236  | 236       | 236  |
|              | on from                                              | WSi,j                              | MSD         | (13)                 | 2225  | 2230  | 2210  | 2190  | 2148  | 2128  | 2122   | 2122  | 2102  | 2002 | 2082  | 2072 | 2018 | 2008 | 8661      | 8861 |
| Above Mettur | utillizatio                                          | WS,                                | WSI         | (12)                 | 1228  | 1278  | 1278  | 1278  | 1248  | 1248  | 1252   | 1252  | 1222  | 1222 | 1222  | 1222 | 1215 | 1215 | 1215      | 1215 |
| Abov         | D/s water utilization from major irrigation projects | Wsij                               | WSU         | (11)                 | 766   | 952   | 932   | 912   | 006   | 880   | 870    | 870   | 088   | 870  | 98    | 850  | 803  | 793  | 783       | 773  |
|              | cts*                                                 | ľu <mark>ľ</mark>                  | IUR         | (01)                 | 0809  | 6394  | 6011  | 5597  | 7209  | 5582  | 5265   | 5134  | 4745  | 4452 | 4342  | 3985 | 4074 | 3874 | 3864      | 3764 |
|              | igation projects*                                    | Iui',s                             | TURS        | 6                    | 4350  | 4865  | 4479  | 4068  |       | 3835  | 3496   | 3355  | 3215  | 2922 | 2812  | 2456 | 2544 | 2344 | 2334      | 2234 |
|              |                                                      | lu <sup>r,g</sup>                  | TURG        | (8)                  | 1530  | 1530  | 1530  | 1530  | 1527  | 1527  | 1530   | 1530  | .1530 | 1530 | 1530  | 1530 | 1530 | 1530 | 1530      | 1530 |
|              | d mediu                                              | lu <sup>m</sup>                    | MOI         | 6                    | 591   | 591   | 165   | 591   | 591   | 165   | 591    | 165   | 591   | 591  | 591   | 165  | 591  | 591  | 165       | 591  |
|              | minor an                                             | WS,i,j                             | IUMI        | (9)                  | 282   | 282   | 282   | 282   | 282   | 282   | 282    | 282   | 282   | 282  | 282   | 282  | 282  | 282  | 282       | 282  |
|              | U/S water utilization from minor and medium irr      | Wski,j                             | IUMUI       | (5)                  | 309   | 309   | 309   | 309   | 309   | 309   | 309    | 309   | 309   | 309  | 309   | 309  | 309  | 309  | 309       | 309  |
|              | ter utiliza                                          | Iu <sup>m,s</sup>                  | IUMHS       | (4)                  | 154   | 154   | 154   | 154   | 22.   | 154   | 154    | 32    | 154   | 154  | 152   | 127  | 154  | 154  | 154       | 154  |
|              | U/S wa                                               | lu <sup>m,g</sup>                  | IUMHG       | (3)                  | 155   | 155   | 155   | 155   | 155   | 155   | 155    | 155   | 155   | 155  | 155   | 155  | 155  | 155  | 155       | 155  |
|              | Exports F                                            | L                                  | Reservoir I | (2)                  | 4200  | 2800  | 6200  | 7800  | 4200  | 5800  | 6200   | 7800  | 4200  | 5800 | 6200  | 7800 | 4200 | 2800 | 6200      | 7800 |
|              | Ę                                                    | <u>;</u> %                         |             | $\widehat{\epsilon}$ |       |       | 25    | I     |       | i,    | C/<br> | I     |       | 5    | <br>≩ |      |      | - 5  | <u></u> - |      |

Table 7.1.5(b): Results of LP Model for 50%, 75%, 90%, 100% Water Year Annual Dependable Flows with Various Exports from Mettur to the Sub-Basins Below Mettur Reservoir (Below Mettur)

|             | ion                                                  | Total                    | ĺ         | (20) | 11073 | 11394.92 | 11457.75 | 11500.63 | 11047 | 11148.34 | 11246.54 | 11275.77 | 10885 | 11195  | 11221  | 11591  | 10606    | 10869.11 | 10917.55 | 11086.24 |
|-------------|------------------------------------------------------|--------------------------|-----------|------|-------|----------|----------|----------|-------|----------|----------|----------|-------|--------|--------|--------|----------|----------|----------|----------|
|             | Water utilization                                    | Ground                   | water     | (61) | 1557  | 1557     | 1557     | 1557     | 1547  | 1557     | 1557     | 1557     | 1557  | 1557   | 1557   | 1745   | 1557     | 1557     | 1557     | 1557     |
|             |                                                      | 83                       | water     | (81) | 9517  | 8838     | 1066     | 9944     | 9500  | - 9592   | 0696     | 61/6     | 9328  | - 9638 | - 9664 | - 9846 | 9049     | 9313     | - 9361   | - 9530   |
|             | Exports<br>ord. i.                                   | UE J.P                   | OE        | (11) |       |          |          |          |       |          |          |          |       |        | •      | •      | -        | •        |          |          |
|             | ation                                                | - <del> </del>           | IRD       | (16) | 537   | 537      | 537      | 537      | 537   | 493      | 493      | 493      | 493   | 503    | 396    | 396    | 375      | 368      | 365      | 365      |
|             | ijor img                                             | II.                      | IRS       | (15) | 523   | 523      | 523      | 523      | 533   | 480      | 480      | 480      | 480   | 490    | 383    | 383    | 361      | 354      | 351      | 351      |
|             | rom ma<br>cts                                        | II.                      | IRG       | (14) | 14    | 14       | 14       | 14       | 4     | 14       | 14       | 14       | 14    | 14     | 14     | 14     | 14       | 14       | 14       | 14       |
|             | zation from<br>projects                              | Ws <sub>i,j</sub>        | MSD       | (13) | 3197  | 3194     | 3194     | 3194     | 3197  | 3194     | 3194     | 3194     | 3197  | 3197   | 3197   | 3197   | 3194     | 3194     | 3194     | 3094     |
| Mettur      | D/s water utilization from major irrigation projects | $W_{i,j}^{I}$            | WSI       | (12) | 1756  | 1753     | 1753     | 1753     | 1756  | 1753     | 1753     | 1753     | 1756  | 1756   | 1756   | 1756   | 1753     | 1753     | 1753     | 1653     |
| Below Metur | D/s w                                                | Wsüj                     | WSU       | (11) | 1441  | 1441     | 1441     | 1441     | 1441  | 1441     | 1441     | 1441     | 1441  | 1441   | 1441   | 1441   | 1441     | 1441     | 1441     | 1441     |
|             | cts*                                                 | lu:                      | IUR       | (10) | 6356  | 6681.06  | 6743.89  | 6786.77  | 6330  | 6478.07  | 6576.27  | 6605.5   | 6212  | 6511   | 6644   | 6826   | 6054     | 6324.45  | 6375.89  | 6644.58  |
|             | gation projects                                      | lu <sup>r,s</sup><br>i,j | IURS      | (6)  | 5536  | 5860.9   | 5923.8   | 5966.7   | 5510  | 5658     | 5756.1   | 5785.4   | 5392  | 1695   | 5824   | 9009   | 5234     | 5504.3   | 5555.8   | 5824.5   |
|             | m imigat                                             | lu',g<br>In',j           | IURG      | (8)  | 820   | 820.12   | 820.12   | 820.12   | 820   | 820.12   | 820.12   | 820.12   | 820   | 820    | 820    | 820    | 820      | 820.12   | 820.12   | 820.12   |
|             | nd mediu                                             | Iu.n                     | IUM       | (7)  | 983   | 982.83   | 982.83   | 982.83   | 983   | 982.83   | 982.83   | 982.83   | 983   | 983    | 983    | 1171   | 983      | 982.83   | 982.83   | 982.83   |
|             | minor a                                              | Ws.RL                    | IUMIL     | (9)  | 463   | 462.84   | 462.84   | 462.84   | 463:  | 462.84   | 462.84   | 462.84   | 463   | 463    | 463    | 651    | 463      | 462.84   | 462.84   | 462.84   |
|             | U/S water utilization from minor and medium irri     | Ws <sub>i,j</sub>        | IUMIH     | (5)  | 520   | 519.99   | 519.99   | 519.99   | 520   | 519.99   | 519.99   | 519.99   | \$20  | 520    | 520    | 520    | 520      | 519.99   | \$19.99  | 519.99   |
|             | vater utiliz                                         | lui,i                    | IUMHS     | (4)  | 260   | 260      | 760      | 260      | 260   | 260      | 260      | 260      | 260   | 260    | 260    | 260    | 260      | 260      | 260      | 260      |
|             | VS V                                                 | Iu <sup>m.g</sup>        | IUMIFIG   | (3)  | 260   | 260      | 260      | 260      | 260   | 260      | 260      | 260      | 260   | 260    | 260    | 260    | 260      | 260      | 260      | 260      |
|             | Exports from                                         | Mettur                   | Reservoir | (2)  | 4200  | 2800     | 6200     | 7800     | 4200  | 5800     | 9079     | 7800     | 4200  | 5800   | 9079   | 7800   | 4200     | 5800     | 9079     | 7800     |
|             | Dep.                                                 | %                        |           | Ē    | 90    |          |          |          | 25    |          |          |          | 96    |        |        |        | <u>@</u> |          |          |          |

Table 7.1.5(c): Results of LP Model for 50%, 75%, 90%, 100% Water Year Annual Dependable Flows with Various Exports from Mettur to the Sub-Basins Below Mettur Reservoir (Total)

|       | - Special Control | <br>   | i                                                 |            |           |       |        |                          |       |                   | Total                                                |         |              |                |          | i                                     |         |                   |          |
|-------|-------------------|--------|---------------------------------------------------|------------|-----------|-------|--------|--------------------------|-------|-------------------|------------------------------------------------------|---------|--------------|----------------|----------|---------------------------------------|---------|-------------------|----------|
| ځ     |                   | MS/N   | U/S water utilization from minor and medium irrig | ition from | minor and | mediu |        | ition projects*          | ects* | D/s wate          | D/s water utilization from major irrigation projects | on from | major in     | igation        | projects | Exports                               | **      | Water utilization | tion     |
| %     |                   | Iu.m.g | Ium,s                                             | WS,H       | Ws,RL     | lu".  | lu'.g  | lu <sup>r,s</sup><br>i,j | Iurij | Ws <sub>i,j</sub> | Ws.                                                  | Wsi.j   | II.8         | $Ir_{i,j}^{s}$ | Ĭŗ,j     | OEq.JE                                | Surface | Ground            | Total    |
|       | Reservoir         | TUMERG | IUMIHS                                            | IUMH       | IOME      | IUM   | IURG   | IURS                     | JUR   | WSU               | WSI                                                  | MSD     | IRG          | IRS            | <b>B</b> | OE                                    | water   | water             |          |
| $\Xi$ | (2)               | (3)    | (4)                                               | (5)        | (9)       | 6     | (8)    | (6)                      | (10)  | (11)              | (12)                                                 | (13)    | (14)         | (13)           | (16)     | (11)                                  | (18)    | (19)              | (20)     |
| 80    | 4200              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 10943                    | 13293 | 2403              | 3034                                                 | 5437    | 249          | 3428           | 3678     |                                       | 20223   | 3759              | 23981    |
|       | 2800              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 10726                    | 13075 | 2393              | 3031                                                 | 5424    | 249          | 3060           | 3309     |                                       | 19624   | 3759              | 23383    |
|       | 6200              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 10402                    | 12755 | 2373              | 3031                                                 | 5404    | 249          | 3118           | 3368     | •                                     | 19339   | 3759              | 23098    |
|       | 2800              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 10034                    | 12384 | 2353              | 3031                                                 | 5384    | 249          | 3096           | 3346     | •                                     | 18929   | 3759              | 22687    |
| 75    | 4200              | 414    | 4]4                                               | 829        | 745       | 1574  | 2347   | 0986                     | 12407 | 2341              | 3004                                                 | 5345    | 240          | 3263           | 3503     | ,                                     | 18882   | 3746              | 22628    |
|       | 2800              | 414    | 414                                               | 829        | 745       | 1574  | 2347   | 9493                     | 12060 | 2321              | 3001                                                 | 5322    | 249          | 3200           | 3449     |                                       | 18429   | 3756              | 22185    |
|       | 6200              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 9452                     | 12042 | 2311              | 3005                                                 | 5316    | 249          | 3220           | 3469     | - 1                                   | 18402   | 3759              | 22160    |
|       | 7800              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 9252                     | 11842 | 2311              | 3005                                                 | 5316    | 249          | 3220           | 3469     | _                                     | 18202   | 3759              | 21960    |
| 8     | 4200              | 414.4  | 414.4                                             | 829        | 745       | 1574  | 2349.9 | 9098                     | 10956 | 2321              | 2978.2                                               | 5298.9  | 249.42 2086. | 2086.9         | 2336     |                                       | 16407   | 3758.8            | 20165.38 |
| _     | 5800              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 8613                     | 10963 | 2311              | 2978                                                 | 5289    | 249          | 1761           | 2221     | -                                     | 16288   | 3759              | 20047    |
|       | 6200              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 8636                     | 98601 | 2301              | 2978                                                 | 5279    | 249          | 1854           | 2104     |                                       | 16184   | 3759              | 19943    |
|       | 7800              | 414    | 414                                               | 829        | 934       | 1762  | 2350   | 8462                     | 10811 | 2291              | 2978                                                 | 5269    | 249          | 1787           | 2036     | •                                     | 15932   | 3947              | 19879    |
| 100   | 4200              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 7778                     | 10128 | 2244              | 2968                                                 | 5212    | 249          | 1665           | 1915     | • 1                                   | 15069   | 3759              | 18828    |
|       | 5800              | 414    | 414                                               | 829        | . 745     | 1574  | 2350   | 7848                     | 10198 | 2234              | 2968                                                 | 5202    | 249          | 1448           | 1698     | -                                     | 14913   | 3759              | 18671    |
|       | 6200              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 0681                     | 10240 | 2224              | 2968                                                 | 5192    | 249          | 1435           | 1685     | • • • • • • • • • • • • • • • • • • • | 14931   | 3759              | 18690    |
|       | 7800              | 414    | 414                                               | 829        | 745       | 1574  | 2350   | 8028                     | 10408 | 2214              | 2868                                                 | 5082    | 249          | 1425           | 1675     | -                                     | 14980   | 3759              | 18739    |

Table 7.2.1: Yagachi Project - LP Model Results with Crop Considerations

|         | <u> </u>                | Crop                    |             | <del>. –</del>              | Croppi             | ng Intensity                      |                                |
|---------|-------------------------|-------------------------|-------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
|         |                         | Area                    | <del></del> |                             |                    | ve Function                       |                                |
|         | Name of                 | Proposed                | Annual      | Area to                     | Annual             | Annual benefi                     | ts from crops                  |
| Sl.No.  | Crop                    | in<br>project<br>report | water       | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         | }                       | (Ha)                    | %           | %                           | %                  | %                                 | %                              |
| (1)     | (2)                     | (3)                     | (4)         | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy<br>(cereals)   | 12323                   | 100         | 100                         | 100                | 100                               | 541                            |
| 2       | Kh.Jowar<br>(cereals)   | 1042                    | 100         | 100                         | 100                | 100                               | 138                            |
| 3       | Kh.Ragi<br>(cereals)    | 3861                    | 100         | 100                         | 100                | 100                               | 238                            |
| 4       | Fodder                  | 2060                    | 100         | 100                         | 0                  | 100                               | 0                              |
| 5       | Tobacco                 | 1042                    | 100         | 100                         | 0                  | 100                               | 0                              |
| 6       | Pulses                  | 1801                    | _100        | 100                         | 87                 | 100                               | 215                            |
| 7       | Fruits & Veg.           | 2060                    | 100         | 100                         | 198                | 100                               | 202                            |
| 8       | Groundnut<br>(Oilseeds) | 1042                    | 99          | 99                          | 58                 | 99                                | 47                             |
| 9       | Sugarcane               | 515                     | 99          | 99                          | 0                  | 99                                | 0                              |
| Total   |                         | 25746                   | 100         | 100                         | 71                 | 100                               | 153                            |
| Objecti | ve function v           | alue                    | 25736       | 25736                       | 18280              | 25734                             | 39391                          |

Table 7.2.2: Hemavathi Project - LP Model Results with Crop Considerations

|         |                       | Crop                    |                      |                             | Croppi             | ng Intensity                      |                                |
|---------|-----------------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
|         |                       | Area                    |                      |                             | Objecti            | ve Function                       |                                |
|         | Name of               | Proposed                | Annual               | Area to                     | Annual             | Annual benefi                     | its from crops                 |
| Sl.No.  | Crop                  | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         |                       | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)     | (2)                   | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy<br>(cereals) | 127238                  | 100                  | 100                         | 100                | 100                               | 452                            |
| 2       | Kh.Jowar<br>(cereals) | 10603                   | 100                  | 100                         | 100                | 100                               | 114                            |
| 3       | Kh.Ragi<br>(cereals)  | 39762                   | 100                  | 100                         | 100                | 100                               | 199                            |
| 4       | Fodder                | 21206                   | 100                  | 100                         | 0                  | 100                               | 0                              |
| 5       | Tobacco               | 10603                   | 100                  | 100                         | 0                  | 100                               | 0                              |
| 6       | Pulses                | 18556                   | 100                  | 100                         | 88                 | 100                               | 205                            |
| 7       | Fruits &<br>Veg.      | 21206                   | 100                  | 100                         | 200                | 100                               | 853                            |
| 8       | Groundnut             | 10603                   | 100                  | 100                         | 57                 | 100                               | 66                             |
| 9       | Sugarcane_            | 5302                    | 100                  | _100                        | 0                  | 100                               | 0                              |
| Total   |                       | 265079                  | 100                  | 100                         | 72                 | 100                               | 210                            |
| Objecti | ve function v         | alue                    | 265079               | 265079                      | 190857             | 265079                            | 112434                         |

Table 7.2.3: Harangi Project - LP Model Results with Crop Considerations

|         |                        | Сгор                    |                      |                             |                    | ng Intensity<br>ve Function       |                                |
|---------|------------------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
|         | Name of                | Proposed                | Annual               | Area to                     | Annual             |                                   | ts from crops                  |
| Sl.No.  | Crop                   | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         | ]                      | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)     | (2)                    | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy<br>(cereals)  | 25698                   | 100                  | 100                         | 100                | 100                               | 452                            |
| 2       | (Kh.Jowar<br>(cereals) | 2142                    | 100                  | 100                         | 100                | 100                               | 114                            |
| 3 .     | Kh.Ragi<br>(cereals)   | 8031                    | 100                  | 100                         | 100                | 100                               | 199                            |
| 4       | Fodder                 | 4283                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| 5       | Tobacco                | 2142                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| 6       | Pulses                 | 3748                    | 100                  | 100                         | 88                 | 100                               | 205                            |
| 7       | Fruits & Veg.          | 4283                    | 100                  | 100                         | 200                | 100                               | 853                            |
| 8       | Groundnut              | 2142                    | 100                  | 100                         | 57                 | 100                               | 66                             |
| 9       | Sugarcane              | 1071                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| Total   |                        | 53540                   | 100                  | 100                         | 72                 | 100                               | 210                            |
| Objecti | ve function v          | alue                    | 53540                | 53540                       | 38549              | 53540                             | 112434                         |

Table 7.2.4: Cauvery Project - LP Model Results with Crop Considerations

|         | T                     | Crop                    |                      |                             | Croppi             | ng Intensity                      |                                |
|---------|-----------------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
| }       |                       | Area                    |                      |                             | Objecti            | ve Function                       |                                |
|         | Name of               | Proposed                | Annual               | Area to                     | Annual             | Annual benefi                     | its from crops                 |
| Sl.No.  | Crop                  | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         |                       | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)     | (2)                   | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy<br>(cereals) | 19440                   | 100                  | 100                         | 100                | 100                               | 452                            |
| 2       | Kh.Jowar (cereals)    | 1620                    | 100                  | 100                         | 100                | 100                               | 114                            |
| 3       | Kh.Ragi<br>(cereals)  | 6075                    | 100                  | 100                         | 100                | 100                               | 199                            |
| 4       | Fodder                | 3290                    | 100                  | 100                         | Ö                  | 100                               | 0                              |
| 5       | Tobacco               | 1620                    | 97                   | 97                          | 0                  | 100                               | 0                              |
| 6       | Pulses                | 1620                    | 100                  | 100                         | 49                 | 100                               | 117                            |
| 7       | Fruits &<br>Veg.      | 2835                    | 100                  | 100                         | 175                | 98                                | 747                            |
| 8       | Groundnut             | 3240                    | 100                  | 100                         | 200                | . 100                             | 132                            |
| 9       | Sugarcane             | 810                     | 100                  | 94                          | 0_                 | 100                               | _ 0                            |
| Total   |                       | 40550                   | 100                  | 99                          | 80                 | 100                               | 196                            |
| Objecti | ve function v         | alue                    | 40541                | 40410                       | 32440              | 40550                             | 79478                          |

Table 7.2.5: Krishnarajasagar (KRS) Project - LP Model Results with Crop
Considerations

|         |                       |                         |                      | Julialaci                   | 4110110            |                                   |                                |
|---------|-----------------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
|         |                       | Crop                    |                      |                             | Croppi             | ng Intensity                      |                                |
|         |                       | Area                    |                      |                             | Objecti            | ve Function                       |                                |
|         | Name of               | Proposed                | Annuai               | Area to                     | Annual             | Annual benefi                     | its from crops                 |
| Sl.No.  | Crop                  | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         | 1                     | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)     | (2)                   | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy<br>(cereals) | 54529                   | 100                  | 100                         | 100                | 100                               | 452                            |
| 2       | Kh.Jowar<br>(cereals) | 4544                    | 100                  | 100                         | 100                | 100                               | 114                            |
| 3       | Kh.Ragi<br>(cereals)  | 17040                   | 100                  | 100                         | 100                | 100                               | 199                            |
| 4       | Fodder                | 9088                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| 5       | Tobacco               | 4544                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| 6       | Pulses                | 7952                    | 100                  | 100                         | 88                 | 100                               | 205                            |
| 7       | Fruits & Veg.         | 9088                    | 100                  | 100                         | 200                | 100                               | 853                            |
| 8       | Groundnut             | 4544                    | 100                  | 100                         | 57                 | 100                               | 66                             |
| 9       | Sugarcane             | 2272                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| Total   |                       | 113601                  | 100                  | 100                         | 72                 | 100                               | 210                            |
| Objecti | ive function v        | alue                    | 113601               | 113601                      | 81793              | 113601                            | 23856                          |

Table 7.2.6: Banasuasagar Project - LP Model Results with Crop Considerations

|         |               | Crop                    |                      |                             | Croppi             | ng Intensity                      |                                |
|---------|---------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
|         |               | Area                    |                      |                             | Objecti            | ve Function                       |                                |
|         | Name of       | Proposed                | Annual               | Area to                     | Annual             | Annual benefit                    | ts from crops                  |
| SI.No.  | Crop          | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         |               | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)     | (2)           | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy      | 276                     | 525                  | 525                         | 584                | 525                               | 77                             |
| 2       | Kh.Jowar      | 460                     | 100                  | 100                         | 100                | 100                               | 387                            |
| 3       | Kh.Ragi       | 920                     | 100                  | 100                         | 100                | 100                               | 361                            |
| 4       | Fodder        | 460                     | 100                  | 100                         | 0                  | 100                               | 0                              |
| 5       | Cotton        | 460                     | 17                   | 17                          | 0                  | 17                                | 0                              |
| 6       | Rabi Paddy    | 460                     | 75                   | 75                          | 89                 | 75                                | 400                            |
| 7       | Pulses        | 1380                    | 100                  | 100                         | 300                | 100                               | 436                            |
| 8       | Fruits & Veg. | 736                     | 100                  | 100                         | 160                | 100                               | 361                            |
| . 9     | Groundnut     | 644                     | 100                  | 100                         | 47                 | 100                               | 0                              |
| 10      | Sugarcane     | 460                     | 2                    | 2                           | 0                  | 2                                 | 0                              |
| 11      | Coconut       | 180                     | 15                   | 100                         | 100                | 0                                 | 0                              |
| Total   | <del></del>   | 6436                    | 137                  | 147                         | 164                | 135                               | 225                            |
| Objecti | ve function v | alue                    | 8817                 | 9461                        | 10555              | 8688                              | 14481                          |

Table 7.2.7: Mananthvady Project - LP Model Results with Crop Considerations

|         |               | Crop                    |                      |                             | Сгоррі             | ng Intensity                      |                                |
|---------|---------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
|         |               | Area                    |                      |                             | Objecti            | ve Function                       |                                |
|         | Name of       | Proposed                | Annual               | Area to                     | Annual             | Annual benefi                     | ts from crops                  |
| Sl.No.  | Crop          | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         |               | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)     | (2)           | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy      | 6750                    | 78                   | 99                          | 99                 | 99                                | 88                             |
| 2       | Kh.Jowar      | 1125                    | 87                   | 91                          | 100                | 100                               | 100                            |
| 3       | Kh.Ragi_      | 2250                    | 100                  | 100                         | 100                | 100                               | 41                             |
| 4       | Fodder        | 1125                    | 100                  | 100                         | 100                | 100                               | 0                              |
| 5       | Cotton        | 1125                    | 100                  | 100                         | 100                | 100                               | 0                              |
| 6_      | Rabi Paddy    | 1125                    | 100                  | 100                         | 100                | 100                               | 100                            |
| 7       | Pulses        | 3375                    | 100                  | 100                         | 100                | 100                               | 100                            |
| 8       | Fruits & Veg. | 1800                    | 100                  | 100                         | 100                | 100                               | 41                             |
| 9       | Groundnut     | 1575                    | 100                  | 100                         | 100                | 100                               | 100                            |
| 10      | Sugarcane     | 1125                    | 100                  | 100                         | 100                | 100                               | 0                              |
| 11      | Coconut       | 1125                    | 100                  | 100                         | 100                | 100                               | 0                              |
| Total   |               | 22500                   | 97                   | 99                          | 100                | 100                               | 52                             |
| Objecti | ve function v | alue                    | 21825                | 22275                       | 22410              | 22136                             | 11700                          |

Table 7.2.8: Kabini Project - LP Model Results with Crop Considerations

|          |               | Crop                    |                      |                             |                    | ng Intensity                      |                                |
|----------|---------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
| ł        |               | Area                    |                      |                             | Objecti            | ve Function                       |                                |
|          | Name of       | Proposed                | Annual               | Area to                     | Annual             | Annual benefi                     | its from crops                 |
| Sl.No.   | Стор          | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
| <u> </u> |               | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)      | (2)           | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1        | Kh.Paddy      | 13719                   | 100                  | 100                         | 100                | 100                               | 882                            |
| 2        | Kh.Jowar      | 2287                    | 100                  | 100                         | 100                | 100                               | 443                            |
| 3        | Kh.Ragi       | 4573                    | 100                  | 100                         | 100                | 100                               | 414                            |
| 4        | Fodder        | 2287                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| 5        | Cotton        | 2287                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| 6        | Rabi Paddy    | 2287                    | 100                  | 100                         | 100                | 100                               | 458                            |
| 7        | Pulses        | 6859                    | 100                  | 100                         | 300                | 100                               | 4997                           |
| 8        | Fruits & Veg. | 3658                    | 100                  | 100                         | 160                | 100                               | 414                            |
| 9        | Groundnut     | 3201                    | 100                  | 100                         | 47                 | 100                               | 0                              |
| 10       | Sugarcane     | 2286                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| 11       | Coconut       | 2286                    | 100                  | 100                         | 0                  | 100                               | 0                              |
| Total    |               | 45730                   | 100                  | 100                         | 82                 | 100                               | 692                            |
| Objecti  | ve function v | alue                    | 45730                | 45730                       | 34499              | 45730                             |                                |

Table 7.2.9: Taraka Project - LP Model Results with Crop Considerations

|         |                | Crop                    |                      |                             | Croppi             | ng Intensity                      |                                |
|---------|----------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
| 1       |                | Area                    |                      |                             | Objecti            | ve Function                       |                                |
| ļ       | Name of        | Proposed                | Annual               | Area to                     | Annual             | Annual benefi                     | its from crops                 |
| Sl.No.  | Crop           | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
| Ĺ       | <u></u>        | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |
| (1)     | (2)            | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy       | 5790                    | 41                   | 45                          | 68                 | 45                                | 176                            |
| 2       | Kh.Jowar       | 965                     | 100                  | 100                         | 100                | 100                               | 44                             |
| 3       | Kh.Ragi        | 1930                    | 100                  | 100                         | 100                | 100                               | 103                            |
| 4       | Fodder         | 965                     | 100                  | 100                         | 0                  | 100                               | 0                              |
| 5       | Cotton         | 965                     | 100                  | 82                          | 0                  | 82                                | 0                              |
| 6       | Rabi Paddy     | 965                     | 97                   | 98                          | 100                | 98                                | 694                            |
| 7       | Pulses         | 2895                    | 100                  | 100                         | 300                | 100                               | 2082                           |
| 8       | Fruits & Veg.  | 1544                    | 100                  | 100                         | 160                | 100                               | 0                              |
| 9       | Groundnut      | 1351                    | 100                  | 72                          | 47                 | 72                                | 0                              |
| 10      | Sugarcane      | 97                      | 99                   | 100                         | 0                  | 100                               | 0                              |
| 11      | Coconut        | 965                     | 71                   | 100                         | 0                  | 100                               | 0                              |
| Total   |                | 18432                   | 92                   | 91                          | 80                 | 91                                | 282                            |
| Objecti | ve function va | alue                    | 16957                | 16773                       | 14746              | 16773                             | 51978                          |

Table 7.2.10: Sagardoddakare Project - LP Model Results with Crop Considerations

|         |                          | Crop                    |                      |                             |                               | ng Intensity                      |                                |
|---------|--------------------------|-------------------------|----------------------|-----------------------------|-------------------------------|-----------------------------------|--------------------------------|
|         |                          | Area                    |                      |                             | Objecti                       | ve Function                       |                                |
|         | Name of                  | Proposed                | Annual               | Area to                     | Annual                        | Annual benefi                     | ts from crops                  |
| Sl.No.  | Crop                     | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food production % (6) 100 600 | Without minimum food requirements | With minimum food requirements |
|         | 1.00                     | (Ha)                    | %                    | %                           | %                             | %                                 | %                              |
| (1)     | (2)                      | (3)                     | (4)                  | (5)                         | (6)                           | (7)                               | (8)                            |
| 1       | Kh.Paddy                 | 510                     | 100                  | 100                         | 100                           | . 100                             | 163                            |
| 2       | Kh.Jowar                 | 85                      | 100                  | 100                         | 600                           | 100                               | 82                             |
| 3       | Kh.Ragi                  | 170                     | 100                  | 100                         | 300                           | 100                               | 76                             |
| 4       | Fodder                   | 85                      | 100                  | 100                         | 0                             | 100                               | 0                              |
| 5       | Cotton                   | 85                      | 100                  | 100                         | 0                             | 100                               | 0                              |
| 6       | Rabi Paddy               | 85                      | 100                  | 100                         | 600                           | 100                               | 85                             |
| 7       | Pulses                   | 255                     | 100                  | 100                         | 600                           | 100                               | 923                            |
| 8       | Fruits &<br>Veg.         | 136                     | 100 -                | 100                         | 600                           | 100                               | 76                             |
| 9       | Groundnut                | 119                     | 100                  | 100                         | 200                           | 100                               | 0                              |
| 10      | Sugarcane                | 85                      | 100                  | 100                         | 0                             | 100                               | 0                              |
| 11      |                          |                         | 100                  | 100                         | 0_                            | 100                               | 0                              |
| Total   | Total 1700               |                         | 100                  | 100                         | 273                           | 100                               | 128                            |
| Objecti | Objective function value |                         |                      | 1700                        | 4641                          | 1700                              | 2176                           |

Table 7.2.11: Upper Nugu Project - LP Model Results with Crop Considerations

|             |                          | Crop                    |                      |                             |                    | ng Intensity                      |                   |
|-------------|--------------------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|-------------------|
|             | l .                      | Area                    |                      |                             | Objecti            | ve Function                       |                   |
|             | Name of                  | Proposed                | Annual               | Area to                     | Annual             | Annual benefi                     | ts from crops     |
| Sl.No.      | Crop                     | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | food requirements |
|             | <u> </u>                 | (Ha)                    | %                    | %                           | %                  | %                                 | %%                |
| (1)         |                          |                         | (4)                  | (5)                         | (6)                | (7)                               | (8)               |
| 1           | Kh.Paddy                 | 12141                   | 36                   | 26                          | 31                 | 26                                | 210               |
| 2           | Kh.Jowar                 | 2024                    | 0                    | 100                         | 100                | 100                               | 106               |
| 3           | Kh.Ragi                  | 4047                    | 21                   | 100                         | 100                | 100                               | 98                |
| 4           | Fodder                   | 2024                    | 100                  | 100                         | 0                  | 100                               | 0                 |
| 5           | Cotton                   | 2024                    | 0                    | 26                          | 0                  | 26                                | 0                 |
| 6           | Rabi Paddy               | 2024                    | 94                   | 10                          | 10                 | 10                                | 109               |
| 7           | Pulses                   | 6071                    | 17                   | 100                         | 300                | 001                               | 118               |
| 8           | Fruits & Veg.            | 3238                    | 5                    | 100                         | 160                | 100                               | 98                |
| 9           | Groundnut                | 2833                    | 100                  | 34                          | 16                 | 34                                | 0                 |
| 10          | Sugarcane                | 2024                    | 0                    | 0                           | 0                  | 0                                 | 0                 |
| 11          | Coconut                  | 2024                    | 44                   | 0                           | 0                  | 0                                 | 0                 |
| Total 40474 |                          | 40474                   | 38                   | 54                          | 65                 | 54                                | 67                |
| Objecti     | Objective function value |                         |                      | 21856                       | 26308              | 21856                             | 27118             |

Table 7.2.12: Nugu Project - LP Model Results with Crop Considerations

|          |                          | Crop<br>Area            |                      |                             |                    | ng Intensity                      |                                |  |  |
|----------|--------------------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|--|--|
|          | Name of                  | Proposed                | Annual               | Area to                     | Annual             | Annual benefits from crops        |                                |  |  |
| Sl.No.   | Crop                     | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |  |  |
| <u> </u> | 100                      | (Ha)                    | %                    | %                           | %                  | %                                 | %                              |  |  |
| (1)      | (2)                      | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)                            |  |  |
| 1        | Kh.Paddy                 | 3158                    | 100                  | 100                         | 100                | 100                               | 229                            |  |  |
| 2        | Kh.Jowar                 | 526                     | 100                  | 100                         | 100                | 100                               | 115                            |  |  |
| 3        | Kh.Ragi                  | 1053                    | 100                  | 100                         | 100                | 100                               | 108                            |  |  |
| 4        | Fodder                   | 526                     | 100                  | 100                         | 0                  | 100                               | 0                              |  |  |
| 5        | Cotton                   | 526                     | 100                  | 100                         | 0                  | 100                               | 0                              |  |  |
| 6        | Rabi Paddy               | 526                     | 100                  | 100                         | 100                | 100                               | 119                            |  |  |
| 7        | Pulses                   | 1579                    | 100                  | 100                         | 300                | 100                               | 129                            |  |  |
| 8        | Fruits &<br>Veg.         | 842                     | 100                  | 100                         | 160                | 100                               | 108                            |  |  |
| 9        | Groundnut                | 737                     | _ 100_               | 100                         | 47                 | 100                               | 0                              |  |  |
| 10       | Sugarcane                | 526                     | 100                  | 100                         | 0                  | 100                               | 0                              |  |  |
| 11       | Coconut                  | 526                     | 100                  | 100                         | 0                  | 100                               | 0                              |  |  |
| Total    |                          | 10526                   | 100                  | 100                         | 82                 | 100                               | 73                             |  |  |
| Objecti  | Objective function value |                         | 10526                | 10526                       | 8631               | 10526                             | 7684                           |  |  |

Table 7.2.13: Mettur Project - LP Model Results with Crop Considerations

|         |                | Crop                    |                      |                             |                    | ng Intensity                      |                   |
|---------|----------------|-------------------------|----------------------|-----------------------------|--------------------|-----------------------------------|-------------------|
|         |                | Arca                    |                      |                             | Objecti            | ve Function                       |                   |
|         | Name of        | Proposed                | Annual               | Area to                     | Annual             | Annual benefi                     | its from crops    |
| SI.No.  | Crop           | in<br>project<br>report | water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | food requirements |
|         |                | (Ha)                    | % %                  |                             | %                  | %%                                | %                 |
| (1)     | (2)            | (3)                     | (4)                  | (5)                         | (6)                | (7)                               | (8)               |
| 1       | Kh.Paddy       | 2732                    | 100                  | 100                         | 100                | 100                               | 139               |
| 2       | Kh.Jowar       | 1821                    | 0                    | 0                           | 4                  | 0                                 | 280               |
| 3       | Kh.Ragi        | 1821                    | 100                  | 100                         | 100                | 100                               | 130               |
| 4       | Fodder         | 1821                    | 100                  | 100                         | 100                | 100                               | 0                 |
| 5       | Cotton         | 1821                    | 100                  | 100                         | 0                  | 100                               | 0                 |
| 6       | Rabi Paddy     | 1821                    | 100                  | 100                         | 100                | 100                               | 289               |
| 7       | Pulses         | 2732                    | 100                  | 100                         | 150                | 100                               | 245               |
| 8       | Fruits & Veg.  | 911                     | 100                  | 100                         | 0                  | 100                               | 526               |
| 9       | Groundnut      | 911                     | 100                  | 100                         | 33                 | 100                               | 0                 |
| 10      | Sugarcane      | 911                     | 100                  | 100                         | 0                  | 100                               | 0                 |
| 11=     | Coconut        | 911                     | 100                  | 100                         | 0                  | 100                               | 0                 |
| Total   |                | 18213                   | 91                   | 91                          | 53                 | 91                                | 146               |
| Objecti | ve function va | alue                    | 16574                | 16574                       | 9653               | 16529                             | 26590             |

Table 7.2.14: Lower Bhavani Project - LP Model Results with Crop
Considerations

|         |                | Crop                    |                                |                             |                    | ng Intensity                      |                                |
|---------|----------------|-------------------------|--------------------------------|-----------------------------|--------------------|-----------------------------------|--------------------------------|
|         | 3. 70%         | Area                    |                                |                             | Objecti            | ve Function                       |                                |
|         | Name of        | Proposed                | Annual                         | Area to                     | Annual             | Annual benefi                     | its from crops                 |
| Sl.No.  | Crop           | in<br>project<br>report | Annual<br>water<br>utilization | be<br>irrigated<br>annually | food<br>production | Without minimum food requirements | With minimum food requirements |
|         | 360            | (Ha)                    | %                              | %                           | %                  | %                                 | %                              |
| (1)     | (2)            | (3)                     | (4)                            | (5)                         | (6)                | (7)                               | (8)                            |
| 1       | Kh.Paddy       | 11421                   | 100                            | 60                          | 60                 | 60                                | 83                             |
| 2       | Kh.Jowar       | 19035                   | 100                            | 100                         | 100                | 100                               | 280                            |
| 3       | Kh.Ragi        | 3807                    | 100                            | 100                         | 0                  | 100                               | 130                            |
| 4       | Fodder         | 3807                    | 100                            | 100                         | 0                  | 100                               | 0                              |
| 5       | Cotton         | 7614                    | 10                             | 100                         | 100                | 100                               | 0                              |
| 6       | Rabi Paddy     | 7614                    | 100                            | 100                         | 100                | 100                               | 289                            |
| 7       | Pulses         | 11421                   | 100                            | 100                         | 100                | 100                               | 245                            |
| 8       | Fruits & Veg.  | 11421                   | 100                            | 100                         | 100                | 100                               | 526                            |
| 9       | Groundnut      | 11421                   | 100                            | 100                         | 100                | 100                               | 0                              |
| 10      | Sugarcane      | 3807                    | 100                            | 100                         | 0                  | 100                               | 0                              |
| _11     |                |                         | 100                            | 100                         | 0                  | 100                               | 0                              |
| Total   |                | 95175                   | 92                             | 96                          | 60                 | 96                                | 141                            |
| Objecti | ive function v | alue                    | 87561                          | 91368                       | 57105              | 91368                             | 134197                         |

Table 7.2.15: Amaravathi Project - LP Model Results with Crop Considerations

|         |                 | Сгор Агеа |             |                                        | Croppir    | ng Intensity      |                   |
|---------|-----------------|-----------|-------------|----------------------------------------|------------|-------------------|-------------------|
|         |                 | Proposed  |             |                                        | _Objecti   | ve Function       |                   |
| Sl.No.  | Name of         | in        | Annual      | Annual Area to be Annual Annual benefi |            |                   |                   |
| 31.NO.  | Crop            | project   | water       | irrigated                              | food       | Without minimum   | With minimum      |
|         |                 | report    | utilization | annually                               | production | food requirements | food requirements |
| L       | <u> </u>        | (Ha)      | %           | %                                      | %          | %                 | %                 |
| (1)     | (2)             | (3)       | (4)         | (5)                                    | (6)        | (7)               | (8)               |
| 1       | Kh.Paddy        | 1214      | 100         | 100                                    | 100        | 100               | 176               |
| 2       | Kh.Jowar        | 2024      | 100         | 100                                    | 100        | 100               | 53                |
| 3       | Kh.Ragi         | 405       | 100         | 100                                    | 0          | 100               | 0                 |
| 4       | Fodder          | 405       | 100         | 100                                    | 0          | 100               | 0                 |
| 5       | Cotton          | 809       | 100         | 100                                    | 100        | 100               | 0                 |
| 6       | Rabi Paddy      | 809       | 100         | 100                                    | 100        | 100               | 132               |
| 7       | Pulses          | 1214      | 100         | 100                                    | 100        | 100               | 35                |
| 8       | Fruits & Veg.   | 1214      | 100         | 100                                    | 100        | 100               | 71                |
| 9       | Groundnut       | 1214      | 100         | 100                                    | 100        | 100               | 294               |
| 10      | Sugarcane       | 405       | 100         | 100                                    | 0          | 100               | 0                 |
| 11      | Coconut         | 405       | 100         | 100                                    | 0          | 100               | 0                 |
| Total   |                 | 10118     | 100         | 100                                    | 64         | 100               | 69                |
| Objecti | ve function val | ue        | 10118       | 10118                                  | 6476       | 10118             | 6981              |

Table 7.2.16: Abstract - LP Model Results with Crop Considerations

|            |                            |                         |             |                               | Cropping Int                 | ensity                                     |                                |  |
|------------|----------------------------|-------------------------|-------------|-------------------------------|------------------------------|--------------------------------------------|--------------------------------|--|
|            | A 1 1 1 1                  | Crop<br>Area            |             |                               | Objective Fu                 | nction                                     |                                |  |
|            |                            | Proposed                |             |                               |                              | Annual benefits from crops                 |                                |  |
| SI.<br>No. | N <mark>ame of</mark> Crop | in<br>project<br>report | in Annual A | Area to be irrigated annually | Annual<br>food<br>production | Without<br>minimum<br>food<br>requirements | With minimum food requirements |  |
|            | San Cont. No.              | (Ha)                    | %           | %                             | %                            | %                                          | %                              |  |
| (1)        | (2)                        | (3)                     | (4)         | (5)                           | (6)                          | (7)                                        | (8)                            |  |
|            | Upper Cauvery Sub-basin    |                         |             |                               |                              |                                            |                                |  |
| 1          | Yagachi                    | 25746                   | 100         | 100                           | 71                           | 100                                        | 153                            |  |
| 2          | Hemavathi                  | 265079                  | 100         | 100                           | 72                           | 100                                        | 210                            |  |
| 3          | Harangi                    | 53540                   | 100         | 100                           | 72                           | 100                                        | 210                            |  |
| 4          | Cauvery                    | 40550                   | 100         | 99                            | 80                           | 100                                        | 196                            |  |
| _5         | Krishnarajsagar (KRS)      | 113601                  | 100         | 100                           | 72                           | 100                                        | 210                            |  |
|            | Kabini Sub-basin           |                         |             |                               |                              |                                            |                                |  |
| 6          | Banasurasagar              | 6436                    | 137         | 147                           | 164                          | 135                                        | 225                            |  |
| <u>_</u> 7 | Mananthvady                | 22500                   | 97          | 99                            | 86                           | 100                                        | 52                             |  |
| 8          | Kabini                     | 45730                   | 100         | 100                           | 82                           | 100                                        | 692                            |  |
| 9          | Taraka                     | 18432                   | 92          | 91                            | 80                           | 91                                         | 282                            |  |
| 10         | Sagardoddakere             | 1700                    | 100         | 100                           | 273                          | 100                                        | 128                            |  |
| 11         | Upper Nugu                 | 40474                   | 38          | 54                            | 65                           | 54                                         | 67                             |  |
| 12         | Nugu                       | 10526                   | 100         | 100                           | 82                           | 100                                        | 73                             |  |
|            | Chinnar Sub-basin          |                         |             |                               |                              |                                            |                                |  |
| 13         | Mettur                     | 18213                   | 91          | 91                            | 53                           | 91                                         | 146                            |  |
|            | Bhavani Sub-basin          |                         |             |                               | <del></del>                  |                                            |                                |  |
| 14         | Lower Bhavani              | 95175                   | 92          | 96                            | 60                           | 96                                         | 141                            |  |
|            | Amaravathi Sub-basin       |                         |             |                               | · ·                          |                                            |                                |  |
| 15         | Amaravathi                 | 10118                   | 100         | 100                           | 64                           | 100                                        | 69                             |  |

Table 7.3.1: Parameters Used in Hydropower Energy Computations

| SI. | Name of<br>Project | Dead<br>Storage<br>Level<br>(m) | Gross<br>Storage<br>Level<br>(m) | Dead Storage Capacity MCM | Gross Storage Capacity MCM | Tail<br>Water<br>Level<br>/Av.Head<br>(m) | Installed<br>Capacity<br>(MW) |
|-----|--------------------|---------------------------------|----------------------------------|---------------------------|----------------------------|-------------------------------------------|-------------------------------|
| (1) | (2)                | (3)                             | (4)                              | (5)                       | (6)                        | (7)                                       | (8)                           |
| 1   | Banasurasagar      | 754.86                          | 772.10                           | 23.75                     | 166.86                     | 734.90                                    | 231.00                        |
| 2   | Mananthvady        | 734.50                          | 748.50                           | 156.15                    | 60 <b>7</b> .78            | 723.50                                    | 817.00                        |
| 3   | Kabini             | 685.50                          | 696.16                           | 99.00                     | 552.00                     | 17.50                                     | 98.00                         |
| 4   | Mettur             | NA                              | 240.79                           | 62.02                     | 2708.79                    | 23.78                                     | 240.00                        |

Note: Overall hydropower energy generation efficiency = 0.85.

Table 7.3.2: Hydropower Energy Computations for Banasurasagar Reservoir

| Sl.  | Month | Rele<br>from Re | eases<br>eservoir | Initial<br>storage | Final<br>storage | Average storage | Head | Power generated | Energy<br>generated |
|------|-------|-----------------|-------------------|--------------------|------------------|-----------------|------|-----------------|---------------------|
| 110. |       | (MCM)           | m3/Sec)           | (MCM)              | (MCM)            | (MCM)           | (m)  | (MW)            | (MWhr)              |
| (1)  | (2)   | (3)             | (4)               | (5)                | (6)              | (7)             | (8)  | (9)             | (10)                |
| 1    | 1     | 4.22            | 1.60              | 16.58              | 45.25            | 187.07          | 306  | 52.9            | 38631. <b>6</b>     |
| 2    | 2     | 4.50            | 1.71              | 45.25              | 104.43           | 230.99          | 377  | 69.7            | 50893.9             |
| 3    | 3     | 4.40            | 1.68              | 104.43             | 107.85           | 262.29          | 428  | 77.5            | 56577.8             |
| 4    | 4     | 3.54            | 1.35              | 107.85             | 107.88           | 264.02          | 431  | 62.7            | 45739.4             |
| 5    | 5     | 0.51            | 0.20              | 107.88             | 124.42           | 272.30          | 445  | 9.4             | 6855.8              |
| 6    | 6     | 1.26            | 0.48              | 124.42             | 116.92           | 276.82          | 452  | 23.4            | 17047.5             |
| 7    | 7     | 2.36            | 0.90              | 116.92             | 90.86            | 260.04          | 425  | 41.2            | 30097.5             |
| 8    | 8     | 3.36            | 1.28              | 90.86              | 52.91            | 228.04          | 373  | 51.4            | 37550.3             |
| 9    | 9     | 3.06            | 1.16              | 52.91              | 17.99            | 191.60          | 313  | 39.3            | 28696.1             |
| 10   | 10    | 1.66            | 0.63              | 17.99              | 0.43             | 165.36          | 270  | 18.4            | 13454.5             |
| 11   | 11    | 0.49            | 0.19              | 0.43               | 5.12             | 158.92          | 260  | 5.2             | 3811.1              |
| 12   | 12    | 0.30            | 0.11              | 5.12               | 16.58            | 167.00          | 273  | 3.3             | 2437.9              |
|      |       |                 |                   |                    |                  |                 |      | Annual          | 331793.5            |

Table 7.3.3: Hydropower Energy Computations for Mananthvady Reservoir

| SI. | Month | Rele<br>from Re |         | Initial<br>storage | Final storage | Average storage | Head | Power generated | Energy<br>generated |
|-----|-------|-----------------|---------|--------------------|---------------|-----------------|------|-----------------|---------------------|
|     |       | (MCM)           | m3/Sec) | (MCM)              | (MCM)         | (MCM)           | (m)  | (MW)            | (MWhr)              |
| (1) | (2)   | (3)             | (4)     | (5)                | (6)           | (7)             | (8)  | (9)             | (10)                |
| 1   | 1     | 0.87            | 0.33    | 35.00              | 102.026       | 92.26           | 28.3 | 1.01            | 739.45              |
| 2   | 2     | 0.90            | 0.34    | 102.03             | 274.356       | 211.94          | 64.9 | 2.41            | 1760.77             |
| 3   | 3 .   | 29.32           | 11.16   | 274.36             | 232.389       | 277.12          | 84.9 | 102.26          | 74646.92            |
| 4   | 4     | 0.87            | 0.33    | 232.39             | 226.161       | 253.03          | 77.5 | 2.78            | 2027.90             |
| 5   | 5     | 0.90            | 0.34    | 226.16             | 297.535       | 285.60          | 87.5 | 3.25            | 2372.70             |
| 6   | 6     | 0.87            | 0.33    | 297.53             | 313.107       | 329.07          | 101  | 3.61            | 2637.38             |
| 7   | 7     | 78.45           | 29.85   | 313.11             | 198.226       | 279.42          | 85.6 | 275.85          | 201371.18           |
| 8   | 8     | 0.90            | 0.34    | 198.23             | 143.282       | 194.50          | 59.6 | 2.21            | 1615.91             |
| 9   | 9     | 0.82            | 0.31    | 143.28             | 96.32         | 143.55          | 44   | 1.48            | 1080.34             |
| 10  | 10    | 83.79           | 31.88   | 96.32              | 83.79         | 113.80          | 34.9 | 119.99          | 87592.14            |
| 11  | 11    | 0.87            | 0.33    | 83.79              | 20.43         | 75.86           | 23.2 | 0.83            | 607.97              |
| 12  | 12    | 0.90            | 0.34    | 20.43              | 35.00         | 51,46           | 15.8 | 0.59            | 427.54              |
|     |       |                 |         |                    |               |                 |      | Annual          | 376880.21           |

Table 7.3.4: Hydropower Energy Computations for Kabini Reservoir

| Sl.<br>No. | Month | Rele<br>from Re   |         | Initial<br>s <b>t</b> orage | Final storage | Average storage | Head  | Power generated | Energy<br>generated |
|------------|-------|-------------------|---------|-----------------------------|---------------|-----------------|-------|-----------------|---------------------|
|            |       | (MCM)             | m3/Sec) | (MCM)                       | (MCM)         | (MCM)           | (m)   | (MW)            | (MWhr)              |
| (1)        | (2)   | (3)               | (4)     | (5)                         | (6)           | (7)             | (8)   | (9)             | (10)                |
| 1          | 1     | 28.11296          | 10.70   | 144.75                      | 310.395       | 326.57          | 17.55 | 20.27           | 14797.71            |
| 2          | 2     | 161.8819          | 61.60   | 310.39                      | 206.469       | 357.43          | 19.21 | 127.76          | 93261.47            |
| 3          | 3     | 316.7635          | 120.53  | 206.47                      | 113.1         | 258.78          | 13.91 | 180.99          | 132124.71           |
| 4          | 4     | 272.2151          | 103.58  | 113.1                       | 97.2665       | 204.18          | 10.97 | 122.72          | 89586.52            |
| 5          | 5     | 460.0645          | 175.06  | 97.266                      | 171.368       | 233.32          | 12.54 | 237.00          | 173011.80           |
| 6          | 6     | 49.70735          | 18.91   | 171.37                      | 453           | 411.18          | 22.10 | 45.13           | 32943.30            |
| 7          | 7     | 88.12823          | 33.53   | 453                         | 395.834       | 523.42          | 28.13 | 101.85          | 74348.72            |
| 8          | 8     | 140.1 <b>9</b> 41 | 53.35   | 395.83                      | 177.211       | 385.52          | 20.72 | 119.33          | 87114.39            |
| 9          | 9     | 111.5126          | 42.43   | 177.21                      | 93.21         | 234.21          | 12.59 | 57.67           | 42095.97            |
| 10         | 10    | 63.88646          | 24.31   | 93.21                       | 71.36         | 181.29          | 9.74  | 25.57           | 18667.29            |
| 11         | 11    | 23.1902           | 8.82    | 71.36                       | 68.5891       | 168.97          | 9.08  | 8.65            | 6315.91             |
| 12         | 12    | 16.8036           | 6.39    | 68.589                      | 144.747       | 205.67          | 11.05 | 7.63            | 5570.32             |
|            |       |                   |         |                             |               |                 |       |                 | 769838.12           |

Table 7.3.5: Hydropower Energy Computations for Mettur Reservoir

| SI.  | Month |       | Releases<br>from Reservoir |         | Final storage  | Average storage | Head | Power<br>generated | Energy<br>generated |
|------|-------|-------|----------------------------|---------|----------------|-----------------|------|--------------------|---------------------|
| 140. |       | (MCM) | m3/Sec)                    | (MCM)   | (MCM)          | (MCM)           | (m)  | (MW)               | (MWhr)              |
| (1)  | (2)   | (3)   | (4)                        | (5)     | (6)            | · (7)           | (8)  | (9)                | (10)                |
| 1    | 1     | 43.94 | 16.72                      | 1226.42 | 1628.64        | 1489.55         | 25.6 | 46.15              | 33688.20            |
| 2    | 2     | 53.55 | 20.38                      | 1628.64 | <b>789.5</b> 9 | 1271.13         | 21.8 | 48.00              | 35039.33            |
| 3    | 3     | 48.80 | 18.57                      | 789.59  | 325.12         | 619.373         | 10.6 | 21.31              | 15557.40            |
| 4    | 4     | 32.84 | 12.50                      | 325.12  | 421.39         | 435.275         | 7.47 | 10.08              | 7357.60             |
| 5    | 5     | 18.81 | 7.16                       | 421.39  | 280.25         | 412.838         | 7.09 | 5.48               | 3997.58             |
| 6    | 6     | 17.69 | 6.73                       | 280.25  | 409.07         | 406.677         | 6.98 | 5.07               | 3702.90             |
| 7    | 7     | 23.53 | 8.95                       | 409.07  | 467.96         | 500.536         | 8.59 | 8.30               | 6061.88             |
| 8    | 8     | 33.25 | 12.65                      | 467.96  | 779.20         | 685.6           | 11.8 | 16.08              | 11734.77            |
| 9    | 9     | 39.54 | 15.04                      | 779.20  | 1012.39        | 957.817         | 16.4 | 26.70              | 19492.43            |
| 10   | 10    | 44.72 | 17.02                      | 1012.39 | 1078.27        | 1107.35         | 19   | 34.92              | 25491.45            |
| 11   | 11    | 26.55 | 10.10                      | 1078.27 | 1158.57        | 1180.44         | 20.3 | 22.10              | 16130.25            |
| 12   | 12    | 26.96 | 10.26                      | 1158.57 | 1226.42        | 1254.51         | 21.5 | 23.85              | 17407.51            |

# 8.1 INTRODUCTION

The objective of this research work was to develop a linear programming (LP) model which can be used for planning the development measures of a real life large size transboundary river basin, i.e., for Cauvery river basin, a major river basin in India. The details of the study area are discussed in Chapter 3. Before planning for intra-basin water transfers among the sub-basins lying within a major river basin, water balance of each sub-basin is carried out, with the purpose of identifying water surplus and water deficit sub-basins. In Chapter 4, therefore, the monthly water balance studies on an annual basis, for all the sixteen sub-basins in Cauvery river basin and Cauvery basin as a whole, for the projected population in the Cauvery basin for the scenario 2050 AD were carried out. The water balance studies are done for, with and without the considerations of the ground water availability in the basins. In the water balance study of each sub-basin, the basin was considered as one entity, which lacked the consideration of the influence of the effects of the locations of the various projects involved and the aerial distribution of the runoff in the basin, on the basin's water balance. In order to see the influence of these factors, the LP technique was applied. Therefore, a LP model was developed and applied to the Cauvery river basin. The model can be applied to any river basin planning problem, and is described in Chapter 5. For analysis the 75%, 50%, 90% and 100% water year dependable flows were used. The necessary data needed for the LP model has been computed in Chapter 6. The computed results of LP model are presented in Chapter 7. The analysis of the results is presented in this chapter.

The LP model is basically related to the conjunctive water use development in the river basin. The amount of the ground water resources available is fixed, and was taken as the same in all the model runs. For considering the surface water availability as a resource in the model, firstly, the model was run for 75% water year dependable flow, representing a normal water year for the Cauvery river basin as a whole, with consideration of various water exports from the Mettur reservoir to the down-stream sub-basins below Mettur, then, it was run for the two water shortage years, i.e., the 90% (a water deficit year), and the 100% (a critical water deficit year) water year dependable flows and one water surplus year, i.e., the 50%(a water surplus year) water year dependable flow.

The annual water export quantity to be released from the Mettur reservoir to the sub-basins lying in the downstream reaches of the Cauvery river below Mettur was considered for the following cases: (i) for an amount equal to the interim award of Cauvery Water Dispute Tribunal (CWDTIA), i.e., for 5800 MCM; (ii) for 4200 MCM; (iii) for 6200 MCM; and (iv) for 7200 MCM, 7800 MCM, 6900 MCM and 6700 MCM for the four flows, respectively.

Five objective functions were considered for analyzing various options, mainly related to the irrigation development. The first of them was to maximize, the annual water utilizations from irrigation, and water supply (i.e., domestic and industrial), from major projects, and was subjected to the various constraints on the system related to the availability of surface and ground waters; intra-basin exports; intra-basin imports; regenerations from irrigation, domestic and industrial uses;

hydropower; and water needs for environmental purposes; excluding the constraints related to the crops. For this objective function, irrigation was considered as lumped at each major project (reservoir), i.e., in terms of the contribution of surface water in the volume of annual irrigation water required to be diverted from each reservoir, as the decision variable in the model. The next two objective functions were to maximize the annual irrigation water use, and to maximize the irrigated crop areas, respectively; with the crop areas as the decision variables in the model for both the objective functions. In the remaining two objective functions the objective was to maximize the total annual net benefits from crops, to maximize the agricultural food production in the basin, respectively. These last four objective functions were subjected to the constraints related to crops only, i.e. 5.3.6, 5.3.7, 5.3.8, and 5.3.9.

The last objective function was also subjected to the constraints of minimum food needs in the basin, i.e., 5.3.10.1, 5.3.10.2, 5.3.10.3, and 5.3.10.4.

The results of LP model for maximization of water utilization for the Cauvery river basin as a whole are given in Tables 7.1(a) to 7.1(d), Tables 7.2(a) to 7.2(d), Tables 7.3(a) to 7.3(d), and Tables 7.4(a) to 7.4(d), for 75%, 50%, 90%, and 100% water year dependable flows, respectively.

# 8.2 ANALYSIS OF LP MODEL RESULTS FOR LUMPED IRRIGATION AND WATER SUPPLY FROM MAJOR PROJECTS

#### 8.2.1 General

The LP model was run for maximization of water utilization for the Cauvery basin as a whole considering the objective function given by equation 5.2.1-I. The results obtained from the model computations are first analyzed thoroughly, keeping

in view the objectives of the problem. An adequate analysis helps in the proper decision making process, before the decisions are actually implemented in practice.

The detailed analysis of the LP model results is done (i) at the individual major project/site level, (ii) at all the sixteen sub-basins level and (iii) for the Cauvery river basin as a whole; for the 75% water year dependable flow. But, the analysis for the flows of other dependabilities is also briefly discussed. Similarly, the 5800 MCM export of water from Mettur reservoir to the sub-basins below Mettur is of main concern, and thus, the detailed analysis gives more emphasis to this aspect.

In the text below, the 'upstream' water demands at the upstream of a major project are many times referred to as 'at the medium and minor projects'; similarly, the 'downstream' water demands at the downstream of the major project are meant for 'at the major project'. This is in reference to the "upstream" and the "downstream" of a major project, i.e., a major reservoir.

# 8.2.2 Analysis at the Individual Major Project/Site Level

The analysis is done at the individual; major project or site level and, at sub-basin level; for the 75% water year dependable flow, with various export quantities from the Mettur reservoir to the sub-basins below Mettur.

In general, it is observed that for the 50%, 75%, 90% and 100% water year dependable flows, the upstream and downstream annual demands for water supply, i.e., at all the medium and minor projects, and major projects, respectively, are met satisfactorily but the upstream annual demands for irrigation at the medium and minor projects, and the downstream annual demands for irrigation at the major projects, even in the 50% water year dependable flow are not met satisfactorily at some of the projects.

The projectwise graphs of the percentage deficits in meeting various annual water demands in respect to the annual water supply and irrigation at the major, medium and minor projects above Mettur, with the annual water export from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows is presented in Figures 8.3.1 to 8.3.6.

# 8.2.2.1 Major Projects in Upper Cauvery sub-basin Above Mettur

The results show that at the major projects 1, 2, 3, 4 and 5, i.e., at the reservoirs Yagachi, Hemavathi, Harangi, Cauvery and Krishnarajsagar (KRS), the upstream annual demands for irrigation and water supply at their medium and minor projects are met satisfactorily and the downstream annual water supply demands at these major projects are also met satisfactorily, but the downstream annual irrigation demands at these major projects, except at KRS, are not met satisfactorily. The annual deficits in meeting the downstream annual irrigation demands at the major projects Yagachi, Hemavathi, Harangi, and Cauvery are 49%, 88%, 8%, and 80%, respectively.

# 8.2.2.2 Major Projects in Kabini sub-basin above Mettur

In the case of major projects 6, 7, 8, 9, 10, 11 and 12, i.e., at the reservoirs Banasursagar, Mananthvady, Kabini, Taraka, Sagardoddakere, Upper Nugu and Nugu, the downstream annual water supply demands at these major projects and the annual upstream water supply demands at their medium and minor projects are met satisfactorily, and the upstream annual irrigation demands at their medium and minor projects are also met satisfactorily, but the downstream annual irrigation demands at these major projects, except Kabini and Sagardoddakere, are not met satisfactorily.

The annual deficits in meeting the downstream annual irrigation demands at the major projects Banasursagar, Mananthvady, Taraka, Upper Nugu and Nugu are 86% 14%, 44%, 83% and 18%, respectively.

#### 8.2.2.3 Major Project in Chinnar sub-basin above Mettur

In the case of Mettur, i.e., major project 13, all the upstream annual water demands at the major project and all the upstream annual water demands at the medium and minor projects are met satisfactorily.

# 8.2.2.3 Major Projects in Bhavani, and Amaravathi sub-basins below Mettur

In the case of Bhavani and Amaravathi reservoirs, i.e., major project, 14 and 15, the upstream annual water supply demands at the medium and minor projects, and the downstream annual water supply demands at the major projects are met satisfactorily and the upstream annual irrigation demands at the medium and minor projects are also met satisfactorily, but the downstream annual irrigation demands at the major projects are not met satisfactorily. The annual deficits in meeting the downstream annual irrigation demands at Bhavani and Amaravathi are 15% and 21%, respectively.

# 8.2.3 Analysis at the Sub-Basin Level

For each water year dependable flow, the graphical presentation of the trade offs between the annual total of all the water demands met at various projects and remaining areas in a sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for two cases, i.e., for the projects above and for the projects below Mettur are presented in Figures 8.1.1 to 8.1.5.

The percentage deficits in meeting the total of annual water demand of a given purpose in a sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figures 8.2.1 to 8.2.9.

The variation in annual irrigation and / or water supply from major, medium and minor projects vs. various percent water year dependable flows in various subbasins are given in Figures 8.4.1 to 8.4.9.

The demands for upstream water supply at the medium and minor projects are completely met during all the water year dependable flows.

# 8.2.3.1 Upper Cauvery sub-basin

In the case of Upper Cauvery sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply and for irrigation at the medium and minor projects are met satisfactorily, and the downstream annual demands for water supply at the major projects are also met satisfactorily. But the downstream annual demands for irrigation at the major projects are not met satisfactorily. The annual total of the deficits in the downstream annual irrigation at various major projects in the sub-basin, which are short of water, is found to be 26%, 23%, 54%, and 58% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.41 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Upper Cauvery sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the medium and minor projects and at the major projects, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figures 8.2.1(a) and 8.2.1(b) respectively.

The variation in annual irrigation from medium and minor projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.1(a). The variation in annual irrigation from major projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.1(b).

#### 8.2.3.2 Kabini sub-basin

In the case of Kabini sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply and for irrigation at the medium and minor projects are met satisfactorily accept for 100% water year dependable flow, the upstream annual water demands for irrigation at the medium and

minor projects, the annual total of deficit 57% is found out. The downstream annual demands for water supply at the major projects are also met satisfactorily. The downstream annual demands for irrigation at the major projects are met satisfactorily for 50% and 75% water year dependable flows. But the downstream annual demands for irrigation at the major projects for 90% and 100% water year dependable flows are not met satisfactorily. The annual total of the deficits in the downstream annual irrigation at various major projects in the sub-basin, which are short of water, is found to be 44%, and 66% for the 90% and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.73 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Kabini sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the medium and minor projects and at the major projects, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figures 8.2.2(a) and 8.2s.2(b), respectively.

The variation in annual irrigation from medium and minor projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.2(a). The variation in annual irrigation from major projects vs. various water year dependable flows in the sub-basin is given in Figure 8.4.2(b).

#### 8.2.3.3 Shimsha sub-basin

In the case of Shimsha sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply and for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the upstream annual water demands for water supply and for irrigation at the medium and minor projects, which are short of water, is found to be (for water supply 51%, 51%, 51%, and 51%) and (for irrigation 68%, 68%, 84%, and 84%) for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.35 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

#### 8.2.3.4 Arkavathi sub-basin

In the case of Arkavathi sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily, but the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily. There is no any major project in this sub-basin. The annual total of the deficits in the upstream annual irrigation at various medium and minor projects in the sub-basin, which are short of water, is found to be 89%, 89%, 91%, and 92% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.30 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Arkavathi sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the major projects and at the medium and minor, and major projects, for the various water exports from Mettur reservoir to the sub-

basins below Mettur, for different water year dependable flows are presented in Figures 8.2.3(a) and 8.2.3(b), respectively.

The variation in annual water supply from major projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.3(a). The variation in annual total water supply from major, medium and minor projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.3(b).

#### 8.2.3.5 Middle Cauvery sub-basin

In the case of Middle Cauvery sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily. The upstream annual demands for irrigation at the medium and minor projects are met satisfactorily for 50% water year dependable flows. But the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily for 75%, 90% and 100% water year dependable flows. The annual total of the deficits in the upstream annual irrigation at various major projects in the sub-basin, which are short of water, is found to be 6%, 6%, and 6% for the 75%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.77 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports

from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Middle Cauvery sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the medium and minor projects and at the major projects, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figures 8.2.4(a) and 8.2.4(b), respectively.

The variation in annual total irrigation from major, medium and minor projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.4.

#### 8.2.3.6 Suvarnavathi sub-basin

In the case of Suvarnavathi sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin, for all the water year dependable flows, the upstream annual water demands for water supply and for irrigation at the medium and minor projects are met satisfactorily. But the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the upstream annual irrigation at various medium and minor projects in the sub-basin, which are short of water, is found to be 90%, 88%, 94%, and 94% for the 75%, 50%, 90%, and 100% water year

dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.20 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Suvarnavathi sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the medium and minor projects, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figures 8.2.5(a) and 8.2.5(b), respectively.

#### 8.2.3.7 Palar sub-basin

In the case of Palar sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily. But the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits

in the upstream annual irrigation at various medium and minor projects in the sub-basin, which are short of water, is found to be 54%, 10%, 57%, and 62% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.60 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

#### 8.2.3.8 Chinnar sub-basin

In the case of Chinnar sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply and for irrigation at the medium and minor projects are met satisfactorily. The annual water utilization factor computed for this sub-basin is 1.00 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year

dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The variation in annual total irrigation from major, medium and minor projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.5.

# 8.2.3.9 Bhavani sub-basin

In the case of Bhavani sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply and for irrigation at the medium and minor projects are met satisfactorily accept for 100% water year dependable flow, where the deficit is of 12% is found out for irrigation; and the downstream annual water demands for water supply and irrigation at the major projects are also met satisfactorily, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.52 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

#### 8.2.3.10 Noyil sub-basin

In the case of Noyil sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply and for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the upstream annual water supply and irrigation at various medium and minor projects in the sub-basin, which are short of water, is found to be (for water supply 65%, 65%, 65%, and 65%) and (for irrigation 97%, 97%, 97%, and 97%) for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.19 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The variation in annual total water supply from major project vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.6(a).

#### 8.2.3.11 Amaravathi sub-basin

In the case of Amaravathi sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal

to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream and downstream annual water demands for water supply at the medium and minor, and major projects are met satisfactorily. But the upstream and downstream annual demands for irrigation at the medium and minor projects and major projects, respectively, are not met satisfactorily. The annual total of the deficits in the upstream and downstream annual irrigation at various medium and minor, and major projects, respectively, in the sub-basin, which are short of water, is found to be (for medium and minor project 69%, 68%, 77%, and 78%) and (for major projects 3%, 24%, 24% and 84%) for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.62 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Amaravathi sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the medium and minor projects and at the major projects, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figures 8.2.6(a), 8.2.6(b), and 8.2.6(c), respectively.

The variation in annual irrigation from medium and minor projects vs. various water year dependable flows in the sub-basin is given in Figure 8.4.7(a). The variation in annual irrigation from major projects vs. various water year dependable flows in the sub-basin is given in Figure 8.4.7(b). The variation in annual irrigation from major, medium and minor projects vs. various water year dependable flows in the sub-basin is given in Figure 8.4.7(c).

#### 8.2.3.12 Tirumanimuttar sub-basin

In the case of Tirumanimuttar sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily. But the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the upstream annual irrigation at various medium and minor projects in the sub-basin, which are short of water, is found to be 91%, 89%, 93%, and 948% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.36 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor

projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Tirumanimuttar sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the medium and minor projects and at the major projects, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figures 8.2.7(a), 8.2.7(b) and 8.2.7(c), respectively.

The variation in annual total irrigation from major, medium and minor projects vs. various percent water year dependable flows in the sub-basin is given in Figures 8.4.8(a). The variation in annual total water supply from major project vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.8(b). The variation in annual total water supply from major, medium and minor projects vs. various percent water year dependable flows in the sub-basin is given in Figure 8.4.8(c).

#### 8.2.3.13 Ponnanai Ar sub-basin

In the case of Ponnanai Ar sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily. But the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the upstream annual irrigation at various medium and minor projects in the sub-basin, which are short of water, is found to be 55%, 54%, 56%,

and 57% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.52 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

The percentage deficits in meeting the total annual water demands of a given purpose in Ponnanai Ar sub-basin, i.e., the deviations from the annual total of target demands of the given purpose, at the medium and minor projects and major projects, for the various water exports from Mettur reservoir to the sub-basins below Mettur, for different water year dependable flows are presented in Figure 8.2.8.

The variation in annual irrigation from major, medium and minor projects vs... various percent water year dependable flows in the sub-basin is given in Figure 8.4.9.

# 8.2.3.14 Upper Coleroon sub-basin

In the case of Upper Coleroon sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily. But the upstream annual demands

for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the upstream annual irrigation at various medium and minor projects in the sub-basin, which are short of water, is found to be 26%, 23%, 27%, and 28% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.63 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

#### 8.2.3.15 Lower Coleroon sub-basin

In the case of Lower Coleroon sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily. But the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the upstream annual irrigation at various major projects in the sub-basin, which are short of water, is found to be 46%, 43%, 48%, and 49% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export

of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.50 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

#### 8.2.3.16 Cauvery Delta sub-basin

In the case of Cauvery Delta sub-basin, the LP model results show that when water is exported from Mettur reservoir, to the sub-basins below Mettur (export equal to 5800 MCM) and to the out side the Cauvery basin; for all the water year dependable flows, the upstream annual water demands for water supply at the medium and minor projects are met satisfactorily. But the upstream annual demands for irrigation at the medium and minor projects are not met satisfactorily. The annual total of the deficits in the downstream annual irrigation at various major projects in the sub-basin, which are short of water, is found to be 63%, 62%, 64%, and 65% for the 75%, 50%, 90%, and 100% water year dependable flows, respectively, for the export of water from Mettur reservoir to the sub-basins below Mettur is as per the CWDTIA. The annual water utilization factor computed for this sub-basin is 0.40 for the 75% water year dependable flow, and for other flow conditions the values are estimated and given in Table 8.1.

The trade-offs between the annual total of all the water demands met at various projects and remaining areas in the sub-basin, with the annual water exports from Mettur reservoir to the sub-basins below Mettur, for various water year dependable flows, for the upstream annual demands at the medium and minor projects, and for the downstream annual demands at the major projects are given in Figures 8.1.1 to 8.1.5, respectively.

#### 8.3 ANALYSIS OF LP MODEL RESULTS WITH CROP CONSIDERATIONS

#### 8.3.1 General

The LP model was run for the objective functions given by equations 5.2.1-II, 5.2.2, 5.2.3 and 5.2.4, with crops being considered as the decision variables in the model, and the results were obtained for all the objectives for analysis, only for the 75% annual dependable flow. The model runs were made at the individual project/site level, i.e., for all the 15 major projects in the Cauvery river system. The surface water contribution as diversions for irrigation from a reservoir, were made available from the LP model results in Section 8.2. Similarly, the ground water contributions towards irrigation were also obtained from the results in Section 8.2. The model was run for monthly time periods on an annual basis. The results are given in Table 7.2.1 to Table 7.2.15.

### 8.3.2 Analysis at the Individual Project/Site Level

# 8.3.2.1 Major Projects in Upper Cauvery sub-basin above Mettur

The results show that at the major projects 1,2,3,4 and 5, i.e., at the reservoirs Yagachi, Hemavathi, Harangi, Cauvery and Krishnarajsagar (KRS), the annual water diversions made available for irrigation from each reservoir and the annual ground

water available, is sufficient to meet the irrigation water needs for the crop areas proposed in the project report, in order to maximize the objective functions for (i) maximization of area to be irrigated, (ii) maximization of annual irrigation water utilization and (iii) maximization of the total annual returns from the crops in the respective sub-basins. But in order to maximize the objective function for annual food production from various crops, to meet the minimum food requirements of the agricultural population in the command areas of the respective major projects, these available annual water diversions and the ground water resource is not sufficient. From the model results in Table 7.2.1, it is seen that, this deficiency in water availability in meeting the irrigation water requirements of the crops at Yagachi, resulted in crop areas for the pulses and oilseed are 13% and 42%, of crop areas mentioned in the project report and 53% for oilseeds of the minimum crop areas needed for the minimum annual food production, respectively.

In case of Hemavathi (Table 7.2.2), the deficiency in water availability in meeting the irrigation water requirements of the crops for the pulses, oilseeds and vegetables are 43%, 100% and 100%, respectively. In case of the Harangi, Cauvery and KRS projects, the irrigation water demands for the cereal crops are met satisfactorily, but the irrigation water demands for pulses and oil seeds are not met at all.

# 8.3.2.2 Major Projects in Kabini sub-basin above Mettur

In case of the sites 6, 7, 8, 9, 10, 11 and 12, i.e., at the reservoirs Banasursagar, Mananthvady, Kabini, Taraka, Sagardoddakere, Upper Nugu and Nugu, the annual demands for irrigation projects for the proposed crop areas for the objective functions for (i) maximization of area to be irrigated, (ii) maximization of annual water

utilization and (iii) maximization of net benefits from the crops proposed in the respective sub-basins are met satisfactorily. But the annual water demands for the crop area for the objective function of maximization of food production to meet the minimum food requirements of the agricultural population in the command areas of the respective major projects are not met satisfactorily. In the objective function of maximization of food production to meet the minimum food requirements of the agricultural population in the command areas of the respective major projects in case of the sites 7, 9 and 11, i.e., at the reservoirs Mananthvady, Taraka and Nugu the irrigation annual water demands are not met satisfactorily. In case of Mananthvady project the annual irrigation requirements satisfied for the crops are 0%, 0%, 26%, 2%, 24%, and 2% for Kharif Paddy, Kharif Jowar, Ragi, pulses, fruits and vegetables, and groundnut, respectively. In case of Upper Nugu the annual irrigation demands satisfied for Kharif Paddy, Rabi Paddy and groundnut are 31%, 10% and 16% respectively. The annual irrigation demands incase of pulses and fruit and vegetables are 300% and 160% respectively.

# 8.3.2.3 Major Projects in Chinnar sub-basin above Mettur

In case of the Mettur reservoir, i.e., major project 13, the annual demands for irrigation projects for the proposed crop areas for the objective functions for (i) maximization of area to be irrigated, (ii) maximization of annual water utilization and (iii) maximization of net benefits from the crops proposed in the respective subbasins are met satisfactorily. The annual irrigation demands for the cereal crops are met satisfactorily. In case of Mettur the irrigation demand for minimum food requirement case the pulses of 150% area can be irrigated, for oil crops the demand is satisfied 33%.

#### 8.3.2.4 Major Projects in Bhavani, and Amaravathi sub-basins below Mettur

In case of the Bhavani and Amaravathi reservoirs, i.e., major projects 14 and 15, the annual demands for irrigation projects for the proposed crop areas for the objective functions for (i) maximization of area to be irrigated, (ii) maximization of annual water utilization and (iii) maximization of net benefits from the crops proposed in the respective sub-basins are met satisfactorily. The annual irrigation demands for the cereal crops are met satisfactorily. In case of lower Bhavani the Kharif Paddy the irrigation of 60% is possible.



Table 8.1: Computed Annual Water Utilization Factors from LP Model Results
Under Different Scenario for 75% Water Year Dependable Flow

| Sl.No.      | Name of Sub-Basins | Exports from<br>Mettur Reservoir | utilization factor-with |                      |              |      |              |                           |
|-------------|--------------------|----------------------------------|-------------------------|----------------------|--------------|------|--------------|---------------------------|
|             |                    |                                  | sw                      | s\ <del>v+</del> imp | sw+imp+swr   | g.w. | gw+gwr       | sw+imp+s<br>wr+gw+g<br>wr |
| (1)         | (2)                | (3)                              | (4)                     | (5)                  | (6)          | (7)  | (8)          | (9)                       |
|             | Upper Cauvery      | 4200                             | 0.40                    | 0.40                 | 1.00         | 1.00 | 0.83         |                           |
| 2           | Upper Cauvery      | 5800                             | 0.40                    | 0.40                 | 1.00         | 1.00 | 0.83         |                           |
| 3           | Upper Cauvery      | 6200                             | 0.36                    | 0.36                 | 1.00         | 1.00 | 0.83         |                           |
| 4           | Upper Cauvery      | 7200                             | 0.35                    | 0.35                 | 1.00         | 1.00 | 0.83         |                           |
| 5           | Kabini             | 4200                             | 0.91                    | 0.82                 | 0.92         | 0.94 | 0.79         |                           |
| 6           | Kabini             | 5800                             | 0.90                    | 0.82                 | 0.92         | 0.94 | 0.79         |                           |
| 7           | Kabini             | 6200                             | 0.89                    | 0.81                 | 0.92         | 0.94 | 0.79         |                           |
| 8           | Kabini             | 7200                             | 0.89                    | 0.81                 | 0.92         | 0.94 | 0.79         |                           |
| 9           | Shimsha<br>Shimsha | 4200                             | 1.00                    | 0.29                 | 0.31         | 1.00 | 0.81         |                           |
| 11          | Shimsha            | 5800                             | 1.00                    | 0.28                 | 0.31         | 1.00 | 0.81         |                           |
| 12          | Shimsha            | 7200                             | 1.00                    | 0.28                 |              | 1.00 | 18.0         |                           |
| 13          | Arkavathi          | 4200                             | 0,81                    | 0.27                 | 0.31<br>0.53 | 1.00 | 0.81<br>0.61 |                           |
| 14          | Arkavathi          | 5800                             | 0.71                    | 0.34                 | 0.53         | 1.00 | 0.61         |                           |
| 15          | Arkavathi          | 6200                             | 0.71                    | 0.29                 | 0.51         | 1.00 | 0.61         |                           |
| 16          | Arkavathi          | 7200                             | 0.67                    | 0.28                 | 0.51         | 1.00 | 0.61         |                           |
| 17          | Middle C.          | 4200                             | 6.67                    | 1.00                 | 0.30         | 1.00 | 0.84         |                           |
| 18          | Middle C.          | 5800                             | 5.16                    | 0.89                 | 0.28         | 1.00 | 0.84         |                           |
| 19          | Middle C.          | 6200                             | 4.85                    | 0.84                 | 0.28         | 1.00 | 0.84         |                           |
| 20          | Middle C.          | 7200                             | 4.55                    | 0.78                 | 0.28         | 1.00 | 0.84         |                           |
| 21          | Suvamavathi        | 4200                             | 1.00                    | 0.13                 | 0.16         | 1.00 | 0.71         |                           |
| 22          | Suvamavathi        | 5800                             | 1.00                    | 0.13                 | 0.16         | 1.00 | 0.71         |                           |
| 23          | Suvamavathi        | 6200                             | 1.00                    | 0.13                 | 0.16         | 1.00 | 0.71         | 0.20                      |
| 24          | Suvarnavathi       | 7200                             | 1.00                    | 0.13                 |              | 1.00 | 0.71         |                           |
| 25          | Palar              | 4200                             | 0.51                    | 0.51                 | 1.00         | 0.95 | 0.76         |                           |
| 26          | Palar              | 5800                             | 0.51                    | 0.51                 | 1.00         | 0.95 | 0.76         |                           |
| 27          | Palar              | 6200                             | 0.55                    | 0.55                 | 1.00         | 0.95 | 0.76         |                           |
| 28          | Palar              | 7200                             | 0.55                    | 0.55                 | 1.00         | 0.95 | 0.76         |                           |
| 29          | Chimar             | 4200                             | 1.00                    | 1.00                 | 1.00         | 0.90 |              |                           |
| 30          | Chinnar            | 5800                             | 1.00                    | 1.00                 | 1.00         | 0.90 | 0.73         |                           |
| 31 32       | Chinnar            | 6200                             | 1.00                    | 1.00                 | 1.00         | 0.90 | 0.73         |                           |
| <del></del> | Chinnar            | 7200                             | 1.00                    | 1.00                 | 1.00         | 0.90 | 0.73         |                           |
| 33          | Bhavani            | 4200                             | 0.59                    |                      |              | 0.95 | 0.74         | 0.52                      |
| 34          | Bhavani            | 5800                             | 0.59                    | 0.58                 | 0.99         | 1.00 | 0.78         | 0.52                      |
| 35          | Bhavani            | 6200                             | 0.56                    | 0.56                 | 0.99         | 1.00 | 0.78         | 0.51                      |
| 36          | Bhavani            | 7200                             | 0.62                    | 0.61                 | 0.99         | 1.00 | . 0.78       | 0.53                      |
| 37          | Noyil              | 4200                             | 0.58                    | 0.20                 | 0.42         | 0.60 | 0.48         | 0.19                      |
| 38          | Noyil              | 5800                             | 0.58                    | 0.20                 | 0.42         | 0.60 | 0.48         | 0.19                      |
| 39          | Noyil              | 6200                             | 0.75                    |                      |              | 0.60 |              |                           |
| 40          | Noyil              | 7200                             | 0.75                    | 0.25                 |              | 0.60 | 0.48         | <del>-</del>              |
| 41          | Amaravathi         | 4200                             | 1.31                    | 0.86                 | 0.74         | 0.81 | 0.65         | <del></del>               |
| 42          | Amaravathi         | 5800                             | 1.26                    | 0.83                 | 0.74         | 0.78 |              | <del> </del>              |
| 43          | Amaravathi         | 6200                             | 1.12                    | 0.73                 | 0.74         | 0.78 |              | <del> </del>              |
| 44          | Amaravathi         | 7200                             | 1.12                    | 0.73                 | 0.73         | 0.78 | 0.62         | 0.57                      |
| 45          | Tirumanimuttar     | 4200                             | 1.30                    | 0,35                 | 0.41         | 1.00 | 0.58         | 0.33                      |
| 46          | Tirumanimuttar     | 5800                             | 1,50                    | 0.40                 | 0.42         | 1.00 | 0.58         | 0.36                      |
| 47          | Tirumanimuttar     | 6200                             | 1.43                    | 0.38                 | 0.41         | 1.00 | 0.58         | 0.35                      |

Table 8.1 (Contd...)

| Sl.No. | Name of Sub-<br>Basins | Exports from Mettur Reservoir | utilization factor-with |        |            |      |        |                           |
|--------|------------------------|-------------------------------|-------------------------|--------|------------|------|--------|---------------------------|
|        |                        |                               | SW                      | sw+imp | sw+imp+swr | g.w. | gw+gwr | sw+imp+<br>swr+gw+<br>gwr |
| (1)    | (2)                    | (3)                           | (4)                     | (5)    | (6)        | (7)  | (8)    | (9)                       |
| 48     | Tirumanimuttar         | 7200                          | 1.66                    | 0.45   | 0.43       | 1.00 | 0.58   | 0.38                      |
| 49     | Ponnanai Ar            | 4200                          | 2.01                    | 0.58   | 0.48       | 0.94 | 0.81   | 0.51                      |
| 50     | Ponnanai Ar            | 5800                          | 2.05                    | 0.59   | 0.48       | 0.94 | 0.81   | 0.52                      |
| 51     | Ponnanai Ar            | 6200                          | 3.49                    | 1.01   | 0.57       | 0.94 | 0.81   | 0.64                      |
| 52     | Ponnanai Ar            | 7200                          | 3.54                    | 1.03   | 0.57       | 0.94 | 0.81   | 0.65                      |
| 53     | Upper Coleroon         | 4200                          | 1.46                    | 0.74   | 0.59       | 0.85 | 0.72   | 0.63                      |
| 54     | Upper Coleroon         | 5800                          | 1.46                    | 0.74   | 0.59       | 0.85 | 0.72   | 0.63                      |
| 55     | Upper Coleroon         | 6200                          | 1.50                    | 0.76   | 0.60       | 0.85 | 0.72   | 0.63                      |
| 56     | Upper Coleroon         | 7200                          | 1.50                    | 0.76   | 0.60       | 0.85 | 0.72   | 0.63                      |
| 57     | Lower Coleroon         | 4200                          | 3.06                    | 0.53   | 0.27       | 0.93 | 0.82   | 0.50                      |
| 58     | Lower Coleroon         | 5800                          | 3.06                    | 0.53   | 0.27       | 0.93 | 0.82   | 0.50                      |
| 59     | Lower Coleroon         | 6200                          | 3.18                    | 0.55   | 0.28       | 0.93 | 0.82   | 0.51                      |
| 60     | Lower Coleroon         | 7200                          | 3.18                    | 0.55   | 0.28       | 0.93 | 0.82   | :0,51                     |
| 61     | Cauvery Delta          | 4200                          | 3.94                    | 0.43   | 0.19       | 1.00 | 0.57   | 0.39                      |
| 62     | Cauvery Delta          | 5800                          | 4,04                    | 0.44   | 0,19       | 1.00 | 0.57   | 0.40                      |
| 63     | Cauvery Delta          | 6200                          | 4.07                    | 0.44   | 0.18       | 1.00 | 0.57   | 0.41                      |
| 64     | Cauvery Delta          | 7200                          | 4.26                    | 0.46   | 0.18       | 1.00 | 0.57   | 0.43                      |

Note: (1) sw = Surface water; sw + imp = Surface water + imports.

sw + imp + swr = Surface water + imports + regenerations from surface water use;

g.w. = Ground water

gw+gwr = Ground water + regenerations from ground water use

sw+imp+swr+gw+gwr = Surface water + imports + regenerations from surface water use + ground water + regenerations from ground water use

- (2) The utilization factors calculated from LP model, where, if the utilization factor is less than one, the surplus water is available; however, when the utilization factor is equal to one, it means the demands are completely met with the following interpretations:
  - (i) the available water is less than the demands, and (ii) the available water is more than the demands and a part of available water is being diverted optimally to downstream sub-basins. This shows the impact of storages and locations on water utilization. This is because, the entire river system is considered as one, unlike in water balance studies where each sub-basin was considered independently.

The annual water utilization factor is defined as the ratio of the amount of water utilized and total quantity of water available from surface water and ground water.

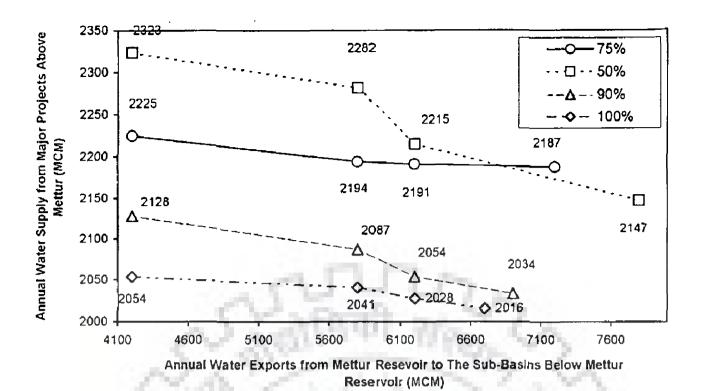


Figure 8.1.1(a): Trade Off Between Annual Water Supply from Major Projects
Above Mettur and Annual Water Exports from Mettur Reservoir
to the Sub Basins Below Mettur for Different Water Year

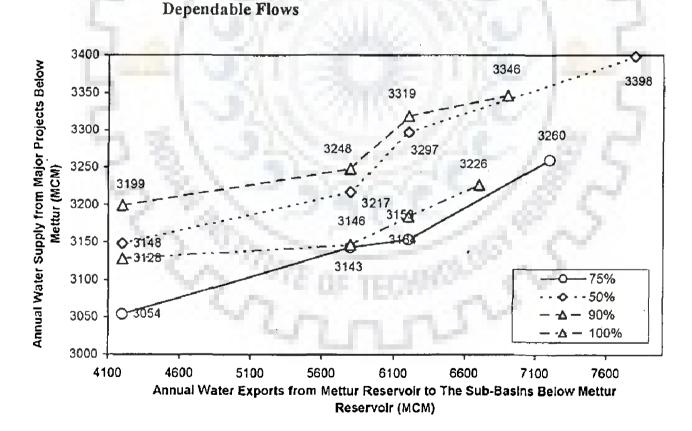


Figure 8.1.1(b): Trade Off Between Annual Water Supply from Major Projects
Below Mettur and Annual Water Exports from Mettur Reservoir
to the Sub Basins Below Mettur for Different Water Year
Dependable Flows

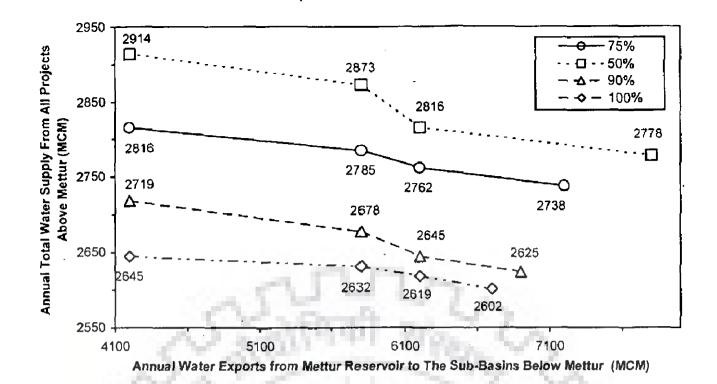


Figure 8.1.2(a): Trade Off Between Annual Total Water Supply Above Mettur and Above Mettur Reservoir and Annual Water Exports from Mettur Reservoir to the Sub Basins Below Mettur for Different Water Year Dependable Flows

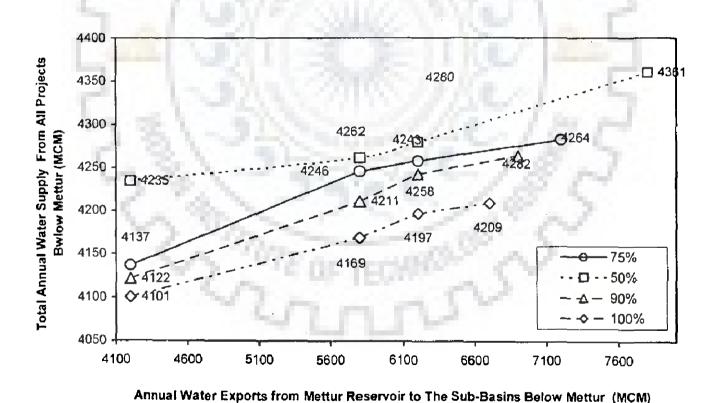


Figure 8.1.2(b): Trade Off Between Total Annual Water Supply Below Mettur and Annual Water Exports from Mettur Reservoir to the Sub Basins Below Mettur for Different Water Year Dependable Flows

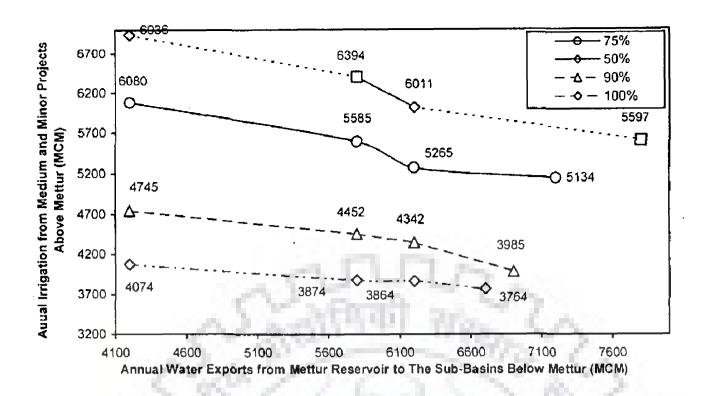


Figure 8.1.3(a): Trade Off Between Annual Irrigation from Medium and Minor Projects Above Mettur and Annual Water Exports from Mettur Reservoir to the Sub Basins Below Mettur for Different Water Year Dependable Flows

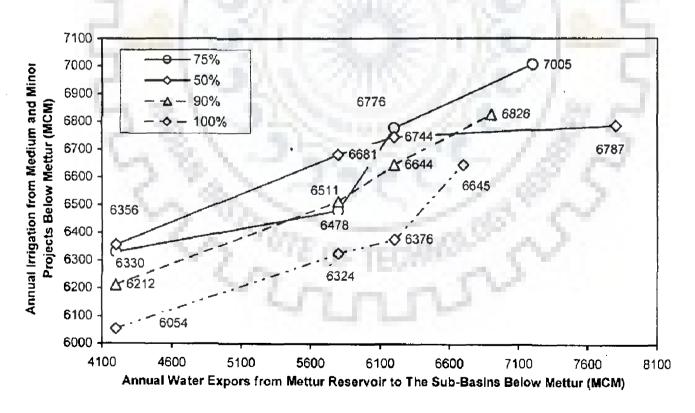


Figure 8.1.3(b): Trade Off Between Annual Irrigation from Medium and Minor Projects Below Mettur and Annual Water Exports from Mettur Reservoir to the Sub Basins Below Mettur for Different Water Year Dependable Flows

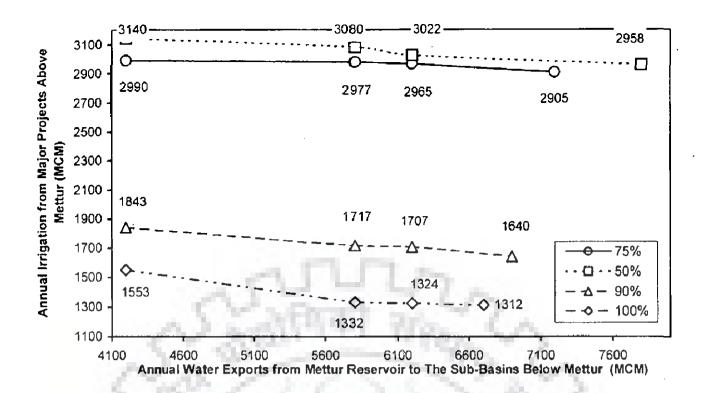


Figure 8.1.4(a): Trade Off Between Annual Irrigation from Major Projects
Above Mettur and Annual Water Exports from Mettur Reservoir
to the Sub Basins Below Mettur for Different Water Year
Dependable Flows

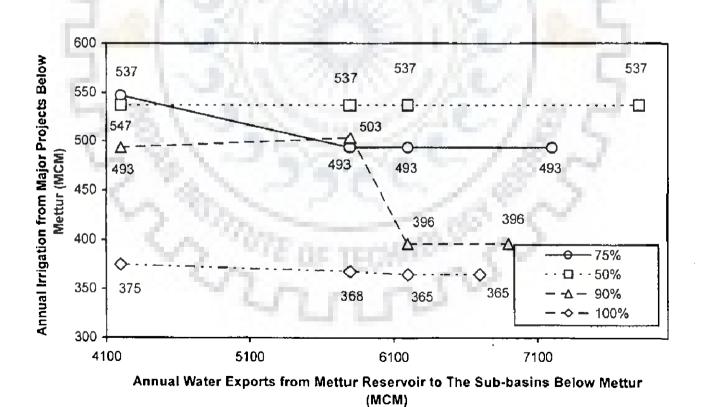
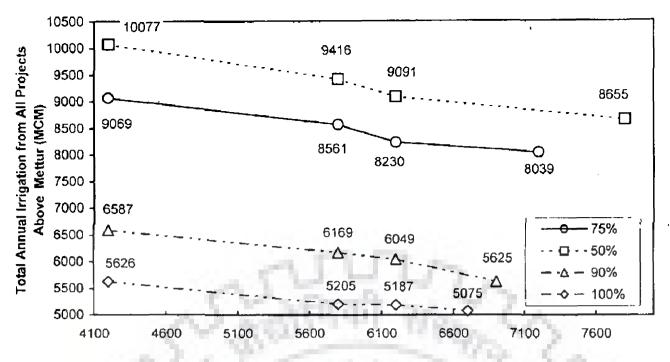


Figure 8.1.4(b): Trade Off Between Annual Irrigation from Major Projects
Below Mettur and Annual Water Exports from Mettur Reservoir
to the Sub Basins Below Mettur for Different Water Year
Dependable Flows



Annual Water Exports from Mettur to The Sub-Basins Below Mettur (MCM)

Figure 8.1.5(a): Trade Off Between Annual Total Irrigation Above Mettur and and Annual Water Exports from Mettur Reservoir to the Sub Basins Below Mettur for Different Water Year Dependable Flows

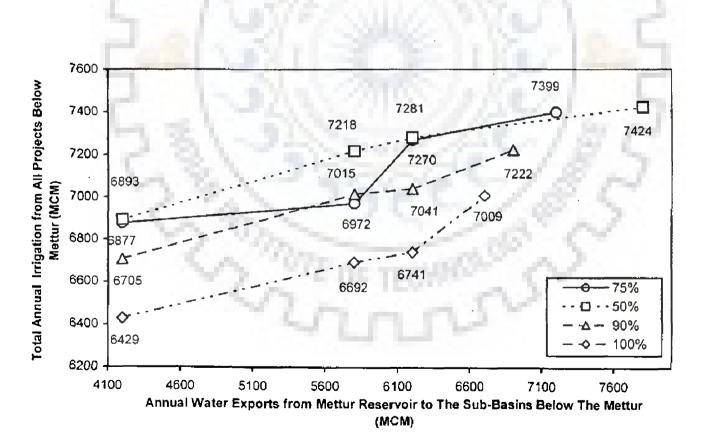


Figure 8.1.5(b): Trade Off Between Annual Total Irrigation Below Mettur and and Annual Water Exports from Mettur Reservoir to the Sub Basins Below Mettur for Different Water Year Dependable Flows

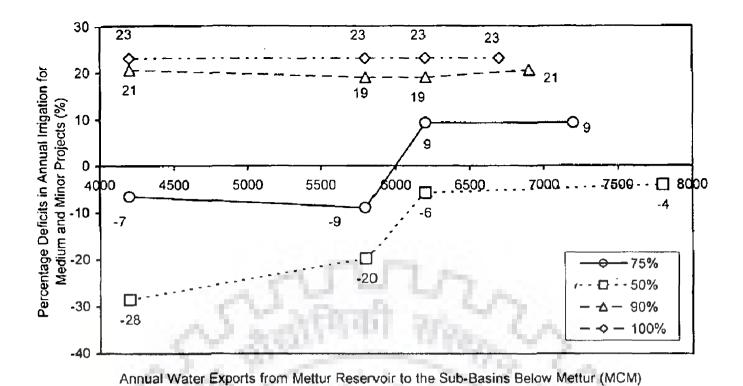
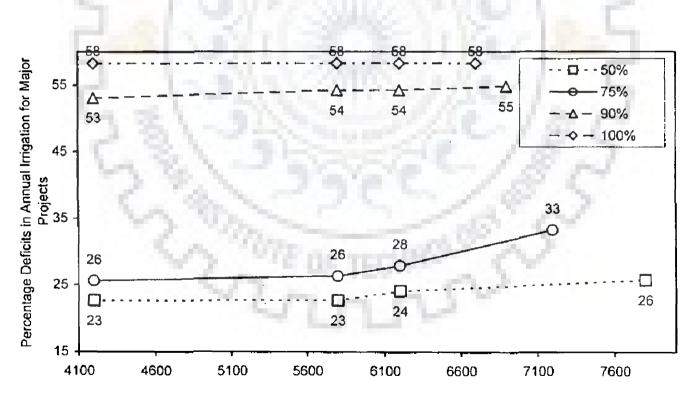


Figure 8.2.1(a): Percentage Deficit in Annual Irrigation for Medium and Minor Projects in Upper Cauvery Sub-Basin vs. Annual Water Exports

from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)



Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

Figure 8.2.1(b): Percentage Deficit in Annual Irrigation for Major Projects in Upper Cauvery Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

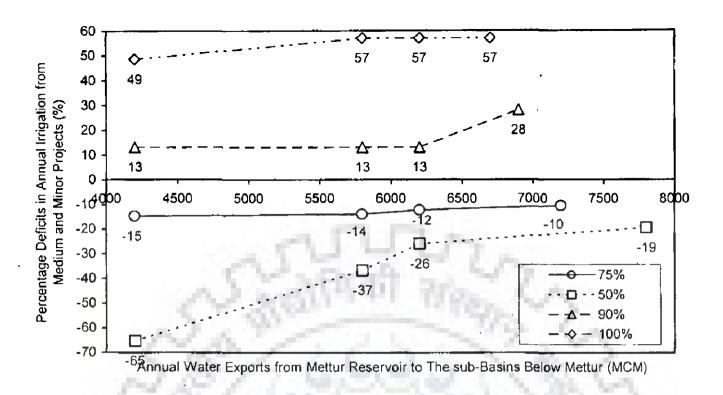


Figure 8.2.2(a): Percentage Deficits in Annual Irrigation for Medium and Minor Projects in Kabini Sub-Basin vs. Annual Water Exports to the Sub-Basins Below Mettur (MCM)

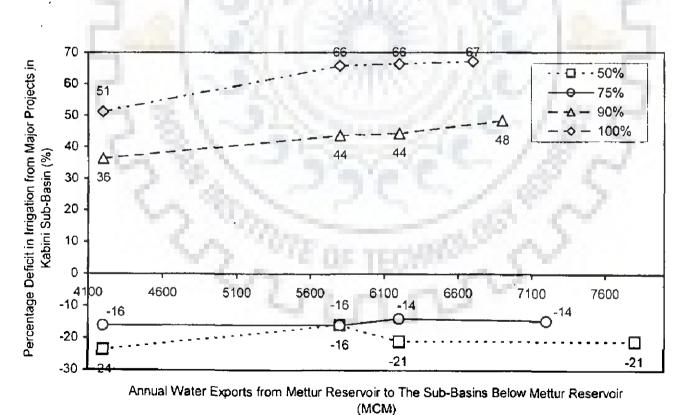


Figure 8.2.2(b): Percentage Deficits in Annual Irrigation for Major Irrigation Projects in Kabini Sub-Basin vs. Annual Water Exports to the Sub-Basins Below Mettur (MCM)

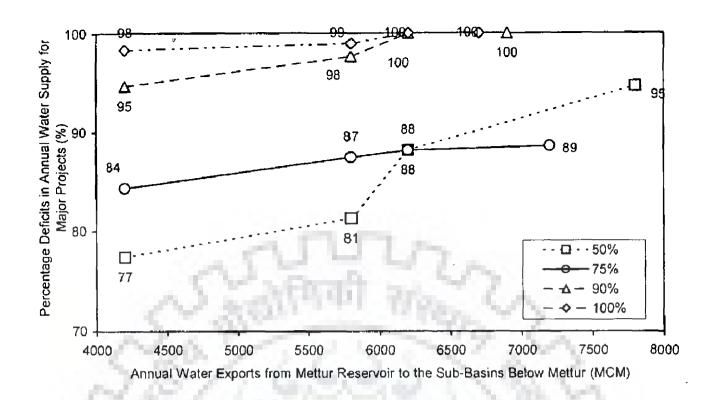


Figure 8.2.3(a): Percentage Deficit in Annual Water Supply for Major Projects in Arkavathi Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

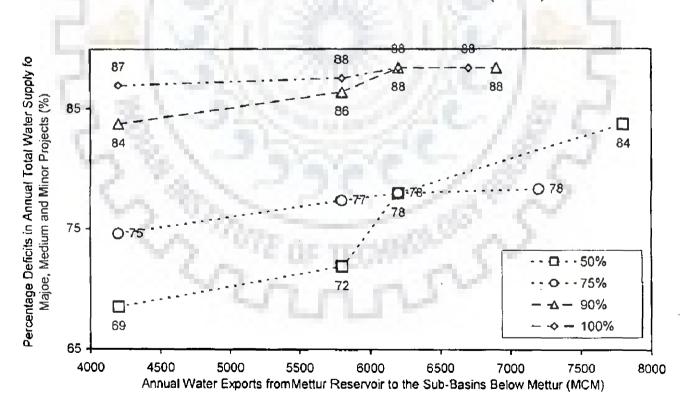


Figure 8.2.3(b): Percentage Deficit in Annual Water Supply for Major, Medium and Minor Projects in Arkavathi Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

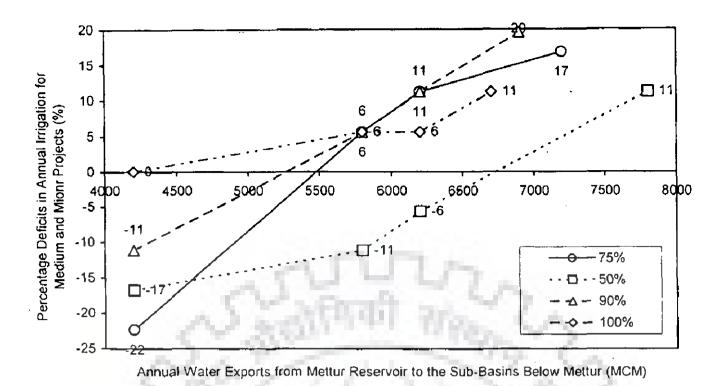


Figure 8.2.4(a): Percentage Deficit in Annual Irrigation for Medium and Minor Projects in Middle Cauvery Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

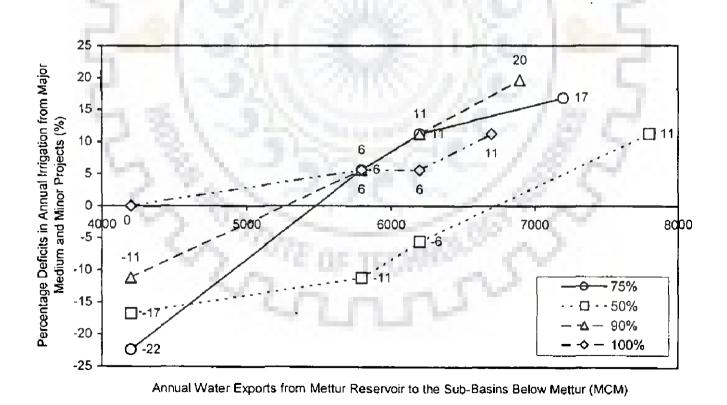


Figure 8.2.4(b): Percentage Deficit in Annual Irrigation for Major, Medium and Minor Projects in Middle Cauvery Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

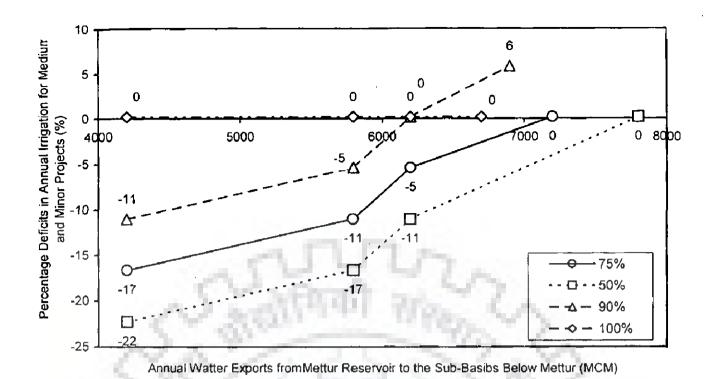


Figure 8.2.5(a): Percentage Deficit in Annual Irrigation for Medium and Minor Projects in Chinnar Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

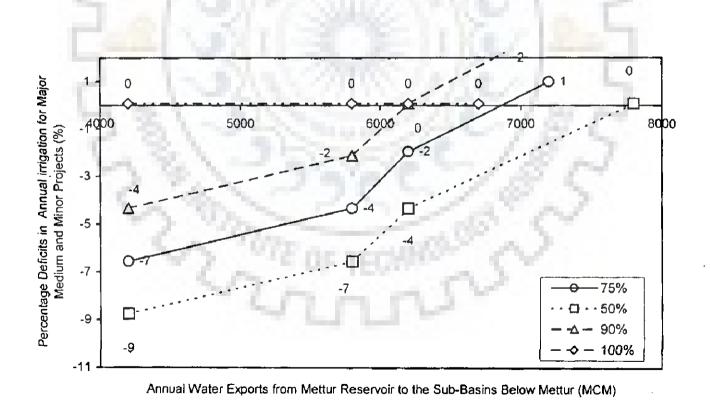
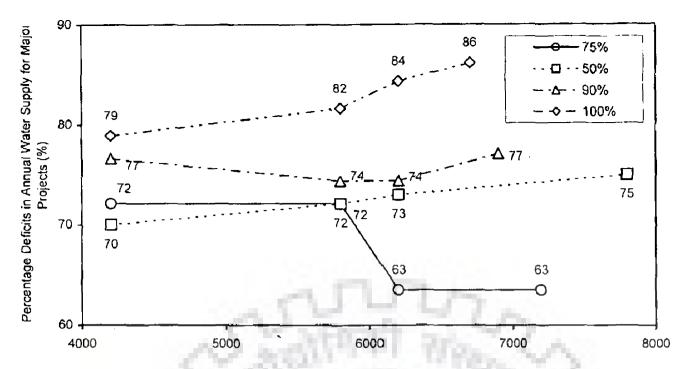


Figure 8.2.5(b): Percentage Deficit in Annual Irrigation for Major Projects in Chinnar Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)



Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

Figure 8.2.6(a): Percentage Deficit in Annual Water Supply for Medium and Minor Projects in Suvarnavathi Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

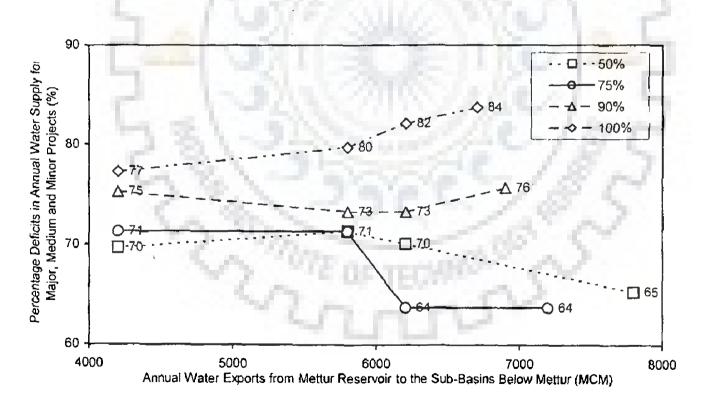
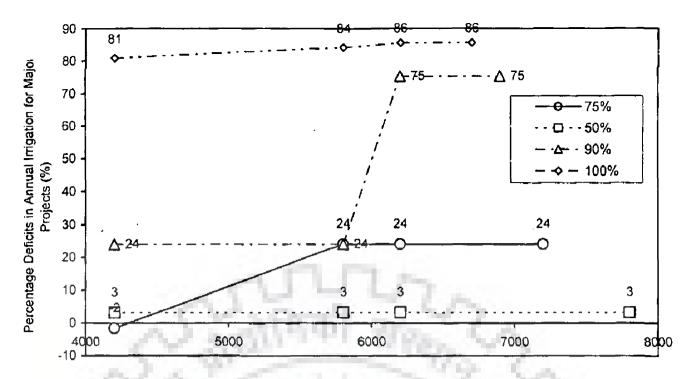
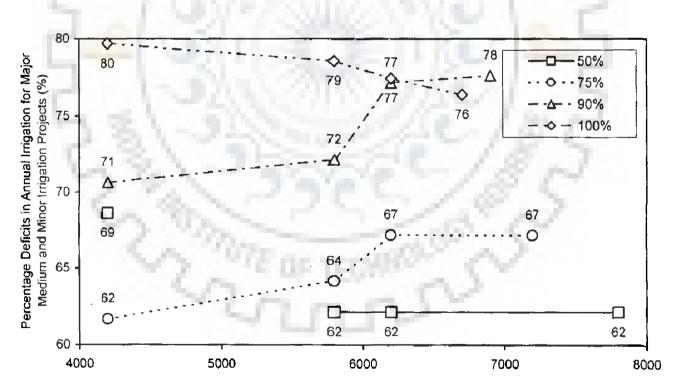


Figure 8.2.6(b): Percentage Deficit in Annual Water Supply for Major, Medium and Minor Projects in Suvarnavathi Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)



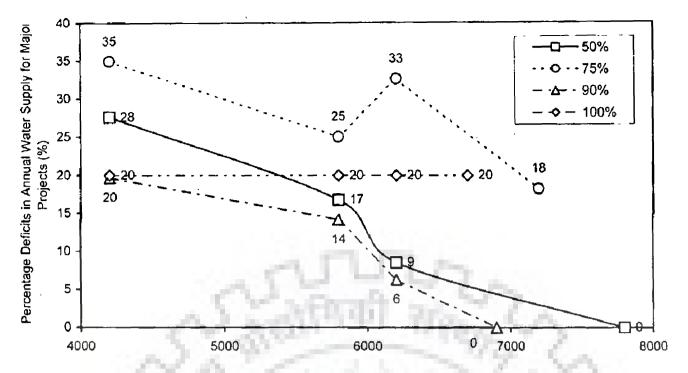
Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

Figure 8.2.7(a): Percentage Deficit in Annual Irrigation for Major Projects in Amaravathi Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)



Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur Dam (MCM)

Figure 8.2.7(b): Percentage Deficit in Annual Irrigation for Major, Medium and Minor Irrigation Projects in Amravathi Sub-Basin vs. Annual Water Exports from Mettur Reservoirto the Sub-Basins Below Mettur (MCM)



Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur Dam (MCM)

Figure 8.2.8(a): Percentage Deficit in Annual Water Supply for Major Projects in Tirumanimuttar Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

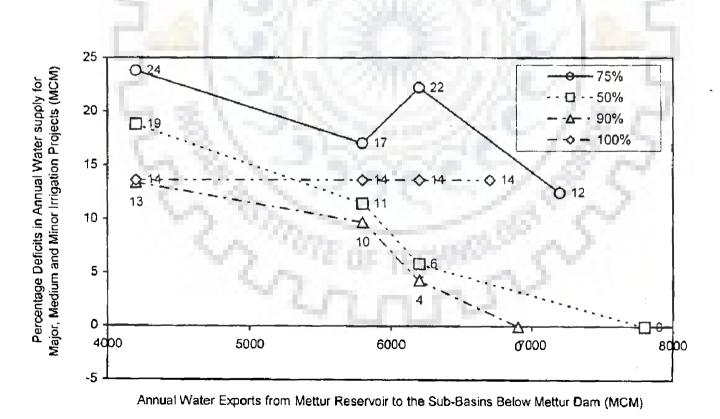


Figure 8.2.8(b): Percentage Deficit in Annual Water Supply for Major, Medium and Minor Projects in Tirumanimuttar Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

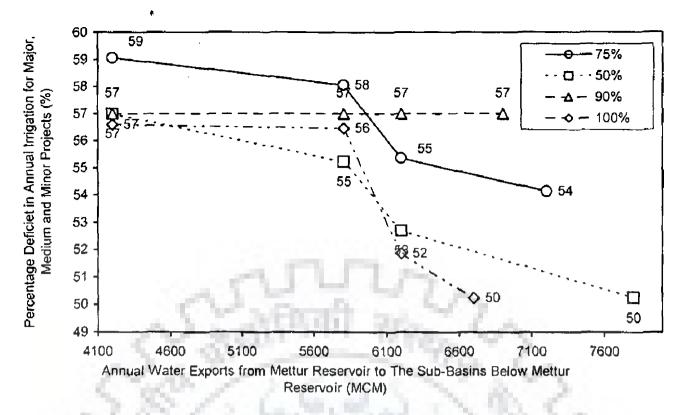


Figure 8.2.9: Percentage Deficit in Annual Irrigation for Major, Medium and Minor Projects in Ponnana Ar Sub-Basin vs. Annual Water Exports from Mettur Reservoir to the Sub-Basins Below Mettur (MCM)

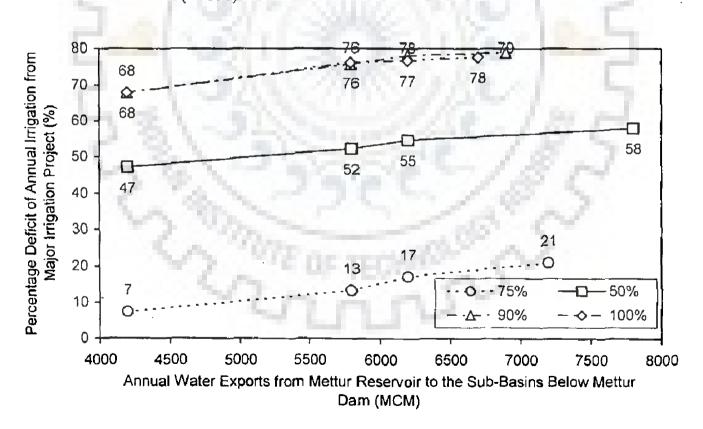


Figure 8.3.1: Graph Between Percentage Deficit of Annual Irrigation vs.
Annual Water Exports from Mettur Reservoir to the Sub-Basins
Below Mettur for Harangi Project

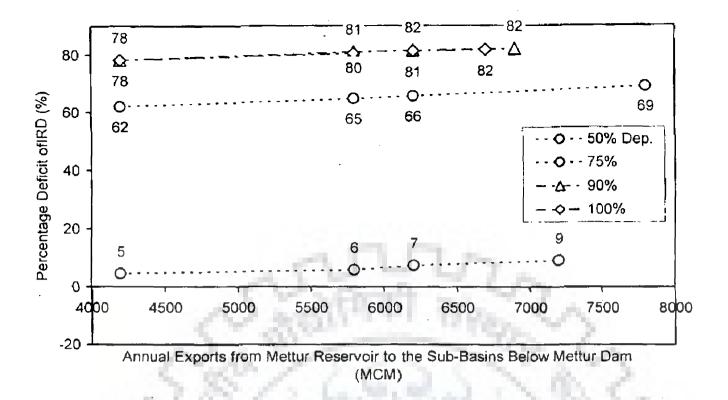


Figure 8.3.2: Graph Between Percentage Deficit of Annual Irrigation vs.

Annual Water Exports from Mettur Reservoir to the Sub-Basins
Below Mettur for Cauvery Project

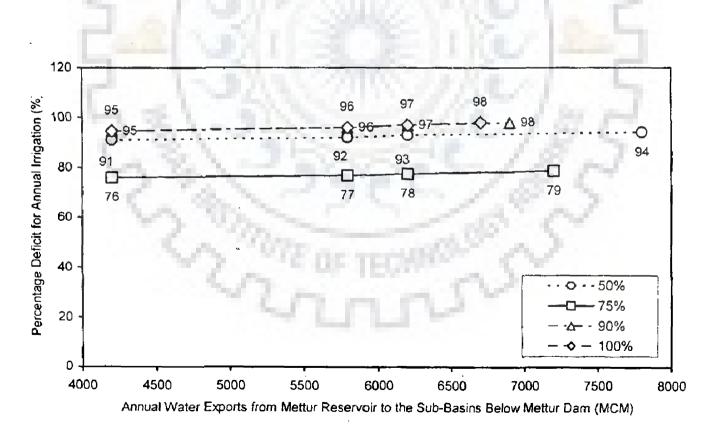


Figure 8.3.3: Graph Between Percentage Deficit of Annual Irrigation vs.
Annual Water Exports from Mettur Reservoir to the Sub-Basins
Below Mettur for Banasurasagar Project

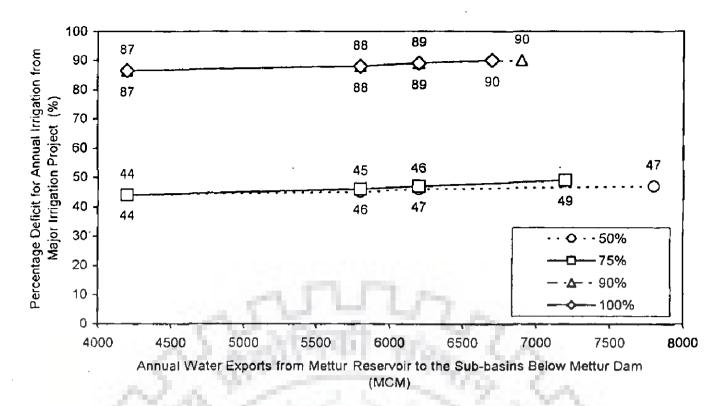


Figure 8.3.4: Graph Between Percentage Deficit of Annual Irrigation vs.

Annual Water Exports from Mettur Reservoir to the Sub-Basins
Below Mettur for Taraka Project

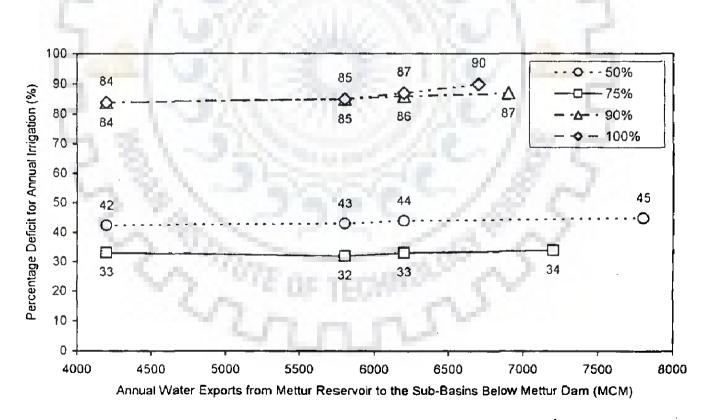


Figure 8.3.5: Graph Between Percentage Deficit of Annual Irrigation vs.

Annual Water Exports from Mettur Reservoir to the Sub-Basins
Below Mettur for Upper Nugu Project

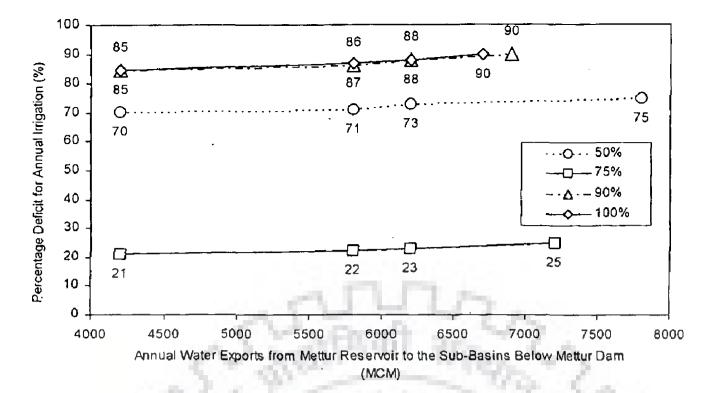


Figure 8.3.6: Graph Between Percentage Deficit of Annual Irrigation vs.

Annual Water Exports from Mettur Reservoir to the Sub-Basins
Below Mettur for Amaravathi Project

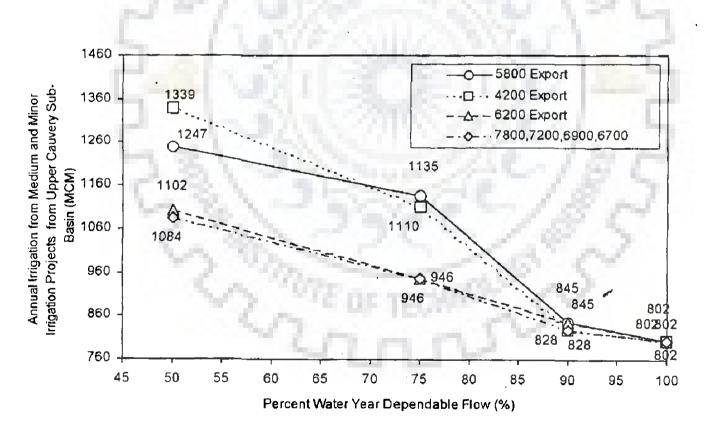


Figure 8.4.1(a): Variation in Annual Irrigation from Medium and Minor Projects vs. Various Percent Water Year Dependable Flows in Upper Cauvery Sub-Basin

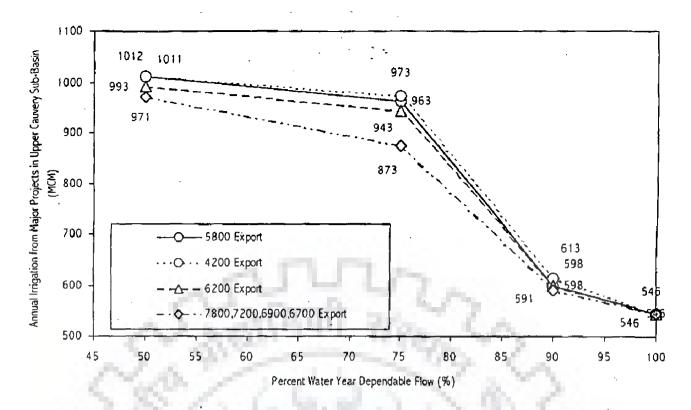


Figure 8.4.1(b): Variation in Annual Irrigation from Major Projects vs. Various

Percent Water Year Dependable Flows in Upper Cauvery SubBasin

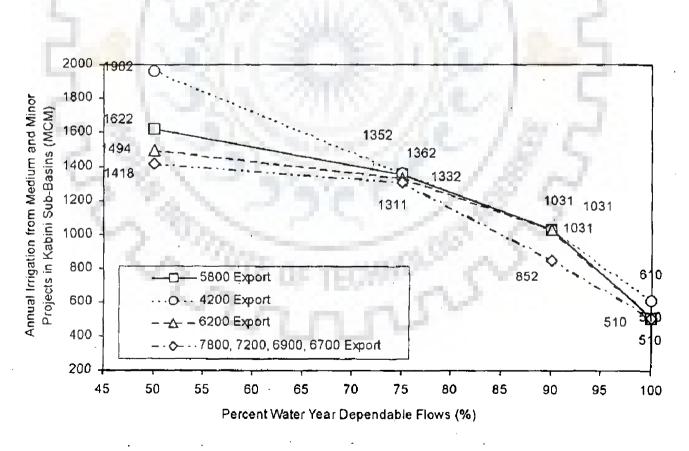


Figure 8.4.2(a): Variation in Annual Irrigation from Medium and Minor Projects
Vs. Various Percent Water Year Dependable Flows in Kabini
Sub-Basin

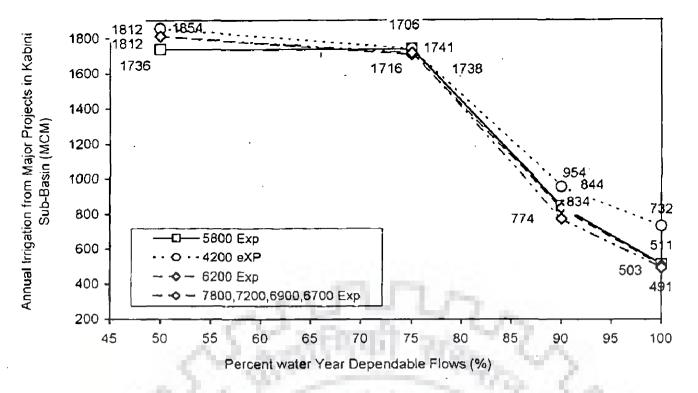


Figure 8.4.2(b): Variation in Annual Irrigation from Major Projects Vs. Various
Percent Water Year Dependable Flows in Kabini Sub-Basin

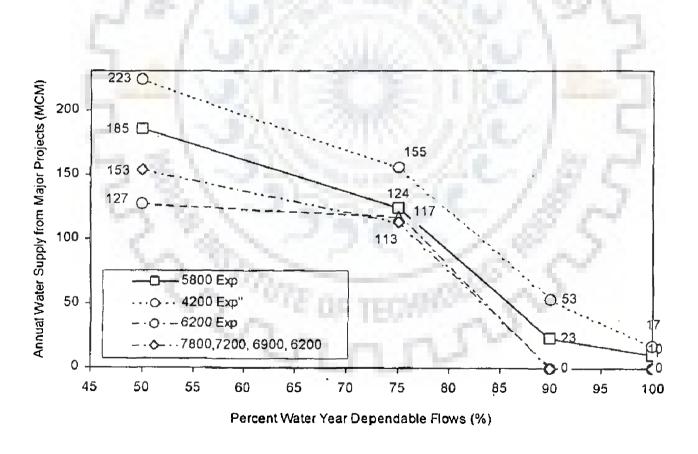


Fig. 8.4.3(a): Variation in Annual water supply from Major Projects Vs. Various Percent Water Year Dependable Flows in Arkavathi Sub-Basin

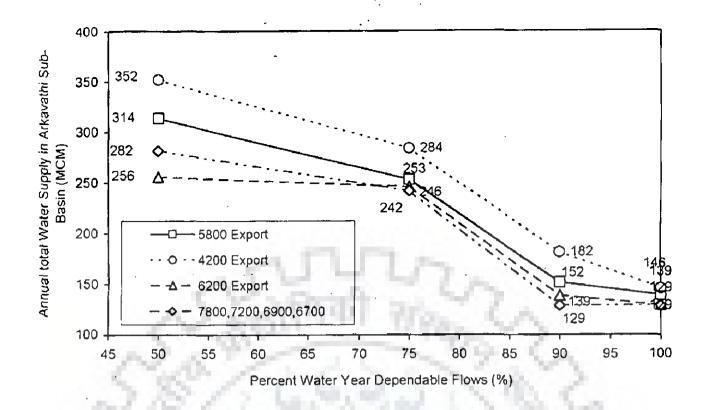


Figure 8.4.3(b): Variation in Annual Total Water Supply from Major, Medium and Minor Projects Vs. Various Percent Water Year Dependable Flows in Arkavathi Sub-Basin

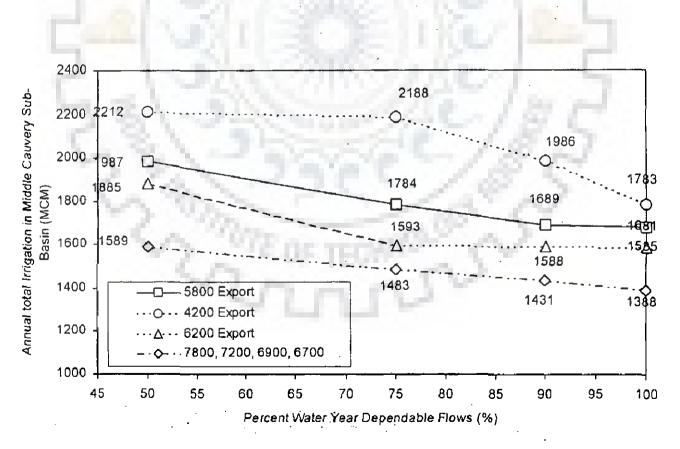


Figure 8.4.4: Variation in Annual Total Irrigation from Major, Medium and Minor Projects Vs. Various Percent Water Year Dependable Flows in Middle Cauvery Sub-Basin

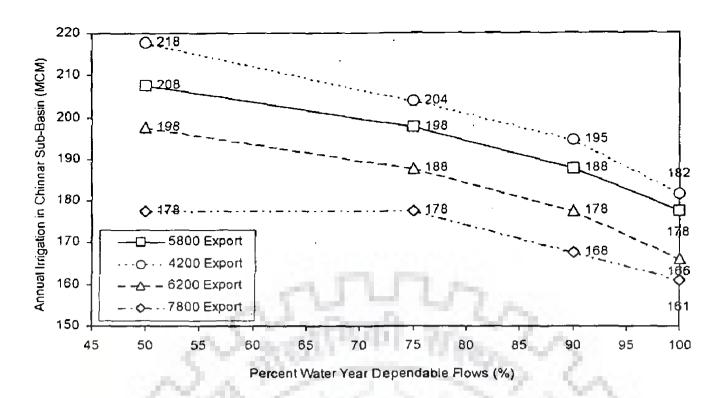


Figure 8.4.5: Variation in Annual Total Irrigation from Major, Medium and Minor Projects vs. Various Percent Water Year Dependable Flows in Chinnar Sub-Basin

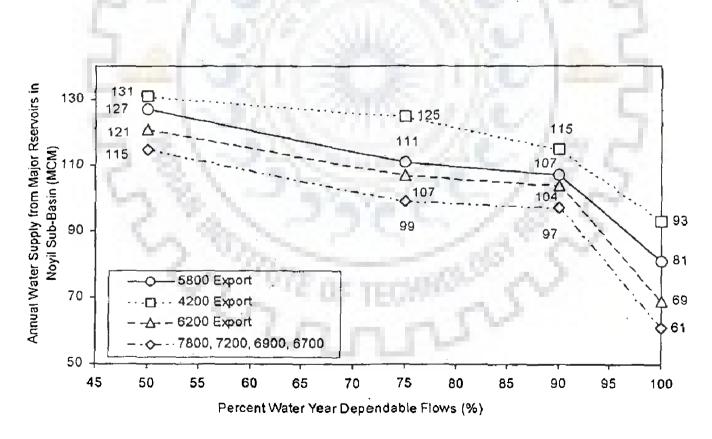


Figure 8.4.6(a): Variation in Annual Total Water Supply from Major Projects with respect to Various Percent Water Year Dependable Flows in Noyil Sub-Basin

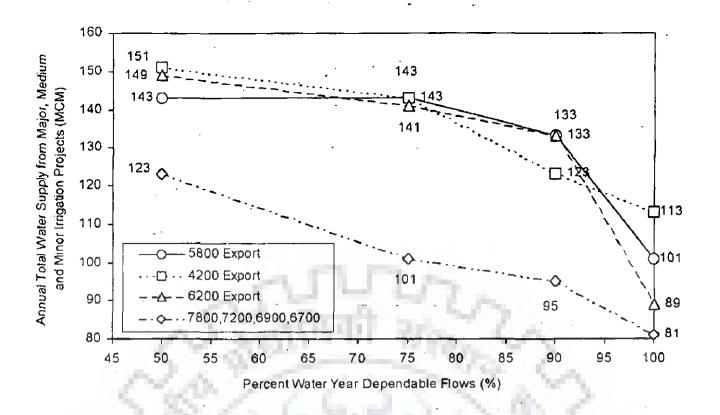


Figure 8.4.6(b): Variation in Annual Total Water Supply from Major, Medium and Minor Projects vs. Various Percent Water Year Dependable Flows in Noyil Sub-Basin

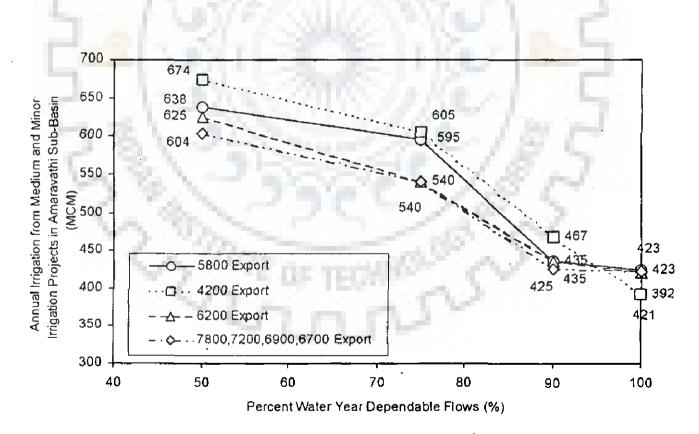


Figure 8.4.7(a): Variation in Annual Irrigation from Medium and Minor Projects vs. Various Percent Water Year Dependable Flows in Amaravathi Sub-Basin

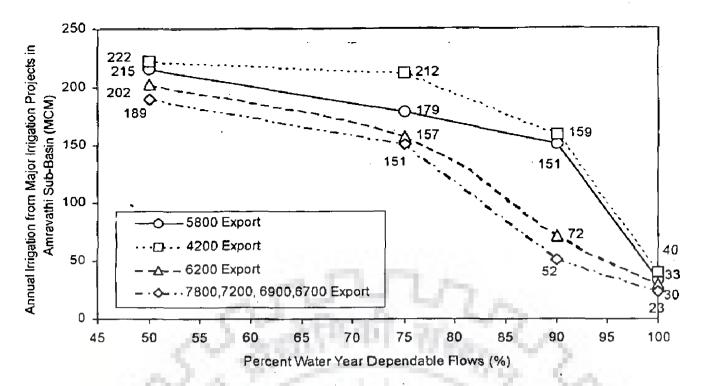


Figure 8.4.7(b): Variation in Annual Irrigation from Major Projects vs. Various Percent Water Year Dependable Flows in Amaravathi Sub-Basin

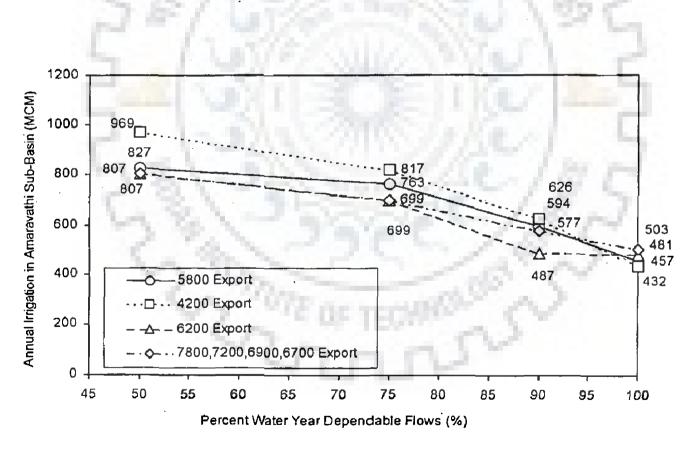


Figure 8.4.7(c): Variation in Annual Irrigation from Major, Medium and Minor Projects vs. Various Percent Water Year Dependable Flows in Amaravathi Sub-Basin

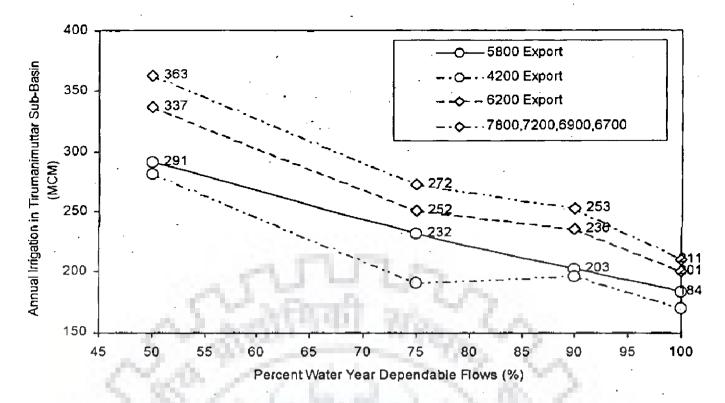


Fig. 8.4.8(a): Variation in Annual Total Irrigation from Major, Medium and Minor Projects with Respect to Various Percent Water Year Dependable Flows in Tirumanimuttar Sub-Basin

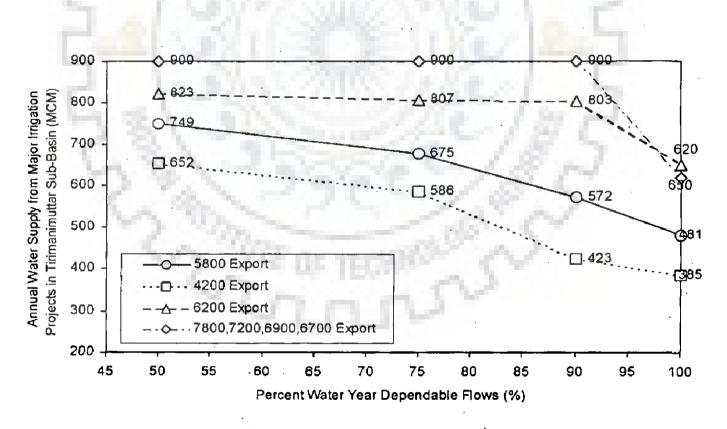


Fig. 8.4.8(b): Variation in Annual Total Water Supply from Major, Projects with Respect to Various Percent Water Year Dependable Flows in Tirumanimuttar Sub-Basin

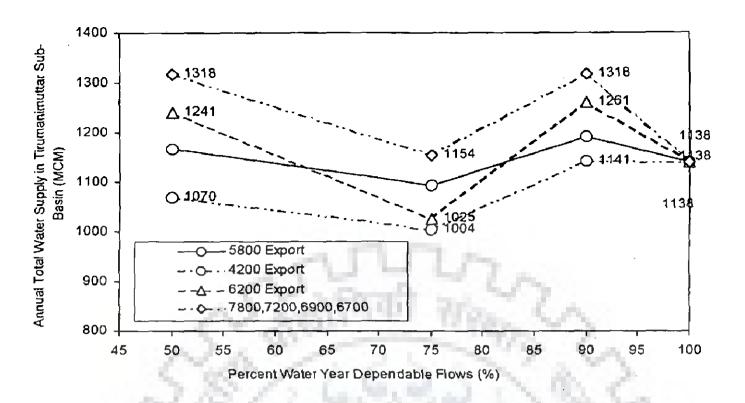


Fig. 8.4.8(c): Variation in Annual Total Water Supply from Major, Medium and Minor Projects vs. Various Percent Water Year Dependable Flows in Tirumanimuttar Sub-Basin

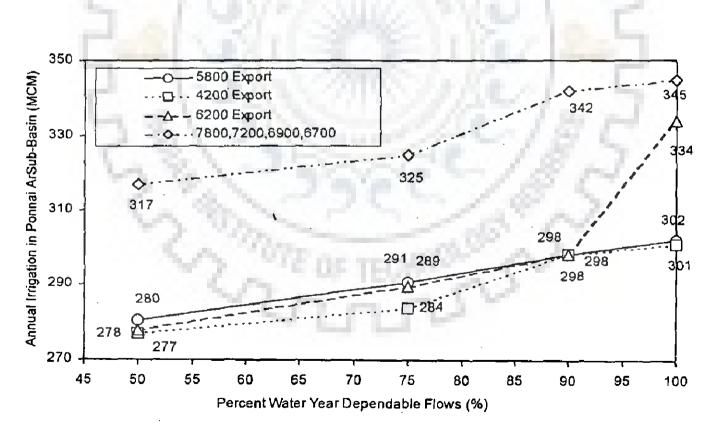


Fig. 8.4.9: Variation in Annual Irrigation from Major, Medium and Minor Projects vs. Various Percent Water Year Dependable Flows in Ponnana Ar Sub-Basin

#### SUMMARY OF FINDINGS AND CONCLUSIONS

#### 9.1 INTRODUCTION

The present study was carried out with an overall objective of comprehensive analysis for optimal water utilization, with intra-basin and inter-basin water transfers considerations for an interstate Cauvery river system, in respect to the interim award of Cauvery Water Dispute Tribunal (CWDTIA) to release at the Mettur reservoir 5800 MCM (205 Million Cubic Feet) of water, which is the contribution from the upper riparian Karnataka state to the lower riparian Tamilnadu state. The river system was presented in Chapter 3. It was very important to assess the surface and ground waters available and its utilization, in the basin on monthly basis. Therefore, this study may be of great importance from actual field application point of view. The details of the studies are sequentially presented in the previous chapters. The presentation in this chapter begins with an overall view of the studies carried out. The subsequent section comprises of the summary of findings of the different aspects of the work accomplished. Finally, conclusions drawn from the overall study are presented in this chapter. Some suggestions are made at the end of this chapter to outline the scope for further related studies.

#### 9.2 AN OVERALL VIEW OF THE PROBLEM

The Cauvery is an inter state river in South India originating in the state of Karnataka and flowing through the states of Karnataka, Kerala, Tamilnadu, and Pondicherry having a catchment area of 81,155 Km<sup>2</sup>. The state wise drainage areas of

Cauvery basin are Karnataka 34,273 Km<sup>2</sup> (42.2%); Tamilnadu 43,867 Km<sup>2</sup> (54.1%); Kerala 2,866 Km<sup>2</sup> (3.5)% and Pondicherry 149 Km<sup>2</sup> (0.2)%. This basin has 16-sub-basins. It has 75% and 50% water year dependable surface water potential of 16,470 MCM and 20,253 MCM, respectively. A total of 3,866 MCM ground water potential is available for future use. The water requirement for the population of human and livestock projected to the year 2050AD for all purposes as estimated in Chapter 4 is 39516 MCM. There are 15 major projects (reservoirs), 58 medium and a large number of minor irrigation projects in the basin. The total irrigable area is 2605200 Ha.

The Supreme Court of India has recently given directives to the Government of India for interlinking of the major rivers of the Himalayan and Peninsular regions for transfer of waters from the water surplus river basins to the water deficit basins to reduce the natural imbalance of the water availability in various basins in the country. The studies on various inter-basin water transfers are carried out, usually on the basis of annual water balance of all the sub-basins lying in the respective major river basins involved, to determine the amount of water available and to identify the water surplus and water deficit basins. But in this study, the monthly water balance studies on an annual basis are carried out for various water year dependable flows. The previous studies carried out for the water balance accounting on an annual basis, do not take into account: (i) the availability and use of the ground water, (ii) the time wise variability and distribution of the water availability with respect to the yearly and within the year time periods, and (iii) the aerial variability and distribution of the water available and its use in a basin/ sub-basin, with respect to the location of the various reservoirs and water use points. In this study to overcome the above mentioned three drawbacks in the previous studies for water balance carried out by conventional method, elsewhere for

the Cauvery river basin, the monthly water balance on annual basis is carried out to overcome the first two drawbacks, and a Linear Programming (LP) optimization model to overcome all the three drawbacks.

The methodology adopted to achieve the objectives is outlined below:

### (A) Sub-basinwise Monthly Water Balance Studies

The monthly water balance studies were made to know the surplus and deficits to find out whether the monthly water requirements are met or not and whether the monthly intra-basin water transfers within the Cauvery basin are possible.

# (1) Estimation of surface water and ground water potential

The 75% water year dependable surface water yields on monthly basis for each sub-basin were calculated by distributing the annual 75% water year dependable yields in the proportion of actual average monthly inflows/yields observed at the nearest gauge and discharge (G&D) site within or outside of the sub-basin. The sub-basinwise ground water potential and the existing uses were computed on the area basis from districtwise ground water statistics, the data collected from the Water Resources of India, a publication of Central Ground Water Board, under the Ministry of water Resources, Government of India, Faridabad. The same procedure was adopted for 50%, 90% and 100% water year dependable flows.

# (2) Assessment of the water requirements/needs

# (a) Irrigation water requirements/needs

The irrigation needs were calculated by keeping the utilization of existing and ongoing major, medium and minor projects undisturbed while the net and gross crop water requirements for future major, medium and minor projects have been worked out by climatological approach. It was considered that at least 30% of the maximum culturable area for each sub-basin should be under irrigation for the year 2050 AD and

in case of sub-basins having less than 30% of irrigation area, the additional area to be brought under irrigation was computed and 50% of this was proposed to be irrigated from future medium projects and the remaining 50% from future minor projects. The ultimate irrigation needs for the future projects are calculated and are used for the water balance studies.

#### (b) Domestic water requirements/needs

The rural, urban and livestock population had been computed by projecting the 1981 census human population and 1982/83 census livestock population to 2050 AD by using suitable compound annual growth rates for human population and one percent for livestock population. The domestic water requirements were calculated considering the per capita water requirements of 70 liters, 200 liters and 50 liters per day respectively as per the NWDA norms. The urban population by 2050 AD is taken as 60.70% of the total projected population by 2050 AD. The entire water requirement for the urban population and the 50% of the rural population was proposed to be met from surface water. The entire water requirement for live stock population and 50% of the requirement for the rural population was proposed to be met from ground water resources.

# (c) Industrial water requirements/needs

For the industrial water requirements, in the absence of relevant data, it had been assumed to be of same order as that of domestic water requirements by 2050 AD.

# (d) Hydropower water requirements/needs

The total evaporation losses of all single purpose hydropower projects in the catchment area of each sub-basin are considered, as hydropower needs.

# (e) Environmental water requirements/needs

The environmental needs in each month are taken equal to 1% of the inflows of those months.

The intra-basin water transfer quantities are taken from the data collected from NWDA. The regeneration from irrigation, domestic and industrial was taken as 10%, 80%, and 80% of net utilization, respectively. The monthly and annual water balances for each month in each sub-basin were calculated and the monthly and annual surplus and deficits were worked out.

## (B) The Mathematical Modeling Approach

- (1) The optimization model for planning and management was considered suitable for this study in view of the large size of problem to be addressed. The study involved modeling for water transfers to other irrigation areas and the interest of co-basin riparian states (bases on sharing of the river water and limitations of its use under numerous location specific hydrological, techno-economic and management constraints pertaining to agreements and CWDT award. In accordance with the reported findings, regarding the modeling approaches, and the nature and scope of the present study, and huge number of variables to be handled the linear programming model was found to be promising.
- (2) To study the effects of the spatial variations with respect to project sites and reservoir storage on the water balance of the system, a project-by-project analysis, and sub-basin wise analysis were carried out.
- (3) The optimization model was run for 75%, 50%, 90%, and 100% water year dependable flows by using LINDO software package for solution. Irrigation was considered as lumped. The monthly diversions from reservoirs and ground water were obtained.
- (4) The cropping pattern was studied for each reservoir. The water availability was taken from step (3) above. The cropping patterns were analyzed keeping in mind (a) The number of paddy crops to be grown, (b) Reducing the area for water extensive crops, and (c) Opting for high revenue crops.
- (5) To see the effect of the water surplus and the water deficit years on the water utilization and on intra basin water transfers, the step (4) was repeated.

- (6) The minimum food requirement with respect to calorific value of crops was also studied.
- (7) The above studies also include the consideration of the interim award of Cauvery Water Dispute Tribunal (CWDTIA).

# 9.3 THE WORKS ACCOMPLISHED

The detailed monthly water balance studies on an annual basis for the sixteen sub-basins of Cauvery river system for various water year dependable flows, i.e., (i) 75% water year annual dependable flow representing a water year under normal conditions, (ii) 90% water year annual dependable flow representing a water deficit year, (iii) 100% (lowest flow) water year annual dependable flow representing a critical water deficit year, and (iv) 50% water year annual dependable annual flow representing a water surplus year, are carried out with considerations of ground water and the environmental water requirements. The monthly water balances, without considering the ground water availability in the sub-basin and with the ground water considerations, are carried out and presented in Chapter 4. The Linear Programming (LP) Model is developed and presented in Chapter 5, for the intra-basin water transfers among the various sub-basins. Chapter 6 deals with computation of input data for linear programming model. The LP model is applied to the Cauvery river system, for conjunctive water use development in the basin, taking care of the interim award of Cauvery Water Dispute Tribunal, and presented in Chapter 7. Crop plans are also derived for each major reservoir in the basin. Chapter 8 deals with analysis of linear programming model.

#### 9.4 SUMMARY OF FINDINGS

# 9.4.1 Water Balance Studies for 75% Water Year Dependable Flows With and Without Ground Water Considerations by Conventional Method

The monthly water balance on an annual basis, with and without ground water considerations, of the sub-basins of the Cauvery river carried out for four water year dependable flows in this thesis. The account of the water balance for 75% water year dependable flow is given in Table 9.1.

Table 9.1: Sub-basin wise Annual Surplus/Deficit in Cauvery Basin from Water Balance for 75% Water Year Dependable Flow

| Sl.No. | Name of sub-basin | Without ground water | With ground water |
|--------|-------------------|----------------------|-------------------|
| (1)    | (2)               | (3)                  | (4)               |
| 1      | Upper Cauvery     | -275.46              | 303.04            |
| 2      | Kabini            | -271.11              | 115.29            |
| 3      | Shimsha           | 150.72               | 656.72            |
| 4      | Arkavathi         | -799.19              | -695.69           |
| 5      | Middle Cauvery    | 66.89                | 272.49            |
| 6      | Suvarnavathi      | -79.64               | -15.74            |
| 7      | Palar             | -161.49              | -21.79            |
| 8      | Chinnar           | -13103.10            | -12932.21         |
| 9      | Bhavani           | -423.60              | -235 90           |
| 10     | Noyil             | -66.40               | -31.19            |
| 11     | Amaravathi        | -750.62              | -442.62           |
| 12     | Tirumanimuttar    | -225.89              | 124.24            |
| 13     | Ponnanai Ar       | -13.7109             | 193.69            |
| 14     | Upper Coleroon    | 86.64                | 339.24            |
| 15     | Lower Coleroon    | 222.16               | 342.76            |
| 16     | Cauvery Delta     | 1203.06              | 1611.16           |
| Total  |                   | -14440.70            | -10416.21         |

Note: Export from Mettur reservoir is 12712 MCM.

The water balance study of sixteen sub-basins of Cauvery river basin for the 75% water year dependable flow with ground water availability considerations, show that Table 9.1, on an annual basis, four of them, i.e., Upper Cauvery, Kabini, Tirumanimuttar and Ponnanai Ar have become water surplus from water deficit; seven of them, i.e., Arkavathi, Suvarnavathi, Palar, Chinnar, Bhavani, Noyil and Amaravathi remain still water deficit.

The sub-basin wise monthly deficits in descending order computed from water balance studies with ground water consideration for 75% water year dependable flows for the Cauvery basin are presented in Table 9.2(a) to Table 9.2(d).

From the results of water balance studies for 75% water year dependable flow without and with the considerations of the ground water, the following observations are made.

#### 9.4.1.1 Upper Cauvery sub-basin

In the Upper Cauvery sub-basin it is found that with the ground water availability considerations [refer Table 4.14.1], the maximum water surplus in the sub-basin is increased from 598.37 MCM (9.5 %) to 703.58 MCM (11.01%) in the month of July and the minimum water surplus in the sub-basin is increased from 16.50 MCM (0.26%) to 18.00 MCM (0.29%) in the month of May. The maximum water deficit has reduced from (-391.29) MCM (-6.21%) to (-277.58) MCM (-4.34%) in the month of October and the minimum water deficit of (-17.62) MCM (-0.28%) in the sub-basin is reduced to (-11.32) MCM (0.18%) with the ground water considerations in the month of November. The sub-basin has become water surplus from water deficit on an annual basis due to consideration of ground water availability. The amount of annual water deficit has changed from (-274.45) MCM (-4.36%) to 286.45 MCM (4.48%) in the sub-basin with the ground water availability.

#### 9.4.1.2 Kabini sub-basin

In the Kabini sub-basin it is found that with the ground water availability considerations [refer Table 4.14.2], the maximum water surplus in the sub-basin is increased from 132.86 MCM (2.7%) in the month of June to 192.31 MCM (3.87%) and the minimum water surplus in the sub-basin is increased from 4.46 MCM (0.10%) to 21.54 MCM (0.43%) in the month of November. The maximum water deficit has reduced from (-253.08) MCM (-5.1%) to (-202.50) MCM (-4.07%) in the month of January and the minimum water deficit of (-5.67) MCM (-0.10%) in the sub-basin is reduced to (-0.85) MCM (-0.02%) with the ground water considerations in the month of April. The sub-basin has become water surplus from water deficit on an annual basis due to consideration of ground water availability. The amount of annual water deficit has changed from (-267.77) MCM (-5.4%) to 107.62 MCM (2.16%) in the sub-basin with the ground water availability.

#### 9.4.1.3 Shimsha sub-basin

In the Shimsha sub-basin it is found that with the ground water availability considerations [refer Table 4.14.3], the maximum water surplus in the sub-basin is increased from 294.72 MCM (7.80%) to 299.95 MCM (7.75%) in the month of October and the minimum water surplus in the sub-basin is increased from 2.42 MCM (0.06%) to 8.86 MCM (0.23%) in the month of May. The maximum water deficit has reduced from (-68.87) MCM (-1.82%) to (-2.49) MCM (-0.06%) in the month of April and the minimum water deficit of (-0.25) MCM (-0.01%) in the sub-basin is reduced to (-2.49) MCM (0.06%) with the ground water considerations in the month of November. The amount of annual surplus water has increased from 150.81 MCM (3.99%) to 640.15 MCM (16.55%) in the sub-basin with the ground water availability.

#### 9.4.1.4 Arkavathi sub-basin

In the Arkavathi sub-basin it is found that with the ground water availability considerations [refer Table 4.14.4], the maximum water deficit has reduced from (-205.15) MCM (-8.71%) to (-196.97) MCM (-8.1%) in the month of September and the minimum water deficit of (-24.55) MCM (-1.0%) in the sub-basin is reduced to (-17.63) MCM (0.70%) with the ground water considerations in the month of February. The amount of annual water deficit has reduced from (-799.19) MCM (-34.10%) to -712.56 MCM (-29.4%) in the sub-basin with the ground water availability considerations.

# 9.4.1.5 Middle Cauvery sub-basin

In the Middle Cauvery sub-basin it is found that with the ground water availability considerations [refer Table 4.14.5], the maximum water surplus in the sub-basin is increased from 24.14 MCM (1.1%) to 54.48 MCM (2.4%) in the month of September and the minimum water surplus in the sub-basin is increased from 1.08 MCM (0.01%) to 2.11 MCM (0.10%) in the month of July. The maximum water deficit has reduced from (-3.31) MCM (-0.2%) in the month of March to (-2.27) MCM (-0.1%) in the month of May and the minimum water deficit of (-1.63) MCM (-0.10%) in the sub-basin is reduced to (-1.28) MCM (-0.1%) with the ground water considerations in the month of June. The amount of annual surplus water has increased from (67.40) MCM (3.1%) to (268.94) MCM (12.10%) in the sub-basin with the ground water availability.

#### 9.4.1.6 Suvarnavathi sub-basin

In the Suvarnavathi sub-basin it is found that with the ground water availability

considerations [refer Table 4.14.6], the maximum water surplus in the sub-basin is increased from 6.52 MCM (0.9 %) to 6.84 MCM (9.11%) in the month of October and the minimum water surplus in the sub-basin is increased from 2.67 MCM (0.30%) to 2.83 MCM (0.50%) in the month of September. The maximum water deficit has reduced from (-17.01) MCM (-2.3%) in the month of July to (-6.52) MCM (-0.9%) in the month of January and the minimum water deficit of (-0.55) MCM (-0.1%) in the month of May in the sub-basin is reduced to (-0.70) MCM (-0.1%) with the ground water considerations in the month of May. The amount of annual water deficit has changed from (-80.00) MCM (-10.90%) to (-22.11) MCM (-2.90%) in the sub-basin with the ground water availability.

#### 9.4.1.7 Palar sub-basin

In the Palar sub-basin it is found that with the ground water availability considerations [refer Table 4.14.7], the maximum water surplus in the sub-basin is increased from 6.00 MCM (1.9 %) in the month of June to 10.05 MCM (2.8%) in the month of September and the minimum water surplus in the sub-basin is increased from 1.84 MCM (0.6%) in the month of October to 3.40 MCM (1.0%) in the month of August. The maximum water deficit has reduced from (-30.75) MCM (-9.5%) in the month of July to (-12.35) MCM (-3.5%) in the month of February and the minimum water deficit of (-0.59) MCM (-0.2%) in the sub-basin is reduced to (-0.36) MCM (-0.1%) with the ground water considerations in the month of May. The amount of annual water deficit has reduced from (-161.00) MCM (-50%) to (-28.49) MCM (-8.0 %) in the sub-basin with the ground water availability.

#### 9.4.1.8 Chinnar sub-basin

In the Chinnar sub-basin it is found that with the ground water availability

considerations [refer Table 4.14.8], the maximum water surplus in the sub-basin is increased from 6.00 MCM (1.9 %) in the month of June to 10.05 MCM (2.8%) in the month of September and the minimum water surplus in the sub-basin is increased from 1.84 MCM (0.60%) in the month of October to 3.40 MCM (1.0 %) in the month of August. The maximum water deficit has reduced from (-30.75) MCM (9.50%) in the month of July to (12.35) MCM (-3.50%) in the month of February and the minimum water deficit of (-0.59) MCM (-0.2%) in the sub-basin is reduced to (-0.36) MCM (-0.1%) with the ground water considerations in the month of May. The amount of annual water deficit has reduced from (-161) MCM (-50.00%) to (-28.49) MCM (-8.00%) in the sub-basin with the ground water availability.

#### 9.4.1.9 Bhavani sub-basin

In the Bhavani sub-basin it is found that with the ground water availability considerations [refer Table 4.14.9], the maximum water surplus in the sub-basin is increased from 98.80 MCM (3.5 %) in the month of November to 106.39 MCM (9.2%) in the month of October and the minimum water surplus in the sub-basin is increased from 23.26 MCM (1.30%) to 35.44 MCM (2.0%) in the month of December. The maximum water deficit has reduced from (-164.53) MCM (-5.8%) in the month of March to (-49.75) MCM (-4.3%) in the month of June and the minimum water deficit of (-8.84) MCM (-0.3%) in the sub-basin is reduced to (-11.19) MCM (-1.00%) with the ground water considerations in the month of September. The amount of annual water deficit has changed from (-424.9) MCM (-15.0%) to (-66.40) MCM (-5.70%) in the sub-basin, with the ground water considerations.

#### 9.4.1.10 Noyil sub-basin

In the Noyil sub-basin it is found that with the ground water availability

considerations [refer Table 4.14.10], the maximum water surplus in the sub-basin is increased from 106.39 MCM (9.2 %) to 105.91 MCM (8.7%) in the month of October and the minimum water surplus in the sub-basin is increased from 23.26 MCM (2.0%) to 23.46 MCM (1.9%) in the month of December. The maximum water deficit has reduced from (-49.75) MCM (-4.3%) to (-42.02) MCM (-3.4%) in the month of June and the minimum water deficit of (-11.19) MCM (-1.0%) in the sub-basin is reduced to (-10.23) MCM (-0.8%) with the ground water considerations in the month of September. The amount of annual water deficit has changed from (-66.40) MCM (-5.7%) to (-39.92) MCM (-3.3%) in the sub-basin with the ground water availability.

# 9.4.1.11 Amaravathi sub-basin

In the Amaravathi sub-basin it is found that with the ground water availability considerations [refer Table 4.14.11], the maximum water surplus in the sub-basin is increased from 189.79 MCM (7.1 %) to 190.15 MCM (6.9%) in the month of November and the minimum water surplus in the sub-basin is increased from 124.28 MCM (4.6%) to 125.29 MCM (4.61%) in the month of October. The maximum water deficit has reduced from (-207.29) MCM (-7.7%) to (-171.93) MCM (-6.2%) in the month of March and the minimum water deficit of (-40.31) MCM (-1.5%) in the sub-basin is reduced to (-19.87) MCM (-0.7%) with the ground water considerations in the month of September. The amount of annual water deficit has changed from (-746.90) MCM (-27.90%) to (-453.63) MCM (-16.5%) in the sub-basin with the ground water availability.

#### 9.4.1.12 Tirumanimuttar sub-basin

In the Tirumanimuttar sub-basin it is found that with the ground water

availability considerations [refer Table 4.14.12], the maximum water surplus in the sub-basin is increased from 267.48 MCM (7.3 %) to 301.08 MCM (7.9%) in the month of October and the minimum water surplus in the sub-basin is increased from 50.49 MCM (1.4%) to 79.69 MCM (2.1%) in the month of December. The maximum water deficit has reduced from (-147.29) MCM (-4.0%) to (-71.71) MCM (-1.9%) in the month of March and the minimum water deficit of (-37.17) MCM (-1.0%) in the sub-basin is reduced to (-18.26) MCM (-0.5%) with the ground water considerations in the month of January. The amount of annual water deficit has changed from (-225.54) MCM (-6.1%) to (-100.64) MCM (-2.7%) in the sub-basin with the ground water availability.

# 9.4.1.13 Ponnanai Ar sub-basin

In the Ponnanai Ar sub-basin it is found that with the ground water availability considerations [refer Table 4.14.13], the maximum water surplus in the sub-basin is increased from 43.78 MCM (4.5 %) to 69.70 MCM (6.3%) in the month of November and the minimum water surplus in the sub-basin is increased from 0.19 MCM (0.01%) in the month of February to 2.34 MCM (0.2%) in the month of April. The maximum water deficit has reduced from (-18.84) MCM (-1.9%) in the month of July to (-1.59) MCM (-0.2%) in the month of December. The sub-basin has become water surplus from water deficit on an annual basis due to consideration of ground water availability. The amount of annual water deficit has changed from (-13.74) MCM (-1.4%) to 216.89 MCM (19.70%) in the sub-basin with the ground water availability.

# 9.4.1.14 Upper Coleroon sub-basin

In the Upper Coleroon sub-basin it is found that with the ground water availability considerations [refer Table 4.14.14], the maximum water surplus in the sub-

basin is increased from 132.50 MCM (9.8 %) to 149.73 MCM (10.91%) in the month of November and the minimum water surplus in the sub-basin has changed from 4.80 MCM (0.4%) in the month of May to 0.86 MCM (0.06%) in the month of April. The maximum water deficit has reduced from (-69.07) MCM (-5.1%) to (-10.73) MCM (-0.78%) in the month of July and the minimum water deficit of (-2.8) MCM (-0.20%) in the month of June in the sub-basin is reduced to (-0.61) MCM (-0.04%) in the month of March. The amount of annual water deficit has changed from 86.64 MCM 6.4% to 358.44 MCM (26.11%) in the sub-basin with the ground water availability.

# 9.4.1.15 Lower Coleroon sub-basin

In the Lower Coleroon sub-basin it is found that with the ground water availability considerations [refer Table 4.14.15], the maximum water surplus in the sub-basin is increased from 46.01 MCM (3.6%) to 74.12 MCM (5.7%) in the month of September, and the minimum water surplus in the sub-basin is increased from 2.80 MCM (0.2%) to 2.87 MCM (0.2%) in the month of May. The amount of annual surplus water has changed from 222.2 MCM (17.2%) to 340.16 MCM (26.1%) in the sub-basin with the ground water availability.

# 9.4.1.16 Cauvery Delta sub-basin

In the Cauvery Delta sub-basin it is found that with the ground water availability considerations [refer Table 4.14.16], the maximum water surplus in the sub-basin is increased from 256.38 MCM (2.6 %) to 307.95 MCM (3.10%) in the month of September and the minimum water surplus in the sub-basin has changed from 10.45 MCM (0.11%) to 9.77 MCM (0.10%) in the month of May. The amount of annual surplus water has changed from 1203.1 MCM (12.10%) to 1413.26 MCM (14.10%) in the sub-basin with the ground water availability.

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# 9.4.2 LP Model Studies for Conjunctive Water Resources Development for 75% Water Year Dependable Flow

The results of LP model for 75% water year dependable flow with 5800 MCM exports from Mettur reservoir to the sub-basins below Mettur are presented in Table 9.3 (for the objective function of maximization of water utilization with lumped irrigation).

Table 9.3: Sub-basin wise Annual Surplus/Deficit in Cauvery Basin from LP Model for 75% Water Year Dependable Flow

| Sl. No. | Name of sub-basin | With ground water (MCM) |
|---------|-------------------|-------------------------|
| (1)     | (2)               | (3)                     |
| 1       | Upper Cauvery     | -703.41                 |
| 2       | Kabini            | -172.39                 |
| 3       | Shimsha           | -1389.95                |
| 4       | Arkavathi         | -2121.66                |
| 5 .     | Middle Cauvery    | 1788.19                 |
| 6       | Suvarnavathi      | -634.41                 |
| 7       | Palar             | -170.06                 |
| 8 .     | Chinnar           | -213.07                 |
| 9       | Bhavani           | -1159.90                |
| 10      | Noyil             | -1058.10                |
| 11      | Amaravathi        | -1379.24                |
| 12      | Tirumanimuttar    | -2465.51                |
| 13      | Ponnanai Ar       | -420.10                 |
| 14      | Upper Coleroon    | -296.89                 |
| 15      | Lower Coleroon    | -506.27                 |
| 16      | Cauvery Delta     | -2541.36                |
| Total   |                   | -13444.12               |

The basic differences between water balance approach and the linear programming model approach are as follows:

In the water balance study, it is assumed that the total water resources available in a sub-basin are being utilized in the same sub-basin, except exports to other sub-basins. Whereas, in the linear programming model this is not the case, and the difference is that: (i) entire water resources are not being utilized in the same sub-basin, and (ii) there is an influence of reservoir storage, time wise variations in water availability and water use, reservoir spills, and variable evaporation losses with respect to time, etc.

The overall influence on the behavior of various sub-basins due to above factors is summarized below for 75% water year dependable flow with 5800 MCM of water export from Mettur to the sub-basins below Mettur:

- (1) From the linear programming results it is found that except Middle Cauvery sub-basin all the other sub-basins are water deficit. Following four types of monthly water deficit patterns are noticed, when the deficits are arranged in descending order.
  - (i) In the Suvarnavathi and Palar sub-basins, the decreasing pattern in the monthly percent deficits are found in the same months, except in the months of January and February.
  - (ii) In the Bhavani and Amaravathi sub-basins, the decreasing patterns in the monthly percent deficits are found in the same months, except in the months of January, February, June and September.
  - (iii) In the sub-basins of Upper Coleroon, Lower Coleroon and Cauvery

    Delta, the decreasing pattern in the monthly percent deficits are found in
    the same month, for all the months.

- (iv) For the remaining nine sub-basins there is no similarity, and have different monthly percent deficits patterns.
- (2) The Arkavathi sub-basin has the maximum percent deficit of 16% in the month of September, in the entire Cauvery river system, and the Upper Cauvery sub-basin has the minimum deficit of 0.001% in the month of May. Similarly, the Noyil and Arkavathi sub-basin have the maximum annual deficits of 87% and the Chinnar sub-basin has the minimum annual deficit of 8%.
- (3) As said earlier, Middle Cauvery sub-basin is the only water surplus sub-basin in the entire river system. In this sub-basin, the month of July has the mximum surplus of 15% and the month of May has the minimum surplus of 0.40%. There is a 81% surplus water availability annually in Middle Cauvery sub-basin.

The sub-basin wise monthly deficits in descending order computed from LP model for 75% water year dependable flows for the Cauvery basin are presented in Table 9.4, and the sub-basin wise observations are presented below. [Refer Table 9.4].

# 9.4.2.1 Upper Cauvery sub-basin

In the case of Upper Cauvery sub-basin, from the LP model results it is found that the maximum water deficit in the sub-basin of -139.96 MCM (-3.9%) in the month of October and the minimum water deficit of -5.01 MCM (-0.1%) in the month of April. The amount of annual deficit water is of -703 MCM (-19.5%) in the sub-basin.

#### 9.4.2.2 Kabini sub-basin

In the case of Kabini sub-basin, from the LP model results it is found that the maximum water deficit in the sub-basin of -164.94 MCM (-3.4 %) in the month of August and the minimum water deficit of -4.95 MCM (-0.1 %) in the month of

February. The amount of annual deficit water is of -625 MCM (-12.7%) in the sub-basin.

#### 9.5.2.3 Shimsha sub-basin

In the case of Shimsha sub-basin, from the LP model results it is observed that the maximum water deficit in the sub-basin of -389.48 MCM (-10.3%) in the month of January and the minimum water deficit of -28.56 MCM (-0.8 %) in the month of October. The amount of annual deficit water is of -2149 MCM (-56.9%) in the sub-basin.

# 9.5.2.4 Arkavathi sub-basin

In the case of Arkavathi sub-basin, it is found from the LP model results that the maximum water deficit in the sub-basin of -395.41 MCM (-16 %) in the month of September and the minimum water deficit of -96.50 MCM (-4%) in the month of April. The amount of annual deficit water is of -2122 MCM (-87%) in the sub-basin.

#### 9.4.2.5 Middle Cauvery sub-basin

In the case of Middle Cauvery sub-basin, from the LP model results it is found that the maximum water surplus in the sub-basin of 336.8 MCM (15%) in the month of July and the minimum water surplus of 9 MCM (0.4%) in the month of May. The amount of annual surplus water is of 1788 MCM (81%) in the sub-basin.

#### 9.4.2.6 Suvarnavathi sub-basin

In the case of Suvarnavathi sub-basin, from the LP model results it is found that the maximum water deficit in the sub-basin of -111.5 MCM (-15 %) in the month of July and the minimum water deficit of -5.56 MCM (-1%) in the month of May. The amount of annual deficit water is of -607 MCM (-82%) in the sub-basin.

#### 9.4.2.7 Palar sub-basin

In the case of Palar sub-basin, from the LP model results it is observed that the maximum water deficit in the sub-basin of -34.54 MCM (-11%) in the month of July and the minimum water deficit of -2.55 MCM (-1%) in the month of May. The amount of annual deficit water is of -186 MCM (-57%) in the sub-basin.

#### 9.4.2.8 Chinnar sub-basin

In the case of Chinnar sub-basin, from the LP model results it is observed that the maximum water deficit in the sub-basin of -30.58 MCM (-1.1%) in the month of March and the minimum water deficit of -6.10 MCM (-0.2%) in the month of August. The amount of annual deficit water is of -229 MCM (-8%) in the sub-basin.

#### 9.4.2.9 Bhavani sub-basin

From the LP model results in the case of Bhavani sub-basin, it is found that the maximum water deficit in the sub-basin of -101.73 MCM (-4%) in the month of July and the minimum water deficit of -2.99 MCM (-0.1%) in the month of November. The amount of annual deficit water is of -606 MCM (-21%) in the sub-basin.

#### 9.4.2.10 Novil sub-basin

From the LP model results in the case of Noyil sub-basin, it is found that the maximum water deficit in the sub-basin of -174.11 MCM (-14 %) in the month of June and the minimum water deficit of -38.90 MCM (-3%) in the month of November. The amount of annual deficit water is of -1064 MCM (-87%) in the sub-basin.

#### 9.4.2.11 Amaravathi sub-basin

In the case of Amaravathi sub-basin, from the LP model results it is found that the maximum water deficit in the sub-basin of -262.38 MCM (-10%) in the month of

July and the minimum water deficit of -8.63 MCM (-0.30%) in the month of November. The amount of annual deficit water is of -1506 MCM (-55%) in the subbasin.

#### 9.4.2.12 Tirumanimuttar sub-basin

In the case of Tirumanimuttar sub-basin, from the LP model results it is found that the maximum water deficit in the sub-basin of -458 MCM (-12%) in the month of March and the minimum water deficit of -309.41 MCM (-8%) in the month of January. The amount of annual deficit water is of -309 MCM (-8%) in the sub-basin.

#### 9.4.2.13 Ponnanai Ar sub-basin

In the case of Ponnanai Ar sub-basin, from the LP model results it is observed that the maximum water deficit in the sub-basin of -61.89 MCM (-6%) in the month of December and the minimum water deficit of -10.64 MCM (-1.0%) in the month of February. The amount of annual deficit water is of -395 MCM (-40%) in the sub-basin.

## 9.4.2.14 Upper Coleroon sub-basin

In the case of Upper Coleroon sub-basin, it is found from the LP model results that the maximum water deficit in the sub-basin of -112.36 MCM (-8.3%) in the month of August and the minimum water deficit of -1.13 MCM (-0.1%) in the month of May. The amount of annual deficit water is of -468 MCM (-34.7%) in the sub-basin.

#### 9.4.2.15 Lower Coleroon sub-basin

In the case of Lower Coleroon sub-basin, it is found from the LP model results that the maximum water deficit in the sub-basin of -145.60 MCM (-11.2 %) in the month of August and the minimum water deficit of -1.47 MCM (-0.1%) in the month of May. The amount of annual deficit water is of -606 MCM (-46.5%) in the sub-basin.

#### 9.4.2.16 Cauvery Delta sub-basin

In the case of Lower Coleroon sub-basin, from the LP model results it is found that the maximum water deficit in the sub-basin of -1345.44 MCM (-14%) in the month of August and the minimum water deficit of -13.59 MCM (-0.1%) in the month of May. The amount of annual deficit water is of -5600 MCM (-56%) in the sub-basin.

#### 9.4.2.17 Spills from sub-basins

The monthly spills over the year from the respective sub-basins in Cauvery basin obtained from Linear Programming model for 75% water year dependable flows with the 5800 MCM water exports from Mettur to the sub-basins below Mettur are presented in the Table 9.5.

The model results show the following pattern:

There may be sometimes shortages of water to meet the demands even though water is available within the sub-basins, but in the LP model the available water in various sub-basins is to be utilized optimally through the intra-basin water transfers over the Cauvery basin as a whole. Due to the consideration in the model of variability in the water availability and its use, with respect to space and time, there may be imbalance between the water needed and its availability; this at times may cause spills from reservoirs etc.

In Upper Cauvery sub-basin the spills occur during the months of June and August. In case of Kabini sub-basin there are no spills during the months of December to March but other months are having spills. In the case of Shimsha, Arkavathi, Palar, Amaravathi, Tirumanimuttar, Ponnanai Ar, Upper Coleroon, Lower Coleroon and Cauvery Delta sub-basis, the spills occurred in the every month during the year. In the Suvarnavathi sub-basin, no spill occurred during the month of May and remaining

months had spills. In the Bhavani and Noyil sub-basins spills occurred during through out the year except in the month of March. In the Cauvery Delta sub-basin spills do not occur during the months of January and February but other months are having spills.

### 9.4.2.18 Crop Planning

#### (i) General

The water availability is taken from the results of the LP model for 75% water year dependable flow with 5800 MCM of water exports from Mettur reservoir to the sub-basins below Mettur, for the objective function of maximization of annual water utilization. The irrigation was considered as lumped. The monthly diversions from reservoirs and ground water for lumped irrigation are obtained from LP model results. The cropping patterns is then studied for all the fifteen reservoirs (major projects). The optimal cropping patterns for the remaining areas not covered by these projects in their respective sub-basins, and other sub-basins, which did include any projects, were not determined. The cropping patterns are analyzed below keeping in mind (a) a number of paddy crops to be grown, (b) reducing the area for water extensive crops and (c) opting for higher revenue crops.

#### (ii) Objective function

Objective Function-Maximization of annual water utilization:

The crops at the reservoirs (major projects) [refer col. (4) in Tables 7.2.1 to 7.2.15], i.e., Mananthvady, Taraka, Upper Nugu, Mettur and Lower Bhavani do not occupy their entire respective proposed culturable command areas, with a minimum cropping intensity of 38% at Upper Nugu and a maximum cropping intensity of 97% at Mananthvady. The crops at the remaining projects do occupy their entire respective proposed culturable command areas, with 137% cropping intensity at Banasurasagar.

Objective function- Maximization of area to be irrigated:

The crops at reservoirs [refer col. (5) in Tables 7.2.1 to 7.2.15], i.e., Cauvery, Mananthvady, Taraka, Upper Nugu, Mettur and Lower Bhavani do not occupy their entire respective proposed culturable command areas, with a minimum cropping intensity of 54% at Upper Nugu and a maximum cropping intensity of 97% at Mananthvady. The crops at the remaining projects do occupy their entire respective proposed culturable command areas with 147% cropping intensity at Banasurasagar.

Objective function- Maximization of annual food production:

The crops at all the reservoirs [refer col. (6) in Tables 7.2.1 to 7.2.15], except Banasursagar and Sagardoddakere, do not occupy their entire respective proposed culturable command areas with a minimum cropping intensity of 53% at Mettur and a maximum cropping intensity of 86% at Mananthvady. The cropping intensities at Banasurasagar and Sagardoddakere are 164% and 273%, respectively. This objective function is the most sensitive in terms of cropping intensity.

Objective function- Maximization of annual benefits from crops (without minimum area for food requirements):

The crops at the reservoirs [refer col. (7) in Tables 7.2.1 to 7.2.15], i.e., Taraka, Upper Nugu, Mettur and Lower Bhavani do not occupy their entire respective proposed culturable command areas, with a minimum cropping intensity of 54% at Upper Nugu and a maximum cropping intensity of 91% at Taraka and Mettur. The crops at the remaining projects do occupy their entire respective proposed culturable command areas, with 135% cropping intensity at Banasurasagar.

Objective function- Maximization of annual benefits from crops (with minimum area for food requirements):

The crops at reservoirs [refer col. (8) in Tables 7.2.1 to 7.2.15], i.e., Mananthvady, Upper Nugu, Nugu and Amaravathi do not occupy their entire respective proposed culturable command areas, with a minimum cropping intensity of 52% at Mananthvady and a maximum cropping intensity of 73% at Nugu. The crops at the remaining projects do occupy their entire respective proposed culturable command areas, with more than 100% cropping intensities.

#### (iii) Water extensive crops

Except at Yagachi, Banasursagar, Mananthvady, Taraka, Upper Nugu and Mettur reservoirs, at other reservoirs, the water extensive crops, i.e., Sugarcane, Kharif Paddy and Rabi Paddy, almost acquire their respective proposed areas, for both the objective functions (i.e., maximization of annual water utilization, and maximization of area to be irrigated annually).

The variations among these crops are as follows:

Sugarcane: For the objective function of maximization of annual water utilization, this crop has cropping intensities of 99%, 2%, 99% and 0% at Yagachi, Banasursagar, Taraka and Upper Nugu, respectively.

Kharif Paddy: For the objective function of maximization of annual water utilization, this crop has cropping intensities of 78%, 41% and 36% at Mananthvady, Taraka and Upper Nugu, respectively.

Rabi Paddy: For the objective function of maximization of annual water utilization, this crop has cropping intensities of only 75%, 97% and 0% at Banasurasagar, Taraka, Upper Nugu and Mettur, respectively.

For the objective function of maximization of area to be irrigated annually, the behavior of these three crops is almost same as found for the objective function of maximization of annual water utilization, with minor variations.

#### (iv) Number of paddy crops to be grown

The pattern discussed below is for number of Paddy crops to be grown, obtained for the objective functions, i.e., maximization of annual water utilization and maximization of area to be irrigated annually.

- (a) Kharif Paddy: At Taraka and Upper Nugu reservoirs it is possible to cultivate only about 36% to 41% of their respective proposed crop areas. Similarly, at Mananthvady about 78% of the proposed crop areas can be cultivated. And at other reservoirs, it is possible to cultivate with full potential the Kharif Paddy.
- (b) Rabi Paddy: As far as the number of Paddy crops to be grown is concerned, it is not possible to cultivate Rabi Paddy at Mettur reservoir. At Banasursagar it is only possible to cultivate 75% of the proposed crop area. And at other reservoirs it is possible to cultivate with full potential the Rabi Paddy.

# (v) Imports / Exports of food

Except at Yagachi and Upper Nugu reservoirs, at other reservoirs the crop productions to meet minimum requirements of the agricultural population are fulfilled. At Yagachi and Upper Nugu reservoirs, the production of groundnut crop is not sufficient to fulfill the food requirements of the agricultural population at these reservoirs. The annual quantity of groundnut to be imported for these two projects works out to 24.12 MT and the annual quantities of other food grains exports from the projects are as follows:

Paddy - 749 MT, Jowar - 1159 MT, Ragi - 531 MT, Pulses - 483 MT, Fruits and Vegetables-14066 MT and Groundnut -541 MT.

#### (vi) High benefit crops

The high benefit crops like Sugarcane, Cotton, Tobacco, and Coconut are occupying their respective areas at all the reservoirs, except Sugarcane and Coconut at Banasurasagar and Upper Nugu reservoirs. The areas occupyied for Sugarcane and Coconut at Banasurasagar are 2% and 0%, respectively, and at Upper Nugu reservoir the areas being occupied for Sugarcane and Coconut are nil for both the crops.

# (vii) Most affected reservoir

Upper Nugu reservoir is the most affected in terms of crop area occupation (i.e., for Kharif Jowar, Kharif Ragi, Rabi Paddy, Pulses, Fruits and Vegetables, Groundnut, and Coconut) for both the objective functions, i.e., maximization of water utilization and maximization of area to be irrigated.

#### 9.4.2.19 Hydropower Generation

During a normal year at Manathvady reservoir about 377 MU (1 MU = 10<sup>6</sup> KWhr) of energy would be generated annually as against 817 MU as per the project proposal. Similarly, at Banasurasagar reservoir about 332 MU of energy would be generated annually as against 406 MU as per the project proposal. At Kabini and Mettur the generated and the proposed values are 769 MU and 98 MU, and 196 and 240 MU, respectively.

# 9.4.3 Water Utilization Factors

The computed monthly and annual water utilization factors from water balance study (conventional method) with 12712 MCM exports from Mettur reservoir and from LP model results with 5800 MCM water exports from Mettur reservoir, to the subbasins below Mettur, for 75% water year dependable flows are presented in Table 9.6

and 9.7, respectively. The following are the observations:

From the water balance studies it is found that except at Lower Coleroon and Cauvery Delta sub-basins in all other sub-basins, a maximum monthly water utilization factor of 1.0 (i.e., all the water demands are met from the available water in that month) is attained in different months, for both without and with ground water considerations. Whereas, at Amaravathi sub-basin a minimum of about 0.25 monthly water utilization factor in the month of November is attained.

The minimum monthly water utilization factors from water balance, and the annual water utilization factor from LP model studies are given below for each sub-basin.

As per the water balance studies, in the case of Upper Cauvery sub-basin, minimum monthly utilization factors of 0.36 and 0.71 for without and with ground water considerations are obtained, respectively. The annual water utilization factor in water balance studies is 0.96 for both without and with ground water considerations. From LP model the annual water utilization factor is 0.41 (see col.8 of Table 9.7). The difference is because in the water balance study, it was not possible to consider, the arial variability and distribution of the surface and ground water available and its availability in the basin, with respect to the locations of the various reservoirs and water use points.

The Kabini sub-basin has a minimum monthly utilization factor of 0.67 for both without and with ground water considerations. The annual water utilization factors in water balance studies are 1.00 and 0.98 for without and with ground water considerations. And as per LP model the annual utilization factor is 0.73.

As per the water balance studies, in the case of Shimsha sub-basin, minimum monthly utilization factors of 0.26 and 0.27 for without and with ground water considerations are obtained, respectively. The annual water utilization factors in water balance studies are 0.96 and 0.86 for without and with ground water considerations. From LP model the annual water utilization factor is 0.35 (see col.8 of Table 9.7).

As per the water balance studies, in the case of Arkavathi sub-basin, minimum monthly utilization factors of 1.00 for both without and with ground water considerations are obtained. The annual water utilization factor in water balance studies is 1.00 for both without and with ground water considerations. From LP model the annual water utilization factor is 0.30 (see col.8 of Table 9.7).

In the case of Middle Cauvery sub-basin, as per the water balance studies, minimum monthly utilization factors of 0.80 and 0.78 for without and with ground water considerations are obtained, respectively. The annual water utilization factors in water balance studies are 0.97 and 0.89 for without and with ground water considerations. From LP model the annual water utilization factor is 0.77 (see col.8 of Table 9.7).

As per the water balance studies, in the case of Suvarnavathi sub-basin, minimum monthly utilization factors of 0.72 and 0.73 for without and with ground water considerations are obtained, respectively. The annual water utilization factor in water balance studies is 1.00 for both without and with ground water considerations. From LP model the annual water utilization factor is 0.2 (see col.8 of Table 9.7).

In the case of Palar sub-basin, as per the water balance studies, minimum monthly utilization factors of 0.84 and 0.77 for without and with ground water considerations are obtained, respectively. The annual water utilization factor in water balance studies is 1.00 for both without and with ground water considerations. From LP model the annual water utilization factor is 0.60 (see col.8 of Table 9.7).

Chinnar sub-basin has a minimum monthly utilization factor of 1.00 for both without and with ground water considerations. The annual water utilization factor in water balance studies is 1.00 for both without and with ground water considerations. From LP model the annual water utilization factor is 1.00 (see col.8 of Table 9.7).

As per the water balance studies, in the case of Bhavani sub-basin, minimum monthly utilization factors of 0.65 for both without and with ground water considerations are obtained, respectively. The annual water utilization factor in water balance studies is 1.00 for both without and with ground water considerations. From LP model the annual water utilization factor is 0.52 (see col.8 of Table 9.7).

In the case of Amaravathi sub-basin, As per the water balance studies, minimum monthly utilization factors of 0.24 and 0.25 for without and with ground water considerations are obtained, respectively. The annual water utilization factor in water balance studies is 1.00 for both without and with ground water considerations. From LP model the annual water utilization factor is 0.62 (see col.8 of Table 9.7).

As per the water balance studies, in the case of Tirumanimuttar sub-basin, minimum monthly utilization factors of 0.51 and 0.58 for without and with ground water considerations are obtained, respectively. The annual water utilization factors in water balance studies are 1.00 and 0.94 for without and with ground water considerations, respectively. From LP model the annual water utilization factor is 0.36 (see col.8 of Table 9.7).

As per the water balance studies, in the case of Ponnanai Ar sub-basin, minimum monthly utilization factors of 0.70 and 0.60 for without and with ground water considerations are obtained, respectively. The annual water utilization factor in water balance studies are 1.00 and 0.82 for without and with ground water considerations respectively. From LP model the annual water utilization factor is 0.52 (see col.8 of Table 9.7).

In the case of Upper Coleroon sub-basin, As per the water balance studies, minimum monthly utilization factors of 0.53 and 0.48 for without and with ground water considerations are obtained, respectively. The annual water utilization factors in

water balance studies are 0.94 and 0.79 both without and with ground water considerations, respectively. From LP model the annual water utilization factor is 0.63 (see col.8 of Table 9.7).

As per the water balance studies, in the case of Lower Coleroon sub-basin, minimum monthly utilization factors of 0.69 and 0.65 for without and with ground water considerations are obtained, respectively. The annual water utilization factors in water balance studies are 0.85 and 0.79 for without and with ground water considerations. From LP model the annual water utilization factor is 0.50 (see col.8 of Table 9.7).

As per the water balance studies, in the case of Cauvery Delta sub-basin, minimum monthly utilization factors of 0.77 and 0.76 for without and with ground water considerations are obtained, respectively. The annual water utilization factors in water balance studies are 0.89 and 0.88 for without and with ground water considerations. From LP model the annual water utilization factor is 0.40 (see col.8 of Table 9.7).

# 9.4.4 Comparison of Total Annual Balance from Water Balance and LP Model Studies

While comparing the total annual water balances (refer Table 9.8), obtained from monthly water balance and LP model studies, for the 75 % water year dependable flow with consideration of ground water (when exports from Mettur reservoir to the sub-basins below Mettur in water balance is 12712 MCM and in LP model it is 5800 MCM), the following observations are made:

In the case of Upper Cauvery sub-basin, from water balance studies it is found that the sub-basin is surplus in water by 286.45 MCM (4.48%), while from LP model studies it is seen that there is a water deficit of -703.41 MCM (-11.01%).

In Kabini sub-basin from water balance studies, it is found that the sub-basin is surplus in water by 107.62 MCM (1.99%), while from LP model studies it is seen that there is a water deficit of -172.40 MCM (-3.47%).

In the case of Shimsha sub-basin, it is observed from water balance studies that, the sub-basin is surplus in water by 640.15 MCM (16.55%), while from LP model studies it is seen that there is a water deficit of -1389.95 MCM (-35.94%).

In the case of Arkavathi sub-basin, from water balance studies it is found that, the sub-basin is deficit in water by -712.56 MCM (-29.35%), while from LP model studies it is seen that there is a water deficit of -2121.66 MCM (-87.38%).

In the case of Middle Cauvery sub-basin, from water balance studies, it is found that the sub-basin is surplus in water by 268.94 MCM (12.11%), while from LP model studies it is seen that there is a water surplus of 1788.15 MCM (80.51%).

In the case of Suvarnavathi sub-basin, from water balance studies it is found that, the sub-basin is deficit in water by -22.11 MCM (-2.88%), while from LP studies it is seen that there is a water deficit of -634.41 MCM (-82.71%).

In the case of Palar sub-basin, from water balance studies it is found that, the sub-basin is deficit in water by -28.49 MCM (-7.98%), while from LP model studies it is seen that there is a water deficit of -170.06 MCM (-47.64%).

In the case of Chinnar sub-basin, from water balance studies it is observed that, the sub-basin is deficit in water by -12932.21 MCM (-78.01%), while from LP studies it is seen that there is a water deficit by -213.00 MCM (-1.28%).

In the case of Bhavani sub-basin, from water balance studies it is found that, the sub-basin is deficit in water by -247.39 MCM (-8.60%), while from LP studies it is seen that there is a water deficit of -1159.90 MCM (-40.30%).

In the case of Noyil sub-basin, it is found from water balance studies that, the

sub-basin is water deficit by -39.92 MCM (-3.27%), while from LP studies it is seen that there is a water deficit by -1058.10 MCM (-86.66%).

In the case of Amaravathi sub-basin, from water balance studies it is found that, the sub-basin is deficit in water by -453.63 MCM (-16.48%), while from LP studies it is seen that there is a water deficit by -1379.24 MCM (-50.10%).

In the case of Tirumanimuttar sub-basin, from water balance studies it is seen that, the sub-basin is surplus in water by 100.64 MCM (2.65%), while from LP studies it is seen that there is a water deficit by -2465.51 MCM (-65.02%).

In the case of Ponnanai Ar sub-basin, from water balance studies it is observed that, the sub-basin is surplus in water by 188.17 MCM (18.72%), while from LP studies it is seen that there is a water deficit of -420.10 MCM (-41.80%).

In the case of Upper Coleroon sub-basin, from water balance studies it is found that, the sub-basin is surplus in water by 334.44 MCM (24.36%), while from LP studies it is seen that there is a water deficit by -296.89 MCM (-21.62%).

In the case of Lower Coleroon sub-basin, from water balance studies it is observed that, the sub-basin is surplus in water by 340.16 MCM (26.09%), while from LP studies it is seen that there is a water deficit by -506.27 MCM (-38.82%).

In the case of Cauvery Delta sub-basin, from water balance studies it is found that,, the sub-basin is surplus in water by 1413.26 MCM (14.12%), while from LP studies it is seen that there is a deficit by -2541.36 MCM (-25.39%).

In the case of Cauvery basin as a whole, from water balance studies it is found that, the Cauvery basin is deficit in water by -10586.00 MCM (-17.95%), while from LP studies it is seen that there is a water deficit of -13444.12 MCM (-22.79%).

From the above discussion for the monthly water balance on annual basis, it is seen that, the Cauvery Delta sub-basin has the maximum surplus of 1413.26 MCM

(14.12%) and the Tirumanimuttar sub-basin has the minimum surplus of 100.64 MCM (2.64%). Whereas, the Chinnar sub-basin has the maximum deficit of -12932.21 MCM (-78.01%) and the Suvarnavathi sub-basin has the minimum deficit of -22.11 MCM (-2.88%).

Similarly, from the LP model results, it is seen that, only the Middle Cauvery sub-basin has the surplus of 1788.15 MCM (80.51%). Whereas, the Cauvery Delta sub-basin has the maximum deficit of -2541.36 MCM (-25.31%) and the Palar sub-basin has the minimum deficit of -170.06 MCM (-47.64%).

#### 9.4.5 Intra-basin Water Exports Within Sub-basins

As per LP model results all the proposed intra-basin water exports except from Kabini project, are possible. Only 76% of proposed as per NWDA reports, intra-basin exports are possible from the Kabini project to the surrounding sub-basins for 75% water year dependable flow after fulfilling its own irrigation and water supply requirements within the sub-basin for 5800 MCM water exports from Mettur to the sub-basins below Mettur. As per the LP model results for 75%, 50%, 90%, and 100% water year dependable flows, the maximum water exports possible to the sub-basins below Mettur are 7200 MCM, 7800 MCM, 6900 MCM, and 6700 MCM, respectively, after fulfilling the irrigation and water supply demands of respective sub-basins.

# 9.5 NEED OF INTER-BASIN IMPORTS OF WATER FROM OTHER RIVER BASIN/BASINS

The Cauvery basin is always short of water for all the water year dependable flow studied, as determined from the monthly water balance computation on an annual basis. The inter-basin imports required from the other river basin/basins river to the Cauvery river basin for various water years dependable flows, obtained from water balance studies are given in Table 9.9.

Table 9.9: Inter-basin Imports Required from Other River Basin / Basins as per Water Balance Studies

| Sl.<br>No. | Water span dependable flow      | Without ground water | With ground water |
|------------|---------------------------------|----------------------|-------------------|
|            | Water year dependable flow      | (MCM)                | (MCM)             |
| 1          | 75% water year dependable flow  | 14434                | 10586             |
| 2          | 50% water year dependable flow  | 13572                | 9859              |
| 3          | 90% water year dependable flow  | 16896                | 13364             |
| 4          | 100% water year dependable flow | 20300                | 17719             |

Note: Exports from Mettur Reservoir is 12712 MCM,

The inter-basin imports required from the other river basin/basins river to the Cauvery river basin for various water years dependable flows, obtained from LP model are given in Table 9.10.

Table 9.10: Inter-basin Imports Required from Other River Basin / Basins as per LP Model Studies

| Sì. No. | W-to-to-down doble form         | With ground water consideration |  |
|---------|---------------------------------|---------------------------------|--|
|         | Water year dependable flow      | (MCM)                           |  |
| 1       | 75% water year dependable flow  | 13444.12                        |  |
| . 2     | 50% water year dependable flow  | 12468.91                        |  |
| 3       | 90% water year dependable flow  | 15888.95                        |  |
| 4       | 100% water year dependable flow | 18853.4                         |  |

Note: Exports from Mettur Reservoir is 5800 MCM.

In the water balance studies of the NWDA the maximum proposed exports from Mettur reservoir to the sub-basins below Mettur is shown as 12712 MCM for normal

year, i.e. for 75% water year dependable flow, while as per the LP model, for 75%, 50%, 90% and 100% water year dependable flows these are 7200 MCM, 7800 MCM, 6900 MCM, and 6700 MCM, respectively, as given in Section 9.4.4.

#### 9.6 CONCLUSIONS

The conclusions drawn from the study on "Optimal Water Utilization and Intrabasin Water Transfers in Cauvery Basin, India," are stated crisply based on the findings of the work done as below:

- (1) A true estimate of water balance of a large river basin can only be achieved, if viewed altogether from a different perspective, unlike the conventional method usually carried out on an annual basis. The basin's variability with respect to the time and space of various parameters, in meeting various water demands and influencing the water balance, i.e. availability of surface and ground waters, use of water, effect of reservoir storages, etc., should be considered and their impact on the water balance should be looked into. Incorporating the variability in space of these parameters, however, is not possible in the conventional method of water balance. In the present study, therefore, only the time variability of the parameters was accounted for in the water balance study of Cauvery river basin. The water balance studies carried out for the Cauvery river system, with and without ground water availability considerations, do provide a clear picture of the monthly variations in the supply and demand in the basin.
- (2) A water balance study of a river basin is unable to provide us with all the information, what is needed in planning for the development of its water

resources. This is one thing that the water balance study of a river basin, does not take into account for the impact of the space variability of various parameters on its water balance, but the optimal use of its water resources is another thing. This necessitated the need of adopting a linear programming based optimization model for the solution of the optimal utilization of Cauvery river waters, a model which can easily incorporate the above two aspects of planning into the model and can also handle a large size optimization problem. The affects of the time and aerial variability in the basin, of the supply and demand, have been clearly brought out by the optimization model.

- (3) The water balance study showed that, with ground water availability considerations, the Upper Cauvery, Kabini, Tirumanimuttar and Ponnanai Ar sub-basins become water surplus from water deficit, during normal and good water years (i.e., for the flows from the 75% water year dependable flow upwards up to the years of highest flows).
- (4) All the sixteen sub-basins in the Cauvery river system, except Middle Cauvery sub-basin, are found short of water during normal and bad water years (i.e., for the flows from the 75% water year dependable flow downwards up to the years of lowest flows), as determined from the linear programming model, whereas the Noyil and Arkavathi sub-basins suffer the most from water deficits, and the Chinnar sub-basin the least.
- (5) The Kabini sub-basin is not able to fulfill its intra-basin water exports requirements completely during normal and bad water years, as determined

from linear programming model.

- (reservoir releases) possible from the Mettur reservoir to the other sub-basins below Mettur for 75%, 50%, 90% and 100% water year dependable flows are 7200 MCM, 7800 MCM, 6900 MCM, and 6700 MCM, respectively, while in the water balance studies of the NWDA the maximum proposed exports from Mettur reservoir to the sub-basins below Mettur is shown as 12712 MCM for a normal water year.
- As per LP model results it is found, that the water share ratios for above and below Mettur for a normal water year with 5800 MCM exports from Mettur reservoir to the sub-basins below Mettur, and other water years, i.e., a water surplus year (50% water year dependable flow), a water deficit year (90% water year dependable flow) and a critical water year (100% water year dependable flow) are in the proportion of 0.98:1.07:0.79:0.72, respectively.
- (8) From the LP model results it is observed that during a normal water year (i.e., the 75% water year dependable flow) various crops would follow the following pattern:
  - (i) The water extensive crops, i.e., Sugarcane, Kharif Paddy and Rabi Paddy would not completely acquire their respective crops areas at Yagachi, Banasurasagar, Mananthvady, Taraka, Upper Nugu and Nugu reservoirs.
  - (ii) Except at Mananthvady, Taraka and Upper Nugu it would be

possible to cultivate with full potential the Kharif Paddy. Similarly, except at Banasurasagar and Mettur it would be possible to cultivate with full potential the Rabi Paddy.

- (iii) Yagachi and Upper Nugu reservoirs would need import of Sugarcane.
- (iv) The high benefit crops, i.e., Sugarcane and Coconut would acquire very little crop areas at Banasurasagar and Upper Nugu reservoirs.
- (v) Upper Nugu reservoir is the most affected reservoir in terms of the crop area occupation.
- (9) The water balance study revealed that during a normal water year, except at Lower Coleroon and Cauvery Delta sub-basins a maximum monthly water utilization factor of 1.00 would be achieved in different months, whereas, at Amaravathi sub-basin a minimum of about 0.25 monthly water utilization factor in the month of November would be achieved both with and without groundwater considerations.

From the linear programming results, the maximum annual water utilization factor is 1 at Chinnar sub-basin and the minimum annual water utilization factor 0.19 at Noyil sub-basin.

- (10) Shimsha, Arkavathi, Palar, Amaravathi, Tirumanimuttar, Ponnanai Ar, Upper Coleroon, Lower Coleroon and Cauvery Delta sub-basins, would spill, in all the months during a normal water year.
- (11) From the linear programming model results, it is found that during a normal

water year, the annual energy production in the system would be 1675 MU. At Kabini reservoir the annual energy generation would be more than the proposed.

- During a normal water year (i.e., the 75% water year dependable flow) about 18.14% of the total annual water demands, i.e., an amount of water equal to the Cauvery basin's annual water needs of 58978 MCM, may need to be imported from the other river basin/basins, as per the water balance studies carried out for conjunctive use development in the basin. The inter-basin water importing needs during a normal and other water years, i.e., a water surplus year, a water deficit year and a critical water year are in the ratios of 1.00:0.93:1.26:1.67, respectively.
- MCM water export from Mettur reservoir to the sub-basins below Mettur during a normal water year and other water years, i.e., a water surplus year, water deficit year and a critical water deficit year are in the ratios of 1.00:0.92:1.18:1.40, respectively.

# 9.7 SCOPE FOR FUTURE STUDY

The Supreme Court of India has recently given directives to the Government of India for interlinking the major rivers of the Himalayan and Peninsular regions for transfer of waters from the water surplus basins to the water deficit basins to reduce the natural imbalance of the water availability in the country. The studies on various interbasin water transfers are carried out, usually on the basis of the annual water balance of all the sub-basins lying in the respective major river basins involved, to determine the

amount of water available and to identify the water surplus and water deficit basins. The annual water balance studies carried out do not take into account: (i) the areal variability and distribution of the water available and its use in the basin, with respect to the locations of the various reservoirs and water use points, (ii) the time wise variability and distribution in the water availability with respect to the yearly and the within the year time periods, and (iii) the availability and use of the ground water. Therefore, for the proper planning and optimal water use, it may be now essential that before the decisions are arrived at for the final implementation of the reservoir projects etc., involved in these proposed inter-basin water transfers, the yield analysis of the various reservoirs in the entire large integrated river system should be carried out using systems analysis techniques. For this purpose, the following may be further carried out: (i) initially the multireservoir multiyield model for the yield analysis of single and multipurpose reservoirs developed by Dahe and Srivastava (2002) can be applied for preliminary screening, to screen a few most attractive alternatives among all the techno-feasible water transfer alternatives possible, within the framework of the existing agreements and the tribunal awards related to the transboundary river water disputes among the various river basins involved, regarding sharing of the river waters among the respective co-basin states, and then analyze these most attractive alternatives selected earlier, by a detailed simulation model, and (ii) the use of ground water should be also included in these studies. If the above considerations are incorporated further into the studies of the inter-basin water transfers among the major river basins, the purpose is not alone to ascertain, precisely and accurately the extent of the amount of basins, and the amount of the shortfall of water in a water deficit basin and the need to import water from the water surplus basins, which will also establish if there is a need of the intra-basin water transfers among the various reservoirs and water use points of the sub-basins lying in a major river basin.



Table 9.2(a): Maximum and Minimum Deficits and Surpluses from Water Balance Studies for 75% Water Year Dependable Flows

|                           | _                    |                      |         |                   |                   |          |                      |                      |              |                   |                   |        |
|---------------------------|----------------------|----------------------|---------|-------------------|-------------------|----------|----------------------|----------------------|--------------|-------------------|-------------------|--------|
| Sub-basin                 |                      |                      | 1.Upper | - Cauvery         |                   |          |                      |                      | Kabini       | :=                |                   |        |
| Ground water              | With                 | Without ground water | water   | Wit               | With ground water | <b>L</b> | Witho                | Without ground water | ater         | With              | With ground water |        |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month    | Quantity             | %                    | Month        | Quantity          | %                 | Month  |
| Monthly Maximum Deficit   | -391.29              | -6.21                | Oct     | -277.58           | 4.34              | Oct      | -253.08.             | -5.14                | Jan          | -202.50           | -4.07             | Jan    |
| Monthly Minimum Deficit   | -17.62               | -0.28                | Nov     | -11.32            | -0.18             | Nov      | -5.6735              | -0.12                | Apr          | -0.85             | -0.02             | Apr    |
| Monthly Minimum Surplus   | 18.00                | 0.29                 | May     | 16.50             | 0.26              | May      | 4.4593               | 0.09                 | Nov          | 21.54             | 0.43              | Nov    |
| Monthly Maximum Surplus   | 598.37               | 9.50                 | Jul     | 703.58            | 10.11             | Inf      | 132.86               | 2.70                 | nnr          | 192.31            | 3.87              | Aug    |
| Annual Deficits/Surpluses | -274.45              | -4.36                | Annual  | 286.45            | 4.48              | Annual   | -267.78              | -5.44                | Annual       | 107.62            | 2.16              | Annual |
|                           |                      |                      |         |                   |                   |          |                      |                      |              |                   |                   |        |
| Sub-basin                 |                      |                      | Shi     | Shimsha           |                   |          |                      |                      | Arkavathi    | thi               |                   |        |
| Ground water              | Without ground water | ound water           |         | With ground water | nd water          |          | Without ground water | and water            |              | With ground water | d water           |        |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month    | Quantity             | %                    | Month        | Quantity          | %                 | Month  |
| Monthly Maximum Deficit   | -68.87               | -1.82                | Jan     | -2.49             | 90:0-             | Apr      | -205.15              | -8.74                | Sep          | 196.97            | -8.12             | Sep    |
| Monthly Minimum Deficit   | -0.25                | -0.01                | Jun     | -2.49             | 90.0-             | Apr      | -24.555              | .1.05                | Apr          | -17.635           | 0.73              | Feb    |
| Monthly Minimum Surplus   | 8.86                 | 0.23                 | May     | 2.42              | 90.0              | Mar      | 0                    | 00:0                 | 0            | 0                 | 0.00              | 0      |
| Monthly Maximum Surplus   | . 294.72             | 7.80                 | Oct     | 299.95            | 7.75              | Oct      | 0                    | 0.00                 | 0            | 0                 | 00:0              | 0      |
| Annual Deficits/Surpluses | 150.81               | 3.99                 | Annual  | 640.15            | 16.55             | Annual   | 61.662-              | -34.05               | Annual       | -712.56           | -29.36            | Annual |
|                           |                      |                      |         |                   |                   |          |                      |                      |              |                   |                   |        |
| Sub-basin                 |                      |                      | Middle  | Cauvery           |                   |          |                      |                      | Suvarnavathi |                   |                   |        |
| Ground water              | With                 | Without ground water | water   | Wit               | With ground water | 17       | Without ground water | and water            |              | With              | With ground water |        |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month    | Quantity             | %                    | Month        | Quantity          | %                 | Month  |
| Monthly Maximum Deficit   | -3.31                | -0.15                | Mar     | -2.27             | -0.10             | May      | -17.01               | -2.30                | Jul          | -6.52             | -0.85             | Jan    |
| Monthly Minimum Deficit   | -1.63                | -0.07                | Jan     | -1.28             | -0.06             | Jun      | -0.55                | -0.07                | May          | -0.70             | 60.0              | May    |
| Monthly Minimum Surplus   | 1.08                 | 0.05                 | Jul     | 2.11              | 0.10              | Apr      | 3.83                 | 0.52                 | Nov          | 2.67              | 0.35              | Scp    |
| Monthly Maximum Surplus   | 24.14                | 1.10                 | Sep     | 52.48             | 2.36              | Sep      | 6.52                 | 0.88                 | Oct          | 6.84              | 68.0              | Oct    |
| Annual Deficits/Surpluses | 67.4                 | 3.07                 | Annual  | 268.94            | 12.11             | Annual   | -80                  | -10.88               | Annual       | -22.11            | -2.88             | Annua  |
|                           |                      |                      |         |                   |                   |          |                      |                      |              |                   |                   |        |
| Sub-basin                 |                      |                      |         | alar              |                   |          |                      |                      | Chinnar      | ar                |                   |        |
| Ground water              | With                 | Without ground water | water   | Wid               | With ground water | 1        | Witho                | Without ground water | ater         | With              | With ground water |        |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month    | Quantity             | %                    | Month        | Quantity          | %                 | Month  |
| Monthly Maximum Deficit   | -30.75               | -9.52                | Jul     | -12.35            | -3.46             | Feb      | -30.75               | -9.52                | lul          | -12.35            | -3.46             | Feb    |
| Monthly Minimum Deficit   | -0.59                | -0.18                | May     | -0.36             | -0.10             | May      | -0.59                | -0.18                | May          | -0.36             | -0.10             | May    |
| Monthly Minimum Surplus   | 1.84                 | 0.57                 | Oct     | 3.40              | 0.95              | Aug      | 1.84                 | 0.57                 | Oct          | 3.40              | 0.95              | Aug    |
| Monthly Maximum Surplus   | 6.00                 | 1.86                 | Jun     | 10.05             | 2.82              | Sep      | 00.9                 | 1.86                 | Jun          | 10.05             | 2.82              | Sep    |
| Annual Deficits/Surninges | 1191-                | -50.00               | Annual  | 198.49            | 27 98             | Jennay   | 1191-                | 50.00                | Anna         | OF 8C             | 7 00              | ou u v |

Table 9.2(b): Maximum and Minimum Deficits and Surpluses from Water Balance Studies for 75% Water Year Dependable Flows

| Ground water              |                      |                      |         |                   |                   |        |                      |                      |                |                   |                   |                   |
|---------------------------|----------------------|----------------------|---------|-------------------|-------------------|--------|----------------------|----------------------|----------------|-------------------|-------------------|-------------------|
|                           | With                 | Without ground water | vater   | With              | With ground water |        | Witho                | Without ground water | ater           | With              | With ground water |                   |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month  | Quantity             | %                    | Month          | Quantity          | %                 | Month             |
| Monthly Maximum Deficit   | -164.53              | -5.82                | Mar     | -49.75            | 4.29              | Jun    | -49.75               | -4.29                | Jun            | -42.02            | -3.44             | unf               |
| Monthly Minimum Deficit   | -8.84                | -0.31                | lnf     | -11.19            | -0.97             | Sep    | -11.19               | -0.97                | Sep            | -10.23            | -0.84             | Sep               |
| Monthly Minimum Surplus   | 35.44                | 1.25                 | Dcc     | 23.26             | 2.01              | Dcc    | 23.26                | 2.01                 | Dec            | 23.46             | 1.92              | Dec               |
| Monthly Maximum Surplus   | 98.8                 | 3.49                 | Nov     | 106.39            | 9.17              | Oct    | 106.39               | 9.17                 | Oct            | 105.91            | 8.67              | Oct               |
| Annual Deficits/Surpluses | -424.9               | -15.03               | Annual  | -66.40            | -5.72             | Annual | -66.40               | -5.72                | Annual         | -39.92            | -3.27             | Annual            |
|                           |                      |                      | Š       |                   |                   |        |                      |                      |                |                   |                   |                   |
| Sub-basin                 |                      |                      | Amar    | avathi            |                   |        |                      |                      | Tirumanimuttar | nuttar            |                   |                   |
| Ground water              | Without ground water | und water            |         | With ground water | id water          |        | Without ground water | und water            |                | With ground water | nd water          | <u> </u><br> <br> |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month  | Quantity             | %                    | Month          | Quantity          | %                 | Month             |
| Monthly Maximum Deficit   | -207.29              | -7.74                | Mar     | -171.93           | -6.25             | Mar    | -147.29              | -4 01                | Mar            | -71.711           | -1.89             | Mar               |
| Monthly Minimum Deficit   | -40.31               | -1.51                | Sep     | -19.87            | -0.72             | Sep    | -37.17               | -1.01                | Jan            | -18.258           | -0.48             | Jan               |
| Monthly Minimum Surplus   | 124.28               | 4.64                 | Oct     | 125.29            | 4.55              | Oct    | 50.49                | 1.37                 | Dcc            | 79.668            | 2.10              | Dec               |
| Monthly Maximum Surplus   | 189.79               | 7.09                 | Nov     | 190.15            | 16.9              | Nov    | 267.48               | 7.28                 | Oct            | 301.08            | 7.94              | Oct               |
| Annual Deficits/Surpluses | -746.9               | -27.89               | Annual  | -453.63           | -16.48            | Annual | -225.54              | -6.14                | Annual         | -100.64           | -2.65             | Annuai            |
| Sub-hasin                 |                      |                      | Ponna   | Ponnanai Ar       |                   |        |                      |                      | Lioner Colemon | Privati           |                   |                   |
| Ground water              | With                 | Without ground water |         |                   | With ground water |        | Without ground water | und water            |                |                   | With ground water |                   |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month  | Quantity             | %                    | Month          | Quantity          | %                 | Month             |
| Monthly Maximum Deficit   | -18.84               | -1.93                | Inf     | 0                 | 00'0              | 0      | 10.69-               | -5.12                | Jul            | -10.73            | -0.78             | Jul               |
| Monthly Minimum Deficit   | -1.59                | -0.16                | Dec     | 0                 | 0.00              | 0      | -2.80                | -0.21                | Jun            | 19.0-             | -0.04             | Mar               |
| Monthly Minimum Surplus   | 0.19                 | 0.05                 | Feb     | 2.34              | 0.21              | Apr    | 4.80                 | 0.36                 | May            | 98.0              | 0.06              | Apr               |
| Monthly Maximum Surplus   | 43.78                | 4.48                 | Nov     | 69.70             | 6.32              | Nov    | 132.50               | 9.83                 | Nov            | 149.73            | 10.91             | Nov               |
| Annual Deficits/Surpluses | -13.74               | -1.41                | Annual  | 216.89            | 19.66             | Annual | 86.64                | 6.42                 | Annual         | 358.44            | 26.11             | Annual            |
| Sub-basin                 |                      |                      | Lower   | oleroon           |                   |        | Î                    |                      | Cauvery Delia  | Delta             |                   |                   |
| Ground water              | Withc                | Without ground water | ater    | 1                 | With ground water |        | Witho                | Without ground water | ater           |                   | With ground water |                   |
| Details                   | Quantity             | %                    | Month   | Quantity          | %                 | Month  | Quantity             | %                    | Month          | Quantity          | %                 | Month             |
| Monthly Maximum Deficit   | 0                    | 0                    | 0       | 0                 | 0                 | 0      | 0                    | 0.0                  | 0              | 0                 | 0                 | 0                 |
| Monthly Minimum Deficit   | 0                    | 0                    | 0       | 0                 | 0                 | 0      | 0                    | 0.0                  | 0              | 0                 | 0                 | 0                 |
| Monthly Minimum Surplus   | 2.80                 | 0.22                 | May     | 2.87              | 0.22              | May    | 10.45                | 0.11                 | May            | 77.6              | 0.10              | May               |
| Monthly Maximum Surplus   | 46.01                | 3.56                 | Sep     | 74.12             | 2.68              | Sep    | 256.38               | 2.58                 | Sep            | 307.95            | 3.08              | Sep               |
| Annual Deficits/Surpluses | 222.2                | 17.21                | Annual. | 340.16            | 26.09             | Annual | 1203.1               | 12.11                | Annual         | 1413.26           | 14.12             | Annual            |

Table 9.4.(a): Monthly Deficits/in/Ascending Order Computed from LP Model for 75% Water Year Dependable Flows for Cauvery River System (With the Water Export of 5800 MCM from Mettur to The Sub-basins Below Mettur) \* Surpluses Descending

|        | c                       |                |             | -                |           | C           | 1.00<br>1.00      |        |        | 1                            |       |        |                | -       |         |                       |       |        |                 |      |        |                   |          |
|--------|-------------------------|----------------|-------------|------------------|-----------|-------------|-------------------|--------|--------|------------------------------|-------|--------|----------------|---------|---------|-----------------------|-------|--------|-----------------|------|--------|-------------------|----------|
| Upper  | Upper Cauvery Sub-basin | -Oasm          |             | Kadini Suo-basin | Sin       | N. S.       | Sminsna Sub-başın | IISIII | AYK    | Arkavatni Su <i>p</i> -basin | Dasin | DDIEN  | Middle Cauvery |         | Suvania | Suvamavathi Sub-basın | asın  | 탈      | Falar Sub-basın | _    | Chin   | Chinar Sub-basin. | <u>:</u> |
| Months | Quantity                | %              | Months      | Quantity %       | %         | Months      | Quantity          | %      | Months | Quantity                     | 9%    | Months | Quantity %     |         | Months  | Quantity              | %     | Months | Quantity        | %    | Months | Quantity          | %        |
| (1)    | (2)                     | (3)            | (4)         | (3)              | 9         | (7)         | (8)               | (6)    | (10)   | (11)                         | (12)  | (13)   | (14)           | (15)    | (16)    | (11)                  | (81)  | (19)   | (30)            | (21) | (22)   | (23)              | (24)     |
| S      | -139.96                 | -3.9           | Aug         | -164.94          | -3.4      | Jan         | -389.48           | -10.3  | Sep    | -395.41                      | -16   | May    | 6              | 0.4     | Jul     | -111.50               | -15   | յոլ    | -34.54          | -11  | Mar    | -30.58            | -1.1     |
| Aug    | -130.85                 | -3.6           | Jul         | -163,31          | -3.3      | Feb         | -307.26           | <br>   | Oct    | -361.07                      | 5     | Jun    | 17.9           | -       | Aug     | -102.69               | -14 / | Sny    | -31.88          | 01-  | Feb    | -25.06            | 6.0-     |
| Jul    | -129.63                 | -3.6           | Sep         | -78.75           | -1.6      | Dec         | -294.08           | -7.8   | Nov    | -212.43                      | Ø,    | Oct    | 22.4           |         | Sep     | -84.04                | =     | Sep    | -26.11          | æ    | Dec    | -24.49            | 6.0-     |
| Sep    | -128.12                 | -3.6           | Jun         | -62.94           | ,<br>1,3  | Aug         | -255.11           | 6.8    | Dec    | -168.16                      | 1     | Apr    | 48.7           | 2 J     | Jan     | .79.02                | =     | Feb    | -19.89          | 9-   | Apr    | -23.54            | -0.8     |
| Jun    | -55.56                  | -1.5           | Oct         | -55.44           | -1:1      | Jul         | -227.46           | -6.0   | Jan    | -157.80                      | φ     | Nov    | 75.4           | 3       | Feb     | -70.69                | -10   | Jan    | -19.06          | φ.   | May    | -22.15            | 8.0-     |
| Feb    | -30.36                  | -0.8           | Nov         | -35.94           | -0.7      | Sep         | -193.99           | -5.1   | Aug    | -150.99                      | φ     | Mar    | 139.9          | 9       | Dec     | -54.26                | £-    | Dec    | -16.00          | ÷    | Sep    | -21.45            | -0.7     |
| Mar    | -29.30                  | -0.8           | Dec         | -18.19           | -0.4      | Mar         | -165.84           | 4.4    | Jul    | -124.47                      | ٠.    | Dec    | 155.6          | 7       | Mar     | -41.86                | φ     | Mar    | -12.61          | 4    | Nov    | -20.80            | 1.0-     |
| Jan    | -24.14                  | -0.7           | Мау         | -18.06           | 0.4       | Nov         | -159.73           | 4.2    | Feb    | -121.91                      | 'n    | Feb    | 201.4          | 6       | Nov     | -26.68                | 4     | Nov    | -10.09          | £•   | અ      | -17.56            | 9.0-     |
| Dec    | -20.49                  | -0.6           | Apr         | -11.12           | -0.2      | Apr         | -64,26            | -1.7   | Jun    | -114.45                      | ئ.    | Jan    | 222.3          | 01      | Apr     | -12.89                | -2    | Apr    | 4.64            | ŀ    | ហាវ    | -16.76            | 9.0-     |
| Nov    | -9.41                   | 6.0            | Мат         | -6.50            | 9.1       | Jun         | -34.39            | -0.9   | Mar    | -110.90                      | ن     | Sep    | 248.8          | =       | Oct.    | -9.88                 | 7     | Oct    | 4.59            | -1   | Jan    | -12.08            | -0.4     |
| Apr    | -5.01                   | <del>0</del> آ | Jan         | -5.37            | -0.1      | May         | -28,90            | -0.8   | May    | -107.47                      | 4     | Aug    | 309.8          | 4       | Joh     | -8.36                 | -     | Jun    | -3.43           | -    | Jul    | -8.92             | -0.3     |
| May    | 0.00                    | 0.0            | Feb         | 4.95             | -0.<br>1. | 8           | -28,56            | -0.8   | Apr    | -96.50                       | 4     | Jul    | 336.8          | 5       | May     | -5.56                 | 7     | May    | -2.55           | .1   | Aug    | <b>€.10</b>       | -0.2     |
| Total  | -703                    | .19.5          | .19.5 Total | -625             | -12.7     | -12.7 Total | -2149             | -56.9  | Total  | -2122                        | -87   | Total  | 1788.0         | 81<br>T | Total   | -607                  | -82   | Total  | -186            | -57  | Total  | -229              | -8.0     |
|        |                         |                |             |                  |           |             |                   |        |        |                              |       |        |                |         |         |                       |       |        |                 | 1    | )      |                   | ı        |

ase shown by -ve sign only for convenience. \* Note: Deficit values

Table 9.4.(b): Monthly Deficits in Ascending Order Computed from LP Model for 75% Water Year Dependable Flows for Cauvery River System (With the Water Export of 5800 MCM from Mettur to The Sub-basins Below Mettur)

| trunanintutar S.b. Pomena Ar S.B. Upper Coleroon S.B. Lower Coleroon S.B. Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Quantity % Months Qua |                                                        |                                   |                            |                   |                 |                      |                |      |      |       |           |      |        |            |      |        |          |              | L           |          |       |        |                    |      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------|----------------------------|-------------------|-----------------|----------------------|----------------|------|------|-------|-----------|------|--------|------------|------|--------|----------|--------------|-------------|----------|-------|--------|--------------------|------|
| 111   112   113   114   115   116   117   118   119   120   120   121   122   122   122   122   122   122   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123   123    | Bhavani Sub-basin Noyil Sub-basin Amaravathi Sub-basin | Noyil Sub-basin                   |                            |                   |                 | Amaravathi Sub-basin | athi Sub-basin | ısin |      | Tiron | animuttar | S.b. | Pon    | nana Ar S. | - 1  | Upper  | Coleroon | S.B.         | Lower       | Coleroon | S.B.  | Cauv   | Cauvery Delta S.B. | 냈    |
| 111   112   113   114   115   116   117   118   119   120   120   121   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145   145    | Quantity % Months Quantity % Months Quantity 9         | Months Quantity % Months Quantity | Quantity % Months Quantity | % Months Quantity | Months Quantity | Quantity             |                |      | %    |       | Quantity  | %    | Months | Quantity   | %    | Months |          | %            | Months      | Quantity | %     | Months | Quantity           | %    |
| 458.82         -12         Dec         -61.89         -6         Aug         -112.36         -8.3         Aug         -145.60           -309.41         -8         Oct         -55.64         -6         Sep         -109.84         -8.1         Sep         -145.60           -309.41         -8         Jan         -48.90         -5         Jul         -104.99         -7.8         Jul         -136.06           -309.41         -8         Jul         -44.07         -5         Oct         -32.92         -2.4         Oct         -42.66           -309.41         -8         Jul         -44.07         -5         Nov         -28.96         -2.1         Nov         -37.53           -309.41         -8         Jul         -28.01         -3         Dec         -22.81         -1.5         Dec         -29.55           -309.41         -8         Mar         -21.31         -2         Jul         -7.91         -0.6         Jan         -10.24           -309.41         -8         Mar         -11.56         -2         Jul         -7.91         -0.6         Jan         -10.24           -309.41         -8         Mar         -11.66         -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | (3) (4) (5) (6) (7) (8)                                | (4) (5) (6) (7)                   | (5) (6) (7)                | (2) (9)           | (£)             |                      | (8)            |      | (6)  | (01)  | (11)      | (12) | (13)   | (14)       | (15) | (16)   | (17)     | (81)         | (61)        | (20)     | (21)  | (22)   | (23)               | (24) |
| 309.41         -8         Oct         -55.64         -6         Sep         -109.84         -8.1         Sep         -142.33           -309.41         -8         Jan         -48.90         -5         Jul         -104.99         -7.8         Jul         -136.06           -309.41         -8         Jul         -44.07         -5         Oct         -32.92         -2.4         Oct         -42.66           -309.41         -8         Jul         -44.07         -5         Nov         -28.96         -2.1         Nov         -37.53           -309.41         -8         Jul         -28.01         -3         Dec         -22.81         -1.7         Dec         -29.55           -309.41         -8         Aug         -26.39         -3         Mar         -1.3         Mar         -1.5         Mar         -1.78           -309.41         -8         Aug         -25.31         -2         Jun         -6.28         -0.5         Jun         -8.14           -309.41         -8         Apr         -17.56         -2         Jun         -6.28         -0.5         Jun         -8.14           -309.41         -8         May         -11.94                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | -101.73 -4 Jun -174.11 -14 Jul -262.38                 | Jun -174.11 -14 Jul               | -174.11 -14 Jul            | -14 Jul           | Jul             |                      | -262.38        |      | -10  | Mar   | 458.82    | -12  | Dec    | -61.89     |      | Aug    | -112.36  | -8.3         | Aug         | -145.60  | -11.2 | Aug    | -1345.44           | -14  |
| 309.41         -8         Jan         -48.90         -5         Jul         -104.99         -7.8         Jul         -136.06           -309.41         -8         Nov         -45.77         -5         Oct         -32.92         -2.4         Oct         -42.66           -309.41         -8         Jul         -44.07         -5         Nov         -28.96         -2.1         Nov         -37.53           -309.41         -8         Jun         -28.01         -3         Dec         -22.81         -1.7         Dec         -29.55           -309.41         -8         Aug         -26.39         -3         Mar         -20.84         -1.5         Mar         -17.88           -309.41         -8         Sep         -23.10         -2         Jun         -6.28         -0.5         Jun         -10.24           -309.41         -8         Apr         -17.66         -2         Jun         -5.81         -0.4         Apr         -7.53           -309.41         -8         Feb         -10.64         -1         Apr         -5.81         -0.4         Apr         -7.53           -309.41         -8         Feb         -10.64         -1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -92.65 -3 May -150.73 -12 Aug -228.18                  | May -150.73 -12 Aug               | -150.73 -12 Aug            | -12 Aug           | Aug             |                      | -228.18        |      | œ    | Feb   | -309.41   | oç   | Oct    | -55.64     | 9-   | Sep    | -109.84  | -8.1         | Sep         | -142.33  | 6'01- | Sep    | -1315.30           | 13   |
| 309.41         -8         Nov         -45.77         -5         Oct         -32.92         -2.4         Oct         -42.66           -309.41         -8         Jul         -44.07         -5         Nov         -28.96         -2.1         Nov         -37.53           -309.41         -8         Jun         -26.39         -3         Mar         -20.84         -1.7         Dec         -29.55           -309.41         -8         Sep         -23.10         -2         Feb         -13.80         -1.0         Feb         -17.88           -309.41         -8         Sep         -21.31         -2         Jun         -7.91         -0.6         Jun         -10.24           -309.41         -8         Apr         -17.66         -2         Jun         -6.28         -0.5         Jun         -8.14           -309.41         -8         May         -11.94         -1         Apr         -5.28         -0.5         Jun         -7.53           -309.41         -8         Feb         -10.64         -1         May         -1.13         -0.1         May         -1.47           -309.41         -8         Feb         -10.64         -1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | -87.69 -3 Jul -114.38 -9 Mar -199.00                   | Jul -114.38 -9 Mar                | -114.38 -9 Mar             | -9 Mar            | -9 Mar          | -                    | -199.00        |      | -7   | Apr   | -309.41   | 00   | Jan    | 48.90      | ٠.   | Jaj    | -104.99  | -7.8         | Jul         | -136.06  | -10.4 | Jul    | -1257.28           | -13  |
| -309.41         -8         Jul         -44.07         -5         Nov         -28.96         -2.1         Nov         -37.53           -309.41         -8         Jun         -28.01         -3         Dec         -22.81         -1.7         Dec         -29.55           -309.41         -8         Aug         -26.39         -3         Mar         -20.84         -1.5         Mar         -27.01           -309.41         -8         Sep         -23.10         -2         Feb         -13.80         -1.0         Feb         -17.88           -309.41         -8         Apr         -17.56         -2         Jun         -6.28         -0.5         Jun         -8.14           -309.41         -8         Apr         -17.56         -2         Jun         -5.81         -0.4         Apr         -7.53           -309.41         -8         Feb         -10.64         -1         Apr         -1.13         -0.1         May         -1.47           -309.41         -8         Feb         -10.64         -1         May         -1.13         -0.1         May         -1.47           -309.41         -8         Total         -39.5         -40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | -3 Aug -96.85 -8 Jun -196.86                           | Aug -96.85 -8 Jun                 | -96.85 -8 Jun              | un/ 8-            | Jun             |                      | -196.86        |      | -7   | Sep   | -309.41   | 80   | Nov    | 45.77      | .5   | 0      | -32.92   | -2.4         | 0 <b>ct</b> | -42.66   | -3.3  | Oct    | -394.22            | 4    |
| .309.41       -8       Jun       -28.01       -3       Dec       -22.81       -1.7       Dec       -29.55         -309.41       -8       Aug       -26.39       -3       Mar       -20.84       -1.5       Mar       -27.01         -309.41       -8       Sep       -23.10       -2       Feb       -13.80       -1.0       Feb       -17.88         -309.41       -8       Apr       -17.66       -2       Jun       -6.28       -0.5       Jun       -8.14         -309.41       -8       Feb       -10.64       -1       Apr       -5.81       -0.4       Apr       -7.53         -309.41       -8       Feb       -10.64       -1       May       -1.13       -0.1       May       -1.47         -309.41       -8       Feb       -10.64       -1       May       -1.13       -0.1       May       -1.47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -75.54 -3 Mar -92.67 -8 Feb -173.13                    | Mar -92.67 -8 Feb                 | -92.67 -8 Feb              | -8 Feb            | Feb             |                      | -173.13        |      | φ    | Nov   | -309,41   | 80   | Jul    | -44.07     | -5   | Nov    | -28.96   | -2.1         | Nov         | -37.53   | -2.9  | Nov .  | -346.85            | -3   |
| -309.41         -8         Aug         -26.39         -3         Mar         -20.84         -1.5         Mar         -27.01           -309.41         -8         Sep         -23.10         -2         Feb         -13.80         -1.0         Feb         -17.81         -17.88           -309.41         -8         Mar         -21.31         -2         Jun         -7.91         -0.6         Jan         -10.24           -309.41         -8         Apr         -17.66         -2         Jun         -5.28         -0.5         Jun         -8.14           -309.41         -8         Feb         -10.64         -1         Apr         -5.81         -0.4         Apr         -7.53           -309.41         -8         Feb         -10.64         -1         May         -1.13         -0.1         May         -1.47           -309.41         -8         Total         -395         -40         Total         -6.68         -34.7         Total         -606                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -53.27 ·2 Feb -83.70 -7 Sep -117.70                    | Feb -83.70 -7 Sep -117.70         | -83.70 -7 Sep -117.70      | -7 Sep -117.70    | Sep -117.70     | -117.70              |                |      | 4    | Oct   | -309.41   | 50   | Jun    | -28.01     | -3   | Dec .  | -22.81   | -1.7         | Dec         | -29.55   | -2.3  | Dec    | -273.11            | ÷    |
| -309.41       -8       Sep       -23.10       -2       Feb       -13.80       -1.0       Feb       -17.88         -309.41       -8       Mar       -21.31       -2       Jun       -6.28       -0.5       Jun       -8.14         -309.41       -8       Apr       -17.66       -2       Jun       -6.28       -0.5       Jun       -8.14         -309.41       -8       May       -11.94       -1       Apr       -5.81       -0.4       Apr       -7.53         -309.41       -8       Feb       -10.64       -1       May       -1.13       -0.1       May       -1.47         -309.41       -8       Total       -395       -40       Total       -468       -34.7       Total       -606                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -41.19 -1 Apr -77.69 -6 Jan -116.57                    | Apr -77.69 -6 Jan                 | -77.69 -6 Jan              | -6 Jan            | Jan             |                      | -116.57        |      | 4    | Aug   | -309.41   | οņ   | Aug    | -26.39     | .3   | Mar    | -20.84   | -1.5         | Mar         | -27.01   | -2.1  | Mar    | -249.57            | -3   |
| -309.41 -8 Mar -21.31 -2 Jan -7.91 -0.6 Jan -10.24<br>-309.41 -8 Apr -17.66 -2 Jun -6.28 -0.5 Jun -8.14<br>-309.41 -8 May -11.94 -1 Apr -5.81 -0.4 Apr -7.53<br>-309.41 -8 Feb -10.64 -1 May -1.13 -0.1 May -1.47<br>-309.41 -8 Total -395 -40 Total -468 -34.7 Total -606                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | -1 Jan -75.34 -6 Apr -72.60                            | Jan -75.34 -6 Apr                 | -75.34 -6 Apr              | -6 Apr            | Apr             |                      | -72.60         |      | -3   | May   | -309.41   | co   | Sep    | -23.10     | -2   | Feb    | -13.80   | -1.0         | Feb         | 88'21    | -1.4  | Feb    | -165.21            | -2   |
| -309.41 -8 Apr -17.66 -2 Jun -6.28 -0.5 Jun -8.14<br>-309.41 -8 May -11.94 -1 Apr -5.81 -0.4 Apr -7.53<br>-309.41 -8 Feb -10.64 -1 May -1.13 -0.1 May -1.47<br>-309.41 -8 Total -395 -40 Total -468 -34.7 Total -606                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | -21.40 -1 Sep -65.07 -5 May -71.86                     | Sep -65.07 -5 May                 | -65.07 -5 May              | -5 May            | May             |                      | -71.86         |      | .3   | Dec   | -309.41   | οņ   | Mar    | -21,31     | -2   | Jan    | .7.91    | 9.0-         | Jan         | -10.24   | -0.8  | Jan    | -94.67             | -1   |
| -309.41 -8 May -11.94 -1 Apr -5.81 -0.4 Apr -7.53<br>-309.41 -8 Feb -10.64 -1 May -1.13 -0.1 May -1.47<br>-309.41 -8 Total -395 -40 Total -468 -34.7 Total -606                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -15.65 -1 Dec -55.64 -5 Dec -46.30                     | Dec -55.64 -5 Dec                 | -55.64 -5 Dec              | -5 Dec            | Dec             |                      | -46.30         |      | -2   | Jun   | -309,41   | oņ.  | Apr    | -17.66     | -2   | unr    | -6.28    | -0.5         | Ju <b>n</b> | -8.14    | 9.0-  | Jun    | -75.16             | -1   |
| -309.41 -8 Feb -10.64 -1 May -1.13 -0.1 May -1.47 -309.41 -8 Total -395 -40 Total -468 -34.7 Total -606                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0 Oct -39.01 -3 Oct -12.44                             | Oct -39.01 -3 Oct                 | -39.01 -3 Oct              | -3 Oct            | Oct             |                      | -12.44         |      | -0.5 | Jul   | -309.41   | oç.  | May    | -11.94     | 7    | Apr    | -5.81    | -0.4         | Apr         | -7.53    | 9.0   | Apr    | -69.62             | 7    |
| -309.41 -8 Total -395 -40 Total -468 -34.7 Total -606                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0 Nov -38.90 -3 Nov -8.63                              | Nov -38.90 -3 Nov                 | -38.90 -3 Nov              | -3 Nov            | Nov             |                      | -8.63          |      | -0.3 | Jan   | -309.41   | œ    | Feb    | -10.64     | -    | May    | -1.13    | <b>.</b> 0.1 | May         | -1.47    | Q .   | May    | -13.59             | 9.1  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | -21 Total -1064 -87 Total -1506                        | Total -1064 -87 Total             | -1064 -87 Total            | -87 Total         | Total           |                      | -1506          |      | -55  | Total | -309.41   | œ    | Total  | 395        | -40  | Total  | -468     | -34.7        | Total       | 909-     | -46.5 | Total  | -5600              | 95-  |

Table 9.5: Monthly Spills as per LP Model for 75% Water Year Dependable Flows with 5800 MCM Water Exports from Mettur to the Sub-basins Below Mettur

|        |                  |         |         | -         |                   | 1                 | -      |         |         | -      |                 |                     |                |                   |                   |                  |
|--------|------------------|---------|---------|-----------|-------------------|-------------------|--------|---------|---------|--------|-----------------|---------------------|----------------|-------------------|-------------------|------------------|
| Months | Upper<br>Cauvery | Kabini  | Shimsha | Arkavathi | Middle<br>Cauvery | Suvarna-<br>vathí | Palar  | Chinnar | Bhavani | Noyil  | Amara-<br>vathi | Tirumani-<br>muttar | Ponnanai<br>Ar | Upper<br>Coleroon | Lower<br>Coleroon | Cauvery<br>Delta |
| ε      | (2)              | (£)     | (4)     | (5)       | (9)               | (2)               | (8)    | (6)     | (01)    | (11)   | (12)            | (13)                | (14)           | (15)              | (91)              | (17)             |
| Jun    | 602.72           | 31.06   | 2.09    | 9.32      | 721.48            | 2.09              | 99.6   | 8.40    | 60.98   | 38.89  | 80.72           | 36.36               | 42.42          | 143.30            | 158.66            | 173.37           |
| Jul    | 00.0             | 42.65   | 186.36  | 6.81      | 364.16            | 74.58             | 20.44  | 0.18    | 149.57  | 23.09  | 165.47          | 23.44               | 67.16          | 316.31            | \$12.59           | 411.86           |
| Aug    | 72.32            | 465.87  | 216.35  | 13.17     | 915.39            | 68.89             | 25.66  | 1.40    | 104.71  | 17.10  | 133.80          | 62.38               | 29.55          | 308.47            | 540.97            | 498.45           |
| Sep    | 00.0             | 363.18  | 225.58  | 98.58     | 875.45            | 62.09             | 28.32  | 78.00   | 37.91   | 14.48  | 57.76           | 106.79              | 43.61          | 321.52            | 569.39            | 569.86           |
| Oct    | 00.0             | 517.96  | 271.09  | 89.27     | 1039.39           | 10.98             | 7.22   | 0.00    | 51.89   | 116.78 | 35.76           | 391.39              | 136.27         | 444.20            | 551.38            | 750.94           |
| Nov    | 00'0             | 95.25   | 225.09  | 36.25     | 516.68            | 22.77             | 0.15   | 73.71   | 63.97   | 64.00  | 101.03          | 256.24              | 143.43         | 470.36            | 553.71            | 556.16           |
| Dec    | 00'0             | 0.00    | 258.06  | 9.62      | 373.36            | 32.72             | 3.71   | 15.86   | 41.24   | 43.07  | 80.54           | 152.05              | 135.78         | 307.25            | 363.37            | 304.45           |
| Jan    | 00'0             | 0.00    | 337.27  | 3.64      | 439.45            | 48.97             | 2.75   | 4.46    | 235.18  | 11.16  | 103.98          | 4.88                | 88.27          | 200.45            | 185.85            | 0.00             |
| Feb    | 00.00            | 0.00    | 260.72  | 2.06      | 363.44            | 44.27             | 1.59   | 1.58    | 173.05  | 14.40  | 45.63           | 143.41              | 5.19           | 175.54            | 172.62            | 0.00             |
| Mar    | 00.0             | 0.00    | 116.21  | 1.28      | 196.54            | 23.52             | 1,44   | 1.55    | 00.0    | 00.00  | \$0.08          | 223.75              | 27.42          | 170.08            | 204.49            | 158.86           |
| Apr    | 0.00             | 83.68   | 21.20   | 2.08      | 180.51            | 4.13              | 0.07   | 3.18    | 249.28  | 27.90  | 4.54            | 95.15               | 20.02          | 198.01            | 215.33            | 274.60           |
| May    | 00.0             | 58.33   | 1.96    | 6.97      | 144.79            | 0.00              | 1.66   | 8.83    | 12.83   | 31.86  | 10.11           | 52.41               | 11.45          | 88.43             | 96.64             | 98.84            |
| Annual | 675.04           | 1657.98 | 2121.98 | 279.05    | 6130.64           | 393.01            | 102.67 | 197.15  | 1180.61 | 402.73 | 869.42          | 1548.25             | 750.57         | 3143.92           | 4125.00           | 3797.39          |

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|            |                      |                                                          | 1           |            |                                                                                              |          | [4]      |           |            | Wei D.     | Parks Chief |             |           |       |          |
|------------|----------------------|----------------------------------------------------------|-------------|------------|----------------------------------------------------------------------------------------------|----------|----------|-----------|------------|------------|-------------|-------------|-----------|-------|----------|
| SI.No.     | Name of Sub-basin    | Water Balance Study                                      |             |            | ΑΑ                                                                                           | All III  | al water | Merr M    | actors mon | I'm I'm    | 4021        | 2           | A P.      | May   | Annual   |
| Ę          | í                    | (5)                                                      | un/         | in (       | gnv/                                                                                         | dac (c)  | 300      | 10N       | 300        | 117        | 3 (5)       | E C         | 14)       | (15)  | (41)     |
| Ξ          | (7)                  | (6)                                                      | <b>E</b>    | <u>c</u>   | (0)                                                                                          | S        | (0)      |           | (10)       |            | (17)        | 1,2,0       | 1,2,6     | 7     | 70.0     |
| -          | Though Carriery      | Without ground water                                     | 0.58        | 00:1       | 00.                                                                                          | 0.66     | 0.54     | 0.85      | 0.67       | 0.44       | 0.38        | 0.30        | 0/0       | 3     | 0.30     |
| -          | Oppor Cauvery        | With ground water                                        | 1.00        | 0.71       | 0.76                                                                                         | 1.00     | 00.1     | 1.00      | 1.00       | 8.         | 00.1        | 0.1         | 99.       | 0.83  | 0.96     |
| <u>,</u>   |                      | Without ground water                                     | 89.0        | 06.0       | 68.0                                                                                         | 00.1     | 19.0     | 0.98      | 1.00       | 1.00       | 1.00        | 1:00        | 1.00      | 0.79  | 8        |
| 7          | Kabini               | With ground water                                        | 19.0        | 0.84       | 0.84                                                                                         | 1.00     | 19.0     | 0.93      | 1.00       | 1.00       | 1.00        | 1.00        | 1.00      | 0.79  | 0.98     |
|            |                      | Without ground water                                     | 00.1        | 00.1       | 1.00                                                                                         | 0.88     | 0.26     | 92.0      | 00:1       | 1.00       | 1.00        | 1.00        | 1.00      | 0.91  | 0.96     |
| m          | Shimsha              | With ground water                                        | 0.94        | 96.0       | 0.95                                                                                         | 0.79     | 0.27     | 0.70      | 0.95       | 0.97       | 0.97        | 0.99        | 1.02      | 0.88  | 98.0     |
|            |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 00.1     | 1.00     | 00:1      | 1.00       | 00.1       | 1.00        | 1.00        | 1.00      | 1.00  | 1.00     |
| 4          | Arkavathi            | With ground water                                        | 00.1        | 1.00       | 1.00                                                                                         | 1.00     | 00 1     | 1.00      | 1.00       | 1.00       | 1.00        | 1.00        | 1.00      | 1.00  | 1.00     |
| L.         |                      | Without ground water                                     | 00.1        | 00.1       | 0.97                                                                                         | 0.93     | 08.0     | 98.0      | 86.0       | 1.00       | 1.00        | 00'1        | 1.00      | 1.00  | 0.97     |
| <u>~</u>   | Middle Cauvery       | With ground water                                        | 1.00        | 06.0       | 0.88                                                                                         | 0.86     | 0.78     | 0.82      | 0.90       | 0.91       | 0.92        | 0.93        | 0.97      | 1.00  | 0.89     |
| ,          |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 0.72     | 06.0      | 1.00       | 1.00       | 1.00        | 1.00        | 1.00      | 1.00  | 1.00     |
| •          | Suvarnavathi         | With ground water                                        | 00.1        | 1.00       | 1.00                                                                                         | 0.97     | 0.73     | 98.0      | 1.00       | 1.00       | 1.00        | 1.00        | 1.00      | 00.1  | 00.1     |
|            |                      | Without ground water                                     | 0.56        | 90'I       | 00.1                                                                                         | 1.00     | 0.84     | 00'1      | 00:1       | 1.00       | 1.00        | 00.1        | 1.00      | 1.00[ | 1.00     |
| _          | Palar                | With ground water                                        | 09.0        | 1.00       | 0.94                                                                                         | 0.82     | 0.77     | 1.00      | 1.00       | 00.        | 00.1        | 1.00        | 1.00      | 1.00  | 00.1     |
| ,          |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 28.      | 1.00      | 1.00       | 00:1       | 1.00        | 1.00        | 1.00      | 1.00  | 1.00     |
| <b>∞</b>   | Chinnar              | With ground water                                        | 1.00        | 1.00       | 1.00                                                                                         | 00.1     | 1.00     | 1.00      | 00.1       | 1.00       | 00.1        | 1.00        | 1.00      | 1.00  | 00.1     |
| ,          |                      | Without ground water                                     | 00.1        | 1.00       | 1.00                                                                                         | 1.00     | 0.68     | 9.0       | 0.82       | 00''       | 1.00        | 1.00        | 1.00      | 1.00  | 1.00     |
| <b>2</b> ^ | Bhavani              | With ground water                                        | 1.00        | 96.0       | 1.00                                                                                         | 1.00     | 89.0     | 99.0      | 0.81       | 1.00       | 1.00        | 1.00        | 1.00      | 1.00  | <u>s</u> |
|            |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 0.30     | 0.45      | 0.73       | 1.32       | 00'I        | 1.00        | 1.00      | 1.00  | 1.00     |
| 2<br>      | Noyil                | With ground water                                        | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 0.31     | 0.47      | 0.74       | 1.00       | 00.1        | 00.<br>I    | 1.00      | 1.00  | 1.00     |
| :          |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 00.1     | 0.34     | 0.24      | 0.44       | 8.<br>1.   | 00.1        | 1.00        | 1.00      | 1.00  | 1.00     |
| =          | Amaravathi           | With ground water                                        | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 0.36     | 0.25      | 0.45       | 90:        | 1.00        | 00.1        | 1.00      | 1.00  | 00.1     |
| :          |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 0.51     | 0.74      | 0.83       | 1.00       | 1.90        | 1.00        | 1.00      | 1.00  | 1.00     |
| <u>-</u> - | I irumanimuttar      | With ground water                                        | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 0.48     | 89.0      | 92.0       | 1.00       | 1.00        | 1:00        | 00.1      | 1.00  | 0.94     |
| :          |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 0.88     | 0.93     | 0.70      | 00.1       | 1.00       | 1.00        | 1:00        | 8.        | 1.00  | 00.1     |
| <u>1</u>   |                      | With ground water                                        | 0.95        | 0.94       | 0.94                                                                                         | 0.74     | 0.75     | 0.60      | 0.80       | 68.0       | 0.84        | 0.91        | 0.96      | 0.88  | 0.82     |
| :          |                      | Without ground water                                     | 1.00        | 1.00       | 1.00                                                                                         | 1.00     | 0.68     | 0.40      | 0.53       | 0.80       | 1.00        | 1.00        | 8         | 0.83  | 10.94    |
| <u>+</u>   |                      | With ground water                                        | 0.94        | 1.00       | 1.00                                                                                         | 0.87     | 09.0     | 0.37      | 0.48       | 0.72       | 0.91        | 1.00        | 0.98      | 0.77  | 0.79     |
|            |                      | Without ground water                                     | 0.88        | 0.93       | 0.88                                                                                         | 0.86     | 0.74     | 0.75      | 69.0       | 0.77       | 0.92        | 0.94        | 0.86      | 0.85  | 0.85     |
| <u>-</u>   | Lower Coleroon       | With ground water                                        | 0.85        | 0.85       | 0.81                                                                                         | 0.79     | 0.70     | 0.71      | 0.65       | 0.75       | 0.87        | 0.87        | 0.83      | 0.85  | 0.79     |
| 1          | 2                    | Without ground water                                     | 0.92        | 0.94       | 0.91                                                                                         | 06.0     | 0.81     | 0.82      | 0.77       | 0.84       | 0.94        | 0.95        | 06.0      | 06.0  | 0.89     |
| 9          | Cauvery Della        | With ground water                                        | 0.92        | 0.92       | 0.89                                                                                         | 0.88     | 08.0     | 0.81      | 97.0       | 0.83       | 0.93        | 0.94        | 06.0      | 0.91  | 0.88     |
| Note:      | (1) Utilization fact | (1) Utilization factor calculated in water balance studi | alance stud | ies is the | es is the ratio between the water utilization (demands) and the amount of water availability | ween the | water un | ilization | (demano    | ls) and th | ie amoun    | it of water | r availab | ility |          |

(2) Further in the water balance studies it is assumed that the available water in a sub-basin is to be utilized first within the sub-basin, and then to be exported (1) Utilization factor calculated in water balance studies is the ratio between the water utilization (demands) and the amount of water availability to other sub-basins if surplus, as water balance are done independent of other sub-basins. (3) Exports from Mettur reservoir to the sub-basins below Mettur is 12712 MCMC

Table 9.7: Computed Annual Water Utilization Factors from LP Model Results with 5800 MCM Water Exports from Mettur to the Sub-basins Below Mettur for 75% Water Year Dependable Flows

| Sl.No.   | Name of Sub-basin |      |          | Utili      | zation fa   | ctor-with |                   |
|----------|-------------------|------|----------|------------|-------------|-----------|-------------------|
| \$1.1NO. | Name of Sub-basin | sw   | sw + imp | sw+imp+swr | g.w.        | gw + gwr  | sw+imp+swr+gw+gwi |
| (1)      | (2)               | (3)  | (4)      | (5)        | (6 <b>)</b> | (7)       | (8)               |
| 1        | Upper Cauvery     | 0.40 | 0.40     | 1.00       | 1.00        | 0.83      | 0.41              |
| 2        | Kabini            | 0.90 | 0.82     | 0.92       | 0.94        | 0.79      | 0.73              |
| 3        | Shimsha           | 1.00 | 0.28     | 0.31       | 1.00        | 0.81      | 0.35              |
| 4        | Arkavathi         | 0.71 | 0.29     | . 0.51     | 1.00        | 0.61      | 0.30              |
| 5        | Middle C.         | 1.00 | 0.89     | 0.28       | 1.00        | 0.84      | 0.77              |
| 6        | Suvarnavathi      | 1.00 | 0.13     | 0.16       | 1.00        | 0.71      | 0.20              |
| 7        | Palar             | 0.51 | 0.51     | 1.00       | 0.95        | 0.76      | 0.60              |
| 8        | Chinnar           | 1.00 | 1.00     | 1.00       | 0.90        | 0.73      | 1.02              |
| 9        | Bhavani           | 0.59 | 0.58     | 0.99       | 1.00        | 0.78      | 0.52              |
| 10       | Noyil             | 0.58 | 0.20     | 0.42       | 0.60        | 0.48      | 0.19              |
| 11       | Amaravathi        | 1,00 | 0.83     | 0.74       | 0.78        | 0.62      | 0.62              |
| 12       | Tirumanimuttar    | 1.00 | 0.40     | 0.42       | 1.00        | 0.58      | 0.36              |
| 13       | Ponnai Ar         | 1.00 | 0.59     | 0.48       | 0.94        | 0.81      | 0.52              |
| 14       | Upper Coleroon    | 1.00 | 0.74     | 0.59       | 0.85        | 0.72      | 0.63              |
| 15       | Lower Colcroon    | 1,00 | 0.53     | 0.27       | 0.93        | 0.82      | 0.50              |
| 16       | Cauvery Delta     | 1.00 | 0.44     | 0.19       | 1.00        | 0.57      | 0.40              |
|          |                   |      |          |            |             |           |                   |

Note: (1) sw = Surface water.

sw + imp = Surface water + imports.

sw + imp + swr = Surface water + imports + regenerations from surface water use.

g.w. = Ground water

gw+gwr = Ground water + regenerations from geround water use

sw+imp+swr+gw+gwr = Surfacw water + imports + regenerations from surface water use + ground water + regenerations from ground water use

- (2) The utilization factors calculated from LP model, where, the utilization factor is less than one, the surplus water is available; however, when the utilization factor is equal to one, it means the demands are not completely met with the following interpretations:
  - (i) the available water is less than the demands, and (ii) the available water is more than the demands and a part of available water is being diverted optimally to downstream sub-basins. This shows the impact of storages and locations on water utilization.

This is because, the entire river system is considered as one, unlike in water balance studies where each sub-basin was considered independently.

Table 9.8: Comparison of Total Annual Water Balance from Water Balance and LP Model Studies

|                                      |                     |           |        |                  |        | To               | tal Annue | Total Annual Water Balance With Ground Water Consideration | lance Wit  | th Ground V                | Vater Con | ısideration |        |           |        |                  |        |
|--------------------------------------|---------------------|-----------|--------|------------------|--------|------------------|-----------|------------------------------------------------------------|------------|----------------------------|-----------|-------------|--------|-----------|--------|------------------|--------|
| 5                                    |                     |           |        |                  |        |                  |           | Water                                                      | r year dep | Water year dependable flow | W         |             |        |           |        |                  |        |
| <u> </u>                             | Sub bosin           |           | 75%    | %                |        |                  | %05       | %                                                          |            | 5                          | %06       | %           |        |           | 100%   | %                |        |
| o'<br>                               |                     | LP        |        |                  | WB     | 3                |           | WB                                                         |            | LP                         |           | WB          |        | LP        |        | WB               |        |
|                                      |                     | Quantity  | %      | Quantity         | %      | Quantity         | %         | Quantity                                                   | %          | Quantity                   | %         | Quantity    | %      | Quantity  | %      | Quantity         | %      |
| $\widehat{\boldsymbol{\varepsilon}}$ | (2)                 | (3)       | (4)    | (5)              | (9)    | (7)              | (8)       | (6)                                                        | (10)       | (11)                       | (12)      | (13)        | (14)   | (15)      | (16)   | (11)             | (18)   |
| _                                    | Upper Cauvry        | -703.41   | -11.01 | 286.45           | 4.48   | -839.72          | -13.14    | 660.90                                                     | 10.34      | -1655,14                   | -25.91    | -262.19     | 4.10   | -1750.46  | -27.40 | -1935.29         | -30.29 |
| 7                                    | Kabini              | -172.40   | -3.47  | 107.62           | 2.16   | 95.16            | 1.91      | 835.27                                                     | 16.79      | -1387.17                   | -27.89    | 487.37      | -9.80  | -2247.62  | 45.19  | -1534.79         | -30.86 |
| m                                    | Shimsha             | -1389.95  | -35.94 | 640.15           | 16.55  | -1169.95         | -30.25    | . 782.71                                                   | 20.24      | -1664.64                   | 43.05     | 628.26      | 16.25  | -1664.64  | -43.05 | 341.17           | 8.82   |
| 4                                    | Arkavathi           | -2121.66  | -87.38 | -712.56          | -29.35 | -2060.66         | -84.87    | -676.56                                                    | -27.87     | -2232.66                   | -91.95    | -795.72     | -32.77 | -2235.66  | -92.08 | 415.48           | -17.11 |
| ~                                    | Middle Cauvery      | 1788.15   | 80.51  | 268.94           | 12.11  | 1788.00          | 80.50     | 330.95                                                     | 14.90      | 781.00                     | 35.16     | 214.50      | 99'6   | 415.00    | 69:81  | 127.95           | 5.76   |
| 9                                    | Suvarnavathi        | -634.41   | -82.71 | -22.11           | -2.88  | -604.41          | -78.80    | 12.48                                                      | 1.63       | -660.41                    | -86.10    | -50.11      | -6.53  | -667.41   | -87.02 | -60.11           | -7.84  |
| 7                                    | Palar               | -170.06   | 47.64  | -28.49           | -7.98  | -55.46           | -15.54    | 44.22                                                      | 12.39      | -156.86                    | 43.94     | -61.49      | -17.22 | -190.86   | -53.46 | -115.48          | -32.35 |
| ∞                                    | Chimar              | -213.00   | -1.28  | -12932.21        | -78.01 | -115.07          | -1.71     | -15822.55                                                  | -95.45     | -223.00                    | -1.35     | -13012.21   | -78.50 | -233.15   | -1.41  | -13155.21        | -79.36 |
| 6                                    | Bhavani             | -1159.90  | 40.30  | -247.39          | 09.8-  | -1159.90         | 40.30     | 239.43                                                     | 8.32       | -1150.00                   | -39.96    | -651.57     | -22.64 | -1219.52  | -42.37 | -946.57          | -32.89 |
| 9                                    | Noyil               | -1058.10  | -86.66 | -39.92           | -3.27  | -1058.10         | -86.66    | -64.52                                                     | -5.28      | -1068.10                   | -87.48    | -51.92      | 4.25   | -1100.10  | -90.10 | -63.92           | -5.23  |
| Ξ                                    | Amaravathi          | -1379.24  | -50.10 | 453.63           | -16.48 | -1335.66         | 48.52     | -303.63                                                    | -11.03     | -1548.54                   | -56.25    | -546.63     | -19.86 | -2145.22  | -77.92 | -710.63          | -25.81 |
| 12                                   | Tirumanimuttar      | -2465.51  | -65.02 | 100.64           | 2.65   | -2332.72         | -61.52    | 465.24                                                     | 12.27      | -2397.72                   | -63.23    | 75.64       | 1.99   | -2469.07  | -65.11 | 16.64            | 0.44   |
| 13                                   | Ponnai Ar           | 420.10    | -41.80 | 188.17           | 18.72  | 400.50           | -39.85    | 214.97                                                     | 21.39      | 412.79                     | 41.07     | 157.17      | 15.64  | 408.99    | -40.70 | 61.17            | 6.09   |
| 14                                   | Upper Coleroon      | -296.89   | -21.62 | 334.44           | 24.36  | -296.89          | -21.62    | 484.44                                                     | 35.28      | -296.89                    | -21.62    | 243.44      | 17.73  | -296.89   | -21.62 | -64.56           | 4.70   |
| 15                                   | Lower Coleroon      | -506.27   | -38.82 | 340.16           | 26.09  | -506.27          | -38.82    | 485.19                                                     | 37.21      | -506.27                    | -38.82    | 284.72      | 21.83  | -506.27   | -38.82 | 182.75           | 14.01  |
| 16                                   | Cauvery Delta       | -2541.36  | -25.39 | 1413.26          | 14.12  | -2416.76         | -24.15    | 2120.53                                                    | 21.19      | -2316.76                   | -23.15    | 951.63      | 9.51   | -5416.76  | -54.12 | 553.63           | 5.53   |
| Tou                                  | Total Cauvery Basin | -13444.12 | -22.79 | -22.79 -10586.00 | -17.95 | -17.95 -12468.91 | -21.14    | -9859.00                                                   | -16.72     | -16895.95                  | -28.65    | -13363.85   | -22.66 | -22137.63 | -37.53 | -37.53 -17718.73 | -30.04 |
|                                      |                     |           |        |                  |        |                  |           |                                                            | 1          |                            |           |             |        | <br>      |        |                  |        |

Note: Exports from Mettur in (i) LP is 5800 MCM, and (ii) Water balance (WB) is 12712 MCM.

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## THE DISTRICT WISE CATCHMENT AREAS OF THE SUB-BASINS LYING IN THE CAUVERY RIVER BASIN

Table I.1: Districtwise Catchment Area of the Upper Cauvery Sub-Basin

| State     | District    | Area Falling<br>in the Sub-basin<br>(Km²) | Total Area of the Sub-basin (%) |
|-----------|-------------|-------------------------------------------|---------------------------------|
| (1)       | (2)         | (3)                                       | (4)                             |
| Karnataka | Chikmagalur | 714                                       | 6.72                            |
| Karnataka | Kodagu      | 2515                                      | 23.68                           |
| Karnataka | Hassan      | 4369                                      | 41.14                           |
| Karnataka | Mandya      | 965                                       | 9.10                            |
| Karnataka | Mysore      | 2056                                      | 19.36                           |
|           | Total       | 10619                                     | 100.00                          |

Table I.2: District wise Catchment Area of the Kabini Sub-basin

|           |           | Area Falling       | Total Area       |
|-----------|-----------|--------------------|------------------|
| State     | District  | in the Sub-basin   | of the Sub-basin |
| - V       | 1305      | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)       | (3)                | (4)              |
| Karnataka | Kodagu    | 151                | 2.14             |
| Karnataka | Mysore    | 4757               | 67.58            |
| Kerala    | Cannanore | 18                 | 0.26             |
| Kerala    | Wynad     | 1873               | 26.60            |
| Kerala    | Kozhikode | 29                 | 0.41             |
| Tamilnadu | Niligiris | 212                | 3.01             |
|           | Total     | 7040               | 100.00           |

Table I.3: District wise Catchment Area of the Shimsha Sub-basin

|           |          | Area Falling       | Total Area       |
|-----------|----------|--------------------|------------------|
| State     | District | in the Sub-basin   | of the Sub-basin |
|           |          | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)      | (3)                | (4)              |
| Karnataka | Hassan   | 527                | 6.23             |
| Karnataka | Mandya   | 2750               | 32.47            |
| Karnataka | Mysore   | 49                 | 0.58             |
| Karnataka | Tumkur   | 3799               | 44.86            |
|           | Total    | 8469               | 100.00           |

Table I.4: District wise Catchment Area of the Arkavathi Sub-basin

| 1.2.7     |            | Area Falling       | Total Area       |
|-----------|------------|--------------------|------------------|
| State     | District   | in the Sub-basin   | of the Sub-basin |
|           | 1/3/10/1   | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)        | (3)                | (4)              |
| Karnataka | Bangalore  | 4109               | 94.43            |
| Karnataka | Kolar      | 6                  | 0.14             |
| Karnataka | Mandya     | 69                 | 1.59             |
| Tamilnadu | Dharmapuri | 167                | 3.84             |
|           | Total      | 4351               | 100.00           |

Table I.5: District wise Catchment Area of the Middle Cauvery Sub-basin

|           |          | Area Falling       | Total Area       |
|-----------|----------|--------------------|------------------|
| State     | District | in the Sub-basin   | of the Sub-basin |
|           |          | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)      | (3)                | (4)              |
| Karnataka | Mandya   | 1148               | 42.89            |
| Karnataka | Mysore   | 1528               | 57.11            |
|           | Total    | 2676               | 100.00           |

Table I.6: District wise Catchment Area of the Suvarnavathi Sub-basin

|           |          | Area Falling       | Total Area       |
|-----------|----------|--------------------|------------------|
| State     | District | in the Sub-basin   | of the Sub-basin |
|           |          | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)      | (3)                | (4)              |
| Karnataka | Mysore   | 1207               | 67.5             |
| Tamilnadu | Periyar  | 580                | 32.5             |
| Total     |          | 1787               | 100.0            |

Table I.7: District wise Catchment Area of the Palar Sub-basin

| 4.00      |          | Area Falling       | Total Area       |
|-----------|----------|--------------------|------------------|
| State     | District | in the Sub-basin   | of the Sub-basin |
| 451       |          | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)      | (3)                | (4)              |
| Karnataka | Mysore   | 1870               | 58.2             |
| Tamilnadu | Periyar  | 1097               | 34.1             |
| Tamilnadu | Salem    | 247                | 7.7              |
| Total     |          | 3214               | 100.0            |

Table I.8: District wise Catchment Area of the Chinnar Sub-basin

| 7.7       | 10 m       | Area Falling     | Total Area       |
|-----------|------------|------------------|------------------|
| State     | District   | in the Sub-basin | of the Sub-basin |
|           | (00)       | (Km²)            | (%)              |
| (1)       | (2)        | (3)              | (4)              |
| Karnataka | Bangalore  | 100              | 2.46             |
| Tamilnadu | Dharmapuri | 3630             | 89.38            |
| Tamilnadu | Salem      | 331              | 8.16             |
| Total     |            | 4061             | 100.00           |

Table I.9: District wise Catchment Area of the Bhavani Sub-basin

|           |            | Area Falling     | Total Area       |
|-----------|------------|------------------|------------------|
| State     | District   | in the Sub-basin | of the Sub-basin |
|           |            | $(Km^2)$         | (%)              |
| (1)       | (2)        | (3)              | (4)              |
| Karnataka | Mysore     | 240              | 3.9              |
| Kerala    | Palghat    | 562              | 9.1              |
| Tamilnadu | Coimbatore | 1002             | 16.3             |
| Tamilnadu | Periyar    | 2469             | 40.1             |
| Tamilnadu | Nilgiris   | 1881             | 30.6             |
| Total     | C. 3       | 6154             | 100.0            |

Table I.10: District wise Catchment Area of the Noyil Sub-basin

|           | 7. T. V        | Area Falling       | Total Area       |
|-----------|----------------|--------------------|------------------|
| State     | District       | in the Sub-basin   | of the Sub-basin |
|           | 13.00          | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)            | (3)                | (4)              |
| Tamilnadu | Coimbatore     | 2117               | 70.6             |
| Tamilnadu | Periyar        | <b>7</b> 42        | 24.7             |
| Tamilnadu | Tiruchirapalli | 140                | 4.7              |
| Total     | 18.            | 2999               | 100.0            |

Table I.11: District wise Catchment Area of the Amaravathi Sub-basin

|                    | (A 70)         | Area Falling     | Total Area       |
|--------------------|----------------|------------------|------------------|
| State              | District       | in the Sub-basin | of the Sub-basin |
|                    | - 4            | (Km²)            | (%)              |
| (1)                | (2)            | (3)              | (4)              |
| Kerala             | Iddukki        | 384              | 4.6              |
| Tamilnadu          | Coimbatore     | 1515             | 18.3             |
| Tamilnadu          | Madurai        | 3888             | 47.0             |
| Tamilnadu          | Periyar        | 1663             | 20.1             |
| T <b>a</b> milnadu | Tiruchirapalli | 830              | 10.0             |
| Total              |                | 8280             | 100.0            |

Table I.12: District wise Catchment Area of the Tirumanimuttar Sub-basin

|           |                | Area Falling       | Total Area       |
|-----------|----------------|--------------------|------------------|
| State     | District       | in the Sub-basin   | of the Sub-basin |
|           |                | (Km <sup>2</sup> ) | . (%)            |
| (1)       | (2)            | (3)                | (4)              |
| Tamilnadu | Dindigul Anna  | 165                | 1.96             |
| Tamilnadu | Pariyar        | 976                | 11.58            |
| Tamilnadu | Salem          | 5042               | 59.81            |
| Tamilnadu | Tiruchirapalli | 2246               | 26.65            |
| Total     | 6. 900         | 8429.00            | 100.00           |

Table I.13: District wise Catchment Area of the Ponnanai Ar Sub-basin

| 5         | 27             | Area Falling     | Total Area       |
|-----------|----------------|------------------|------------------|
| State     | District       | in the Sub-basin | of the Sub-basin |
| 1         | 1 340/4        | (Km²)            | (%)              |
| (1)       | (2)            | (3)              | (4)              |
| Tamilnadu | Madurai        | 24               | 1.16             |
| Tamilnadu | Pudukkottai    | 486              | 23.69            |
| Tamilnadu | Thanjavur      | 3                | 0.16             |
| Tamilnadu | Tiruchirapalli | 1537             | 74.99            |
| Total     | A TOUR         | 2050.00          | 100.00           |

Table I.14: District wise Catchment Area of the Upper Coleroon Sub-basin

|           |                | Area Falling       | Total Area       |
|-----------|----------------|--------------------|------------------|
| State     | District       | in the Sub-basin   | of the Sub-basin |
|           |                | (Km <sup>2</sup> ) | (%)              |
| (1)       | (2)            | (3)                | (4)              |
| Tamilnadu | Tiruchirapalli | 3080               | 99.94            |
| Tamilnadu | Thanjavur      | 2                  | 0.06             |
| Total     |                | 3082.00            | 100.00           |

Table I.15: District wise Catchment Area of the Lower Coleroon Sub-basin

|           |                   | Area Falling     | Total Area       |
|-----------|-------------------|------------------|------------------|
| State     | District          | in the Sub-basin | of the Sub-basin |
|           |                   | (Km²) ·          | (%)              |
| (1)       | (2)               | (3)              | (4)              |
| Tamilnadu | Tiruchchirappalli | 522              | 37.91            |
| Tamilnadu | Thanjavur         | 144              | 10.44            |
| Tamilnadu | South Arcot       | 712              | 51.65            |
|           | Total             | 1378             | 100.00           |

Table I.16: District wise Catchment Area of the Cauvery Delta Sub-basin

| State       | District                         | Area Falling<br>in the Sub-basin<br>(Km²) | Total Area of the Sub-basin (%) |
|-------------|----------------------------------|-------------------------------------------|---------------------------------|
| (1)         | (2)                              | (3)                                       | (4)                             |
| Tamilnadu   | Pudukkottai                      | 144                                       | 2.19                            |
| Tamilnadu   | Thanjavur                        | 1915                                      | 29.17                           |
| Tamilnadu   | Nagappattinam<br>Quaid-E- Millad | 4269                                      | 65.03                           |
| Tamilnadu   | Tiruchchirappalli                | . 89                                      | 1.34                            |
| Pondicherry | Karaikal                         | 149                                       | 2.27                            |
|             | Total                            | 6566                                      | 100.00                          |

## METEOROLOGICAL DATA FOR VARIOUS SUB-BASINS IN CAUVERY RIVER BASIN

Table II.1: Meteorological Data for: Upper Cauvery Sub-basin

| Month |       | erature<br>C) |           | Relative Humidity (%) |       | Wind Speed |           | Cloud cover of sky (Oktas) |       | Monthly<br>Evapotran-<br>spiration |
|-------|-------|---------------|-----------|-----------------------|-------|------------|-----------|----------------------------|-------|------------------------------------|
|       | Max   | Min           | 08.30 hrs | 17.30 hrs             | km/hr | km/day     | 08.30 hrs | 17.30 hrs                  | mm    | mm                                 |
| 1     | 2     | 3             | 4         | 5                     | 6     | 7          | . 8       | 9                          | 10    | 11                                 |
| Jan   | 28.3  | 16.4          | 75        | 30                    | 11.3  | 225        | 3         | 2.9                        | 2,8   | 128.4                              |
| Feb   | 31.2  | 18.2          | 69        | 25                    | 9.1   | 181        | 2.8       | 2.9                        | 5.5   | 133.5                              |
| Mar   | 33.5. | 20.2          | 71        | 21                    | 8.8   | 175        | 2.3       | 3.2                        | 12    | 165.9                              |
| Apr   | 34.0  | 21.4          | 75        | 34                    | 8.4   | 167        | 3.7       | 5.1                        | 67.6  | 154.2                              |
| May   | 32.6  | 21.2          | 79        | 51                    | 10.2  | 203        | 4.9       | 5.5                        | 156.9 | 147.6                              |
| Jun   | 28.9  | 20.2          | 81        | 66                    | 13.9  | 277        | 5.9       | 6.4                        | 60.5  | 123.5                              |
| Jul   | 27.3  | 19.7          | 84        | 70                    | 14.1  | 281        | 6.4       | 6.8                        | 71.9  | 115.5                              |
| Aug   | 27.9  | 19.6          | 84        | 67                    | 12.5  | 249        | 6.2       | 6.7                        | 80.1  | 117.2                              |
| Sep   | 28.7  | 19.3          | 83        | 61                    | 10.7  | 213        | 5.7       | 6.1                        | 116.3 | 116.9                              |
| Oct   | 28.4  | 19.6          | 85        | 61                    | 7.9   | 157        | 5.6       | 5.9                        | 179.9 | 110.5                              |
| Nov   | 27.4  | 18.3          | 80        | 54                    | 9.3   | 185        | 4.7       | 4.9                        | 66.6  | 106                                |
| Dcc   | 27.0  | 16.5          | 78        | 43                    | 11.3  | 225        | 3.6       | 3.9                        | 14.7  | 114.3                              |

Latitude : 12<sup>0</sup> 18' N Longitude : 76<sup>0</sup> 42' E Height above MSL : 767 M Height of anemometer : 9 M.

Table II.2: Meteorological Data for: Kabini Sub-basin

| Month | Temperature<br>(°C) |      | Relative Humidity (%) |           | Wind Speed |        | Cloud cover of sky<br>(Oktas) |           | Normal<br>Rainfall . | Monthly<br>Evapotran-<br>spiration |
|-------|---------------------|------|-----------------------|-----------|------------|--------|-------------------------------|-----------|----------------------|------------------------------------|
|       | Max                 | Min  | 08.30 hrs             | 17.30 hrs | kın/lır    | km/day | 08.30 hrs                     | 17.30 hrs | min                  | min                                |
| 1     | 2                   | 3    | 4                     | - 5       | 6          | 7      | 8                             | 9         | 10                   | 11                                 |
| Jan   | 28.3                | 16.4 | 75                    | 30        | 11.3       | 225    | 3.0                           | 2.9       | 2.8                  | 128.4                              |
| Fcb   | 31.2                | 18.2 | 69                    | 25        | 9.1        | 181    | 2.8                           | 2.9       | 5.5                  | 133.5                              |
| Mar   | 33.5                | 20.2 | 71                    | 21        | 8.8        | 175    | 2.3                           | 3.2       | 12.0                 | 165.9                              |
| Apr   | 34.0                | 21.4 | 75                    | 34        | 8.4        | 167    | 3.7                           | 5.1       | 67.6                 | 154.2                              |
| May   | 32.6                | 21.2 | 79                    | 51        | 10.2       | 203    | 4.9                           | 5.5       | 156.9                | 147.6                              |
| Jun   | 28.9                | 20.2 | 81                    | 66        | 13.9       | 277    | 5.9                           | 6.4       | 60.5                 | 123.5                              |
| Jul   | 27.3                | 19.7 | 84                    | 70        | 14.1       | 281    | 6.4                           | 6.8       | 71.9                 | 115.5                              |
| Aug   | 27.9                | 19.6 | 84                    | 67        | 12.5       | 249    | 6.2                           | 6.7       | 80,1                 | 117.2                              |
| Sep   | 28.7                | 19.3 | 83 -                  | 61        | 10.7       | 213    | 5.7                           | 6.1       | 116.3                | 116.9                              |
| Oct   | 28.4                | 19.6 | 85                    | 61        | 7.9        | 157    | 5.6                           | 5.9       | 179.9                | 110.5                              |
| Nov   | 27.4                | 18.3 | 80                    | 54        | 9.3        | 185_   | 4.7                           | 4.9       | 66.6                 | 106.0                              |
| Dec   | 27.0                | 16.5 | 78                    | 43        | 11.3       | 225    | 3.6                           | 3.9       | 14.7                 | 114.3                              |

Latitude : 12° 18' N

Height above MSL

: 767 M

Longitude: 76° 42' E

Height of anemometer: 9 M.

Table II.3: Meteorological Data for: Shimsha Sub-basin

| Month | Temperature (°C) |      | Relative Humidity (%) |           | Wind Speed |        | Cloud cover of sky<br>(Oktas) |           | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|------------------|------|-----------------------|-----------|------------|--------|-------------------------------|-----------|--------------------|------------------------------------|
|       | Max              | Min  | 08.30 lus             | 17.30 hrs | km/lu      | km/day | 08.30 lurs                    | 17.30 hrs | ı <b>n</b> ın      | min                                |
| 1     | 2                | 3    | 4                     | 5         | 6          | 7      | 8                             | 9         | 10                 | 11                                 |
| Jan   | 28.3             | 16.4 | 75                    | 30        | 11.3       | 225    | 3                             | 2.9       | 2.8                | 128.4                              |
| Feb   | 31.2             | 18.2 | 69                    | 25        | 9.1        | 181    | 2.8                           | 2.9       | 5,5                | 133.5                              |
| Mar   | 33.5             | 20.2 | 71                    | 21        | 8.8        | 175    | 2.3                           | 3.2       | 12                 | 165.9                              |
| Apr   | 34.0             | 21.4 | 75                    | 34        | 8.4        | 167    | 3,7                           | 5.1       | 67.6               | 154.2                              |
| May   | 32.6             | 21.2 | 79                    | 51        | 10.2       | 203    | 4.9                           | 5.5       | 156,9              | 147.6                              |
| Jun   | 28.9             | 20.2 | 81                    | 66        | 13.9       | 277    | 5.9                           | 6.4       | 60.5               | 123.5                              |
| Jul   | 27.3             | 19.7 | 84                    | 70        | 14.1       | 281    | 6.4                           | 6.8       | 71.9               | 115.5                              |
| Aug   | 27.9             | 19.6 | 84                    | 67        | 12.5       | 249    | 6.2                           | 6.7       | 80.1               | 117.2                              |
| Sep   | 28.7             | 19.3 | 83                    | 61        | 10.7       | 213    | 5.7                           | 6.1       | 116.3              | 116.9                              |
| Oct   | 28.4             | 19.6 | 85                    | 61        | 7.9        | 157    | 5.6                           | 5.9       | 179,9              | 110.5                              |
| Nov   | 27.4             | 18.3 | 80                    | 54        | 9.3        | 185    | 4.7                           | 4.9       | 66.6               | 106                                |
| Dec   | 27.0             | 16.5 | 78                    | 43        | 11.3       | 225    | 3.6                           | 3.9       | 14.7               | 114.3                              |

Latitude : 12" 18' N Longitude : 76° 42' E Height above MSL : 767 M Height of anemometer : 9 M.

Table II.4: Meteorological Data for: Arkavathi Sub-basin

| Month | Temperature<br>(°C) |      | Relative Humidity (%) |            | Wind Speed |        | Cloud cover of sky<br>(Oktas) |            | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|---------------------|------|-----------------------|------------|------------|--------|-------------------------------|------------|--------------------|------------------------------------|
|       | Max                 | Min  | 08.30 hrs             | 17.30 lurs | km/hr      | km/day | 08.30 lus                     | 17.30 lurs | mm                 | min                                |
| ì     | 2                   | 3    | 4                     | 5          | 6          | 7      | 8                             | 9          | 10                 | 11                                 |
| Jan   | 26.9                | 15   | 77                    | 40         | 10.4       | 207    | 3.7                           | 2.9        | 3.3                | 117.4                              |
| Feb   | 29.7                | 16.5 | 67                    | 29         | 9.7        | 193    | 2.6                           | 2.8        | 10.2               | 130.0                              |
| Mar   | 32.3                | 19   | 63                    | 24         | 9.4        | 187    | 2.0                           | 2.9        | 6.1                | 166.2                              |
| Apr   | 33.4                | 21.2 | 70                    | 34         | 9.0        | 179    | 3.6                           | 5.0        | 45.7               | 158.2                              |
| May   | 32.7                | 21.1 | 75                    | 46         | 11.3       | 225    | 5.0                           | 5.7        | 116.5              | 156.5                              |
| Jun   | 28.9                | 19.7 | 82                    | 62         | 17.1       | 341    | 6.9                           | 6.9        | 80.1               | 126.5                              |
| Jul   | 27.2                | 19.2 | 86                    | 68         | 17.5       | 349    | 7.6                           | 7.4        | 116.6              | 115.7                              |
| Aug   | 27.3                | 19.2 | 86                    | 66         | 15.2       | 303    | 7.5                           | 7.1        | 147.1              | 114.2                              |
| Sep   | 27.6                | 18.9 | 85                    | 62         | 12.1       | 241    | 6.9                           | 6.8        | 142.7              | 108.9                              |
| Oct   | 27.5                | 18.9 | 83                    | 64         | 8,2        | 163    | 6.1                           | 6.3        | 184,9              | 105.1                              |
| Nov   | 26.3                | 17.2 | 78                    | 59         | 8.5        | 169    | 4.9                           | 5.2        | 54.3               | 98.3                               |
| Dec   | 25.7                | 15.3 | 78                    | 51         | 9.6        | 191    | 4.2                           | 3.9        | 16.2               | 102.9                              |

Latitude : 12° 58' N Longitude : 77° 35' E

Height above MSL : 921 M Height of anemometer : 16 M.

Table II.5: Meteorological Data for: Middle Cauvery Sub-basin

| Month | Tempo<br>(° | erature<br>C) | Relative I | Humidity<br>6) | Wind Speed Cloud cover of sk<br>(Oktas) |        |           | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |       |
|-------|-------------|---------------|------------|----------------|-----------------------------------------|--------|-----------|--------------------|------------------------------------|-------|
|       | Max         | Min           | 08.30 hrs  | 17.30 hrs      | km/hr                                   | km/day | 08.30 hrs | 17.30 hrs          | min                                | mm    |
| i     | 2           | 3             | 4          | 5              | 6                                       | 7      | 8         | 9                  | 10                                 | 11    |
| Jan   | 28.3        | 16.4          | 75.0       | 30.0           | 11.3                                    | 225.0  | 3.0       | 2.9                | 2.8                                | 128.4 |
| Feb   | 31.2        | 18.2          | 69.0       | 25.0           | 9,1                                     | 181.0  | 2.8       | 2.9                | 5.5                                | 133,5 |
| Mar   | 33,5        | 20.2          | 71.0       | 21.0           | 8.8                                     | 175.0  | 2.3       | 3.2                | 12.0                               | 165.9 |
| Apr   | 34.0        | 21.4          | 75.0       | 34.0           | 8.4                                     | 167.0  | 3.7       | 5.1                | 67.6                               | 154.2 |
| May   | 32,6        | 21,2          | 79.0       | 51.0           | 10.2                                    | 203.0  | 4.9       | 5.5                | 156.9                              | 147.6 |
| Jun   | 28.9        | 20.2          | 81.0       | 66.0           | 13.9                                    | 277.0  | 5.9       | 6.4                | 60.5                               | 123.5 |
| Jul   | 27.3        | 19.7          | 84.0       | 70.0           | 14.1                                    | 281.0  | 6.4       | 6.8                | 71.9                               | 115.5 |
| Aug   | 27.9        | 19.6          | 84.0       | 67.0           | 12.5                                    | 249.0  | 6.2       | 6.7                | 1.08                               | 117.2 |
| Sep   | 28.7        | 19.3          | 83.0       | 61.0           | 10.7                                    | 213.0  | 5.7       | 6.1                | 116.3                              | 116.9 |
| Oct   | 28.4        | 19.6          | 85.0       | 61.0           | 7.9                                     | 157.0  | 5.6       | 5.9                | 179.9                              | 110.5 |
| Nov   | 27.4        | 18.3          | 80.0       | 54.0           | 9.3                                     | 185.0  | 4.7       | 4.9                | 66.6                               | 106   |
| Dec   | 27.0        | 16.5          | 78.0       | 43.0           | 11.3                                    | 225.0  | 3.6       | 3.9                | 14.7                               | 114.3 |

Latitude : 12° 18' N Longitude : 76° 42' E

Height above MSL : 767 M Height of anemometer : 9 M.

Table II.6: Meteorological Data for: Suvarnavathi Sub-basin

| Month | Temperature (°C) |      | Relative Humidity (%) |           | Wind Speed |         | Cloud cover of sky<br>(Oktas) |           | Normal<br>Rainfall | Monthly Evapotran- spiration |
|-------|------------------|------|-----------------------|-----------|------------|---------|-------------------------------|-----------|--------------------|------------------------------|
|       | Max              | Min  | 08.30 hrs             | 17.30 hrs | kın/hr     | kın/day | 08.30 hrs                     | 17.30 hrs | mm                 | min                          |
| 1     | 2                | 3    | 4                     | 5         | 6          | 7       | 8                             | 9         | 10                 | 11                           |
| Jan   | 28.3             | 16.4 | 75                    | 30        | 11.3       | 225.0   | 3.0                           | 2.9       | 2.8                | 128.4                        |
| Feb   | 31.2             | 18.2 | 69                    | 25        | 9.1        | 181.0   | 2.9                           | 2.9       | 5.5                | 133.5                        |
| Mar   | 33.5             | 20,2 | 71                    | 21        | 8.8        | 175.0   | 2.8                           | .3.2      | 12.0               | 165.9                        |
| Apr   | 34.0             | 21.4 | 75                    | 34        | 8.4        | 167.0   | 4.4                           | 5.1       | 67.6               | 154.2                        |
| May   | 32.6             | 21.2 | 79 .                  | 51        | 10.2       | 203.0   | 5.2                           | 5.5       | 156.9              | 147.6                        |
| Jun   | 28,9             | 20.2 | 81                    | 66        | 13.9       | 277.0   | 6.2                           | 6.4       | 60.5               | 123.5                        |
| Jul   | 27.3             | 19.7 | 84                    | 70        | 14.1       | 281.0   | 6.6                           | 6.8       | 71.9               | 115.5                        |
| Aug   | 27.9             | 19.6 | 84                    | 67        | 12.5       | 249.0   | 6.5                           | 6.7       | 80.1               | 117.2                        |
| Sep   | 28.7             | 19.3 | 83                    | 61        | 10.7       | 213.0   | 5.9                           | 6.1       | 116.3              | 116.9                        |
| Oct   | 28.4             | 19.6 | 85                    | 61        | 7.9        | 187.0   | 5,8                           | 5.9       | 179.9              | 110.5                        |
| Nov   | 27.4             | 18.3 | 80                    | 54        | 9.3        | 185.0   | 4.8                           | 4.9       | 66.6               | 106.0                        |
| Dec   | 27.0             | 16.5 | 78                    | 43        | 11.3       | 225.0   | 3.8                           | 3.9       | 14.7               | 114.3                        |

Latitude: 12° 18' N Longitude: 76° 42' E

Height above MSL : 767 M Height of anemometer : 9 M.

Table II.7: Meteorological Data for: Palar Sub-basin

| Month | Temperature (°C) |      | Relative Humidity (%) |           | Wind Speed |         | Cloud cover of sky<br>(Oktas) |            | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|------------------|------|-----------------------|-----------|------------|---------|-------------------------------|------------|--------------------|------------------------------------|
|       | Max              | Min  | 08.30 hrs             | 17.30 hrs | kn√lır     | kın/day | 08.30 hrs                     | 17.30 lurs | min                | ının                               |
| i     | 2                | 3    | 4                     | 5         | 6          | 7       | 8                             | 9          | 10                 | 11                                 |
| Jan   | 28.3             | 16.4 | 75                    | 30        | 11,3       | 225     | 2.95                          | 2.9        | 2.8                | 128.4                              |
| Feb   | 31.2             | 18.2 | 69                    | 25        | 9.1        | -181    | 2.85                          | 2.9        | 5,5                | 133.5                              |
| Mar   | 33.5             | 20.2 | 71                    | 21        | 8.8        | 175     | 2.75                          | 3.2        | 12.0               | 165.9                              |
| Арг   | 34.0             | 21.4 | 75                    | 34        | 8.4        | 167     | 4.4                           | 5.1        | 67.6               | 154.2                              |
| May   | 32.6             | 21.2 | 79                    | 51        | 10.2       | 203     | 5,2                           | 5.5        | 156.9              | 147.6                              |
| Jun   | 28.9             | 20.2 | 81                    | 66        | 13.9       | 277     | 6.15                          | б.4        | 60.5               | 123.5                              |
| Jul   | 27.3             | 19.7 | 84                    | 70        | 14.1       | 281     | 6.6                           | 6.8        | 71.9               | 115.5                              |
| Aug   | 279.0            | 19.6 | 84                    | 67        | 12.5       | 249     | 6.45                          | 6.7        | 80.1               | 117.2                              |
| Sep   | 28.7             | 19.3 | 83                    | 61        | 10.7       | 213     | 5.9                           | 6.1        | 116.3              | 116.9                              |
| Oct   | 28.4             | 19.6 | 85                    | 61        | 7.9        | 157     | 5.75                          | 5.9        | 179.9              | 110.5                              |
| Nov   | 27.4             | 18.3 | 80                    | 54        | 9.3        | 185     | 4.8                           | 4.9        | 66.6               | 106                                |
| Dec   | 27.0             | 16.5 | 78                    | 43        | 11.3       | 225     | 3.75                          | 3.9        | 14.7               | 114.3                              |

Latitude : 12° 18' N Longitude : 76° 42' E Height above MSL : 767 M Height of anemometer : 9 M.

Table II.8: Meteorological Data for: Chinnar Sub-basin

| Month | Temperature<br>(°C) |      | Relative Humidity (%) |           | Wind Speed |        | Cloud cover of sky (Oktas) |           | Normal<br>Rainfall | Monthly Evapotran- spiration |
|-------|---------------------|------|-----------------------|-----------|------------|--------|----------------------------|-----------|--------------------|------------------------------|
|       | Max                 | Min  | 08.30 hrs             | 17.30 lus | kın/lır    | km/day | 08.30 hrs                  | 17.30 hrs | min                | nun                          |
| 1     | 2                   | 3    | 4                     | 5         | 6          | 7      | 8                          | 9         | 10                 | 11                           |
| Jan   | 31,1                | 19.2 | 73                    | 43        | 10.2       | 203    | 2.5                        | 3         | 8.6                | 138.9                        |
| Fcb   | 33.1                | 19.2 | 72                    | 35        | 10.7       | 213    | 2.1                        | 2.5       | 11.8               | 151.7                        |
| Mar   | 36.1                | 22.5 | 69                    | 32        | 10.3       | 205    | 1.9                        | 2.4       | 14.8               | 189.5                        |
| Apr   | 36.9                | 25.1 | 70                    | 41        | 8.3        | 165    | 3.1                        | 4.5       | 55.1               | 174.9                        |
| May   | 36.8                | 25.5 | 71                    | 47        | 8.1        | 161    | 4                          | 5.1       | 92.8               | 170.8                        |
| Jun   | 34.9                | 24.4 | 74                    | 51        | 9.6        | 191    | 5,2                        | 6,4       | 82.4               | 147.2                        |
| Jul   | 33.4                | 23.6 | 78                    | 56        | 9          | 179    | 6.1                        | 7         | 104.7              | 135.1                        |
| Aug   | 33.2                | 23.4 | 79                    | 55        | 7.9        | 157    | 5.7                        | 6.7       | 143.2              | 134.8                        |
| Sep   | 33.1                | 23.3 | 77                    | 54        | 6.9        | 137    | 5.1                        | 5.9       | 141,6              | 133.1                        |
| Oct   | 31.9                | 22.8 | 80                    | 62        | 5.3        | 106    | 5.2                        | 6         | 185.9              | 120                          |
| Nov   | 30.5                | 21.2 | 78                    | 61        | 6.5        | 129    | 4.4                        | 5.3       | 89.3               | 111.5                        |
| Dec   | 30.1                | 19.6 | 75                    | 52        | 8.4        | 167    | 3.4                        | 4.2       | 34.3               | 120.2                        |

For the period From 1931 To 1960

Latitude: 11° 39′ N

Longitude: 78° 10′ E

Height above MSL: 278 M

Height of anemometer: 8.1 M.

Table II.9: Meteorological Data for: Bhavani Sub-basin

| Month | -    | erature<br>C) | Relative I | - 1       | Wind  | Speed  | Cloud cor<br>(Ok | - 1       | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|------|---------------|------------|-----------|-------|--------|------------------|-----------|--------------------|------------------------------------|
|       | Max  | Min           | 08.30 lus  | 17.30 hrs | km/lu | km/day | 08.30 hrs        | 17.30 hrs | mm                 | mm                                 |
| 1     | 2    | 3             | 4          | 5         | 6     | 7      | 8                | 9         | 10                 | 11                                 |
| Jan   | 29.7 | 19.2          | 75         | 41        | 6.5   | 129    | 3.9              | 3.3       | 11.4               | 122.2                              |
| Feb   | 32.2 | 20.2          | 70         | 32        | 6.5   | 129    | 3.5              | 3,0       | 7.4                | 132,4                              |
| Mar   | 34.7 | 22.1          | 67         | 29        | 7.1   | 141    | 2.7              | 2.8       | 8.9                | 170.4                              |
| Apr   | 34.6 | 23.4          | 73         | 45        | 7.0   | 139    | 3.7              | 4.7       | 61.0               | 156.8                              |
| May   | 33.5 | 23.6          | 74         | 57        | 10.6  | 211    | 4.5              | 5,3       | 69.1               | 158.0                              |
| Jun   | 30.5 | 22.5          | 75         | 65        | 16.3  | 325    | 5.9              | 6.4       | 34.0               | 140.0                              |
| Jul   | 29.0 | 22.0          | 77         | 66        | 16.3  | 325    | 6,5              | 6,8       | 41.7               | 132.1                              |
| Aug   | 29.9 | 22.1          | 77         | 65        | 14.9  | 297    | 5.8              | 6.3       | 33.9               | 139.4                              |
| Sep   | 30.7 | 22.0          | 77         | 63        | 13.1  | 261    | 5.1              | 6.0       | 37.3               | 137.5                              |
| Oct   | 30.4 | 22.0          | 78         | 67        | 7.8   | 155    | 5.5              | 6.3       | 148.7              | 118.0                              |
| Nov   | 29.3 | 21.1          | 78         | 61        | 5.4   | 108    | 5.4              | 5.4       | 125.3              | 103.9                              |
| Dec   | 28.9 | 19.6          | 75         | 49        | 6.1   | 122    | 4.5              | 4.4       | 33.5               | 110.4                              |

(Average for the period from 1931 to 1960)

Latitude : 11° 00' N Longitude : 76° 58' E

Height above MSL

: 409 M

Height of anemometer : 12.7 M.

Table II.10: Meteorological Data for: Noyil Sub-basin

| Month |      | erature<br>C) | Relative I |            | Wind  | Speed   | Cloud co    | ver of sky | Normal<br>Rainfall | Monthly Evapotran- spiration |
|-------|------|---------------|------------|------------|-------|---------|-------------|------------|--------------------|------------------------------|
|       | Max  | Min           | 08.30 hrs  | 17.30 lurs | km/hr | kın/day | 08.30 hrs   | 17.30 hrs  | ınm                | min                          |
| 1     | 2    | 3             | 4          | 5          | 6     | 7       | 8           | 9          | 10                 | 11                           |
| Jan   | 29.7 | 19.2          | 75         | 41         | 6.5   | 129     | 3.9         | 3.3        | 11.4               | 122.2                        |
| Feb   | 32.2 | 20.2          | 70         | 32         | 6.5   | 129     | 3.5         | 3.0        | 7.4                | 132.4                        |
| Mar   | 34.7 | 22.1          | 67         | 29         | 7.1   | 141     | 2.7         | 2.8        | 8.9                | 170.4                        |
| Арг   | 34.6 | 23.4          | 73         | 45         | 7.0   | 139     | 3.7         | 4.7        | 61.0               | 156.8                        |
| May   | 33.5 | 23.6          | 74         | 57         | 10.6  | 211     | 4.5         | 5.3        | 69.1               | 158.0                        |
| Jun   | 30.5 | 22.5          | 75         | 65         | 16.3  | 325     | <b>5</b> .9 | 6.4        | 34.0               | 140,0                        |
| Jul   | 29.0 | 22.0          | 77         | 66         | 16.3  | 325     | 6.5         | 6.8        | 41.7               | 132,1                        |
| Aug   | 29.9 | 22.1          | 77         | 65         | 14.9  | 297     | 5.8         | 6.3        | 33,9               | 139.4                        |
| Sep   | 30.7 | 22.0          | 77         | 63         | 13.1  | 261     | 5,1         | 6.0        | 37.3               | 137.5                        |
| Oct   | 30.4 | 22.0          | 78         | 67         | 7.8   | 155     | 5.5         | 6.3        | 148,7              | 118.0                        |
| Nov   | 29.3 | 21.1          | 78         | 61         | 5.4   | 108     | 5.4         | 5.4        | 125.3              | 103.9                        |
| Dec   | 28.9 | 19.6          | 75         | 49         | 6.1   | 122     | 4.5         | 4.4        | 33.5               | 110,4                        |

(Average for the period from 1931 to 1960)

Latitude : 11<sup>0</sup> 00' N Longitude : 76<sup>0</sup> 58' E

Height above MSL

: **40**9 M

Height of anemometer: 12.7 M.

Table II.11: Meteorological Data for: Amaravathi Sub-basin

| Month | Tempe |      | Relative I | - 1       | Wind  | Specd       | Cloud cov<br>(Ok | •         | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|-------|------|------------|-----------|-------|-------------|------------------|-----------|--------------------|------------------------------------|
|       | Max   | Min  | 08.30 lus  | 17.30 hrs | km/lษ | kın/day     | 08.30 lus        | 17.30 lus | ının               | mm                                 |
| 1     | 2     | 3    | 4          | 5         | 6     | 7           | 8                | 9         | 10                 | 11                                 |
| Jan   | 30.0  | 18.8 | 76         | 40        | 10.3  | 205         | 3.7              | 3.0       | 6.7                | 136.0                              |
| Feb   | 32.5  | 19.1 | 71         | 32        | 10.7  | 213         | 3.2              | 2.8       | 4.0                | 146.3                              |
| Mar   | 35.1  | 21.4 | 69         | 29        | 12.0  | <b>2</b> 39 | 2.7              | 2,6       | 4.8                | 192.0                              |
| Apr   | 35.3  | 23,4 | 73         | 44        | 14.7  | 293         | 3,9              | 5.1       | 70.3               | 183.8                              |
| May   | 33.9  | 23,3 | 75         | 56        | 23.0  | 458         | 4.6              | 5.5       | 76.0               | 197.9                              |
| Jun   | 31.4  | 22.3 | 77         | 66        | 32.6  | 649         | 5.7              | 6.2       | 35.2               | 183.8                              |
| Jul   | 30.0  | 21.7 | 81         | 68        | 31.0  | 618         | 5.6              | 6.6       | 37.0               | 171.5                              |
| Aug   | 31.1  | 21,8 | 80         | 67        | 30.8  | 613         | 5.9              | 6.3       | 18.1               | 178.6                              |
| Sep   | 31.9  | 21.7 | 79         | 63        | 26.2  | 522         | 4.6              | 5.7       | 41.9               | 176.7                              |
| Oct   | 30.9  | 21,9 | 81         | 67        | 16.3  | 325         | 5.3              | 6.0       | 127.1              | 141.2                              |
| Nov   | 29.0  | 20.7 | 79         | 60        | 9.5   | 189         | 5.0              | 5.2       | 127.4              | 114.2                              |
| Dec   | 29.0  | 18.7 | 76         | 48        | 10.1  | 201         | 4.1              | 3.8       | 25.7               | 123.2                              |

Latitude : 11° 02' N Longitude : 77° 08' E Height above MSL : 400 M Height of anemometer : 6.75 M.

Table II.12: Meteorological Data for: Tirumanimuttar Sub-basin

| Month |      | erature<br>C) | Relative I | -         | Wind           | Speed  | Cloud cov<br>(Ok |           | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|------|---------------|------------|-----------|----------------|--------|------------------|-----------|--------------------|------------------------------------|
|       | Max  | Min           | 08.30 hrs  | 17.30 hrs | kn <b>v</b> hr | km/day | 08.30 lus        | 17.30 lus | mm                 | nun                                |
| 1     | 2    | 3             | 4          | 5         | 6              | 7      | 8                | 9         | 10                 | 11                                 |
| Jan   | 31.1 | 19.2          | 73         | 43        | 10.2           | 203    | 2.5              | 3         | 8.6                | 138.9                              |
| Feb   | 33.1 | 19.2          | 72         | 35        | 10,7           | 213    | 2.1              | 3         | 11.8               | 151.7                              |
| Маг   | 36.1 | 22.5          | 69         | 32        | 10.3           | 205    | 1.9              | 2         | 14.8               | 189,5                              |
| Apr   | 36.9 | 25.1          | . 70       | 41        | 8.3            | 165    | 3.1              | 5         | 55.1               | 174.9                              |
| May   | 36.8 | 25.5          | 71         | 47        | 8.1            | 161    | 4.0              | 5         | 92.8               | 170,8                              |
| Jun   | 34.9 | 24.4          | 74         | 51        | 9.6            | 191    | 5.2              | 6         | 82.4               | 147.2                              |
| Jul   | 33.4 | 23.6          | 78         | 56        | 9.0            | 179    | 6.1              | 7         | 104.7              | 135.1                              |
| Aug   | 33.2 | 23.4          | 79         | 55        | 7.9            | 157    | 5.7              | 7         | 143.2              | 134.8                              |
| Sep   | 33.1 | 23.3          | 77         | 54        | 6.9            | 137    | 5.1              | 6         | 141.6              | 133.1                              |
| Oct   | 31.9 | 22.8          | 80         | 62        | 5.3            | 106    | 5.2              | 6         | 185.9              | 120.0                              |
| Nov   | 30.5 | 21.2          | 78         | 61        | 6.5            | 129    | 4.4              | 5         | 89.3               | 111.5                              |
| Dec   | 30.1 | 19.6          | 75         | 52        | 8.4            | 167    | 3.4              | 4         | 34.3               | 120,2                              |

(Average for the period from 1931 to 1960)

Latitude : 11° 39′ N Longitude : 78° 10′ E

Height above MSL

: 278 M

Height of anemometer : 8.1 M.

Table II.13: Meteorological Data for: Ponnanai Ar Sub-basin

| Month |      | erature<br>C) | Relative I | 7 1       | Wind   | Speed  | Cloud cov<br>(Ok | ver of sky<br>tas) | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|------|---------------|------------|-----------|--------|--------|------------------|--------------------|--------------------|------------------------------------|
|       | Max  | Min           | 08.30 hrs  | 17.30 hrs | km/lır | km/day | 08.30 hrs        | 17.30 hrs          | mm                 | mm                                 |
| 1     | 2    | 3             | 4          | 5         | 6      | 7      | 8                | 9                  | 10                 | 11                                 |
| Jan   | 30.1 | 20.6          | 79         | 54        | 10.1   | 201    | 3.4              | 3.7                | 18.4               | 131.3                              |
| Feb   | 32.7 | 21.3          | 78         | 43        | 7.7    | 153    | 3.1              | 3.1                | 7.5_               | 136.8                              |
| Mar   | 35.1 | 22.9          | 76         | 38        | 8.8    | 175    | 3.1              | 2.5                | 8.4                | 176.9                              |
| Apr   | 36.7 | 25.8          | 73         | 42        | 9.7    | 193    | 2.8              | 4.2                | 70.1               | 178.6                              |
| May   | 37.1 | 26.4          | 67         | 31        | 17.4   | 347    | 4.3              | 5.0                | 79.8               | 210.1                              |
| Jun   | 36.4 | 26.5          | 59         | 33        | 28.9   | 576    | 4.5              | 6.2                | 33.9               | 239.2                              |
| Jul   | 35.5 | 25.9          | 61         | 33        | 31.4   | 625    | 6.1              | 6.4                | 40.5               | 248.0                              |
| Aug   | 35.1 | 25.4          | 65         | 47        | 25.8   | 514    | 5.7              | 6.2                | 104.6              | 218.8                              |
| Sep   | 34.2 | 24.9          | 70         | 51        | 19.4   | 386    | 5.1              | 4.3                | 107.6              | 187.5                              |
| Oct   | 32.3 | 23.9          | 79         | 63        | 10.9   | 217    | 5.3              | 6.0                | 170                | 135.2                              |
| Nov   | 29.9 | 22.7          | 81         | 65        | 8,5    | 169    | 5.1              | 5.6                | 156.2              | 110.4                              |
| Dec   | 25,3 | 21.3          | 79         | 65        | 11.1   | 221    | 4.3              | 5.2                | 70.6               | 117.5                              |

(Average for the period from 1931 to 1960)

Height above MSL

: 88 M

Latitude: 10° 46' N Longitude: 78° 43' E

Height of anemometer : 17.2 M.

Table II.14: Meteorological Data for: Upper Coleroon Sub-basin

| Month |      | erature<br>C) | Relative I | Humidity<br>6) | Wind    | Speed  | Cloud co  |           | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|------|---------------|------------|----------------|---------|--------|-----------|-----------|--------------------|------------------------------------|
|       | Max  | Min           | 08.30 hrs  | 17.30 hrs      | kın/lır | km/day | 08,30 hrs | 17.30 hrs | mm                 | min                                |
| 1     | 2    | 3             | 4          | 5              | 6       | 7      | 8         | 9         | 10                 | 11                                 |
| Jan   | 30.1 | 20.6          | 79         | 54             | 10.1    | 201    | 3.4       | 3,7       | 18.4               | 131,3                              |
| Feb   | 32.7 | 21.3          | 78         | 43             | 7.7     | 153    | 3.1       | 3.1       | 7.5                | 136.8                              |
| Mar   | 35.1 | 22.9          | 76         | 38             | 8.8     | 175    | 3.1       | 2.5       | 8.4                | 176.9                              |
| Apr   | 36.7 | 25.8          | 73         | 42             | 9.7     | 193    | 2.8       | 4.2       | 70.1               | 178.6                              |
| May   | 37.1 | 26.4          | 67         | 31             | 17.4    | 347    | 4.3       | 5.0       | 79.8               | 210.1                              |
| Jun   | 36.4 | 26.5          | 59         | 33             | 28.9    | 576    | 4.5       | 6.2       | 33.9               | 239.2                              |
| Jul   | 35,5 | 25.9          | 61         | 33             | 31.4    | 625    | 6.1       | 6.4       | 40.5               | 248.0                              |
| Aug   | 35.1 | 25.4          | 65         | 47             | 25.8    | 514    | 5.7       | 6.2       | 104.6              | 218.8                              |
| Scp   | 34.2 | 24.9          | 70         | 51             | 19.4    | 386    | 5.1       | 4.3       | 107.6              | 187.5                              |
| Oct   | 32.3 | 23.9          | 79         | 63             | 10.9    | 217    | 5.3       | 6.0       | 170.0              | 135.2                              |
| Nov   | 29.9 | 22.7          | 81         | 65             | 8.5     | 169    | 5.1       | 5.6       | 156.2              | 110.4                              |
| Dec   | 29.3 | 21.3          | 79         | 65             | 11.1    | 221    | 4.3       | 5.2       | 70.6               | 117.5                              |

(Average for the period from 1931 to 1960)

Latitude: 10° 46' N Longitude: 78° 43' E

Height above MSL

: 88 M

Height of anemometer : 17.2 M.

Table II.15: Meteorological Data for: Lower Coleroon Sub-basin

| Month | Tempe | erature<br>C) | Relative I |            | Wind  | Speed  | Cloud cor<br>(Ok | ver of sky | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|-------|---------------|------------|------------|-------|--------|------------------|------------|--------------------|------------------------------------|
|       | Max   | Min           | 08.30 hrs  | 17.30 lurs | km/hr | km/day | 08.30 hrs        | 17.30 hrs  | mm                 | ının                               |
| . 1   | 2     | 3             | 4          | 5          | 6     | 7      | . 8              | 9          | 10                 | 11                                 |
| Jan   | 27.9  | 20.8          | 83         | 71         | 10.4  | 200    | 4.1              | 3.7        | 41.7               | 112.6                              |
| Fcb   | 29.0  | 21.2          | 84         | 70         | 9.0   | 173    | 3.5              | 3.4        | 14.8               | 116.4                              |
| Mar   | 30.8  | 22.9          | 79         | 69         | 9.7   | 186    | 3.1              | 2,9        | 26.8               | 151.4                              |
| Apr   | 32.8  | 25.7          | 75         | 73         | 11.7  | 225    | 4.1              | 3.5        | 37.8               | 159.2                              |
| May   | 35.7  | 27.1          | 67         | 72         | 12.6  | 242    | 4.4              | 4.5        | 70.7               | 176. <b>6</b>                      |
| Jun   | 36.9  | 27.0          | 63         | 62         | 11.8  | 227    | 5.3              | 5.9        | 34.5               | 164.1                              |
| Jul   | 35.4  | 26.1          | 68         | 60         | 10.4  | 200    | 6.0              | 6.5        | 68.9               | 150.3                              |
| Aug   | 34.5  | 25.4          | 73         | 66         | 9.8   | 188    | 5.8              | 6.0        | 109.5              | 145.4                              |
| Sep   | 33.8  | 25.1          | 73         | 70         | 9.2   | 177    | 5.3              | 5.4        | 113.4              | 139.4                              |
| Oct . | 31.5  | 24.3          | 81         | 75         | 7.4   | 142    | 5.3              | 5.6        | 241.5              | 100.5                              |
| Nov   | 29.0  | 22.8          | 83         | 76         | 9.0   | 173    | 5,3              | 5,4        | 362. <b>2</b>      | 102.5                              |
| Dec   | 27.9  | 21.5          | 83         | 74         | 11.1  | 213    | 4.7              | 4.7        | 183.4              | 106.2                              |

(Average for the period from 1931 to 1960)

Latitude : 11° 46' N

Height above MSL

: 12 M

Longitude: 79" 46' E

Height of anemometer : 17.2 M.

Table II.16: Meteorological Data for: Cauvery Delta Sub-basin

| Month |      | erature<br>C) | Relative I |           | Wind   | Speed   | Cloud cor  | ver of sky<br>tas) | Normal<br>Rainfall | Monthly<br>Evapotran-<br>spiration |
|-------|------|---------------|------------|-----------|--------|---------|------------|--------------------|--------------------|------------------------------------|
|       | Max  | Min           | 08.30 hrs  | 17,30 hrs | kn√lır | knv/day | 08.30 lurs | 17.30 hrs          | mm                 | ının                               |
| 1     | 2    | 3             | 4          | 5         | 6      | 7       | 8          | 9                  | 10                 | 11                                 |
| Jan   | 27.7 | 22.8          | 78         | 74        | 18.8   | 374     | 4.4        | 4.0                | 57.2               | 133.6                              |
| Feb   | 28.7 | 23.5          | 77         | 72        | 15.8   | 315     | 4.0        | 3.2                | 25.2               | 136.2                              |
| Mar   | 30.3 | 25.1          | 74         | 71        | 14,3   | 285     | 3.7        | 2.8                | 21.5               | 167.4                              |
| Арг   | 32.5 | 26.8          | 73         | 73        | 13.1   | 261     | 4.5        | 3.7                | 55.1               | 164.1                              |
| May   | 35.5 | 27.4          | 69         | 69        | 12.7   | 253     | 4.9        | 4.4                | 56.0               | 177.1                              |
| Jun   | 36.6 | 27.0          | 61         | 61        | 12.5   | 249     | 5.4        | 5.5                | 28.8               | 171.6                              |
| Jul   | 35.3 | 26.3          | 65         | 63        | 11.3   | 225     | 5.8        | 5.9                | 47.7               | 162.0                              |
| Aug   | 34.4 | 26,0          | 70         | 67        | 10.3   | 205     | 5.5        | 5.4                | 62,0               | 156.9                              |
| Sep   | 33.7 | 25,7          | 71         | 69        | 9.7    | 193     | 5.1        | 4.9                | 61.8               | 148.8                              |
| Oct   | 31.4 | 25.0          | 79         | 75        | 8.7    | 173     | 5.5        | 5.4                | 224,0              | 127,2                              |
| Νον   | 28.9 | 23.9          | 82         | 77        | 13.3   | 265     | 6.0        | 5.5                | 458,2              | 112.2                              |
| Dec   | 27.7 | 22.8          | 81         | 76        | 17.8   | 355     | 5.2        | 5.1                | 239.0              | 118.8                              |

(Average for the period from 1931 to 1960)

Latitude: 10° 46' N Longitude: 79° 51' E

Height above MSL

: 9 M

Height of anemometer : 4.96 M.

Table III.1: Cauvery River Basin: Annual Irrigation and Utilizations through
Existing, Ongoing, Future; Major, Medium and Minor Projects

| SI. | Name of Sub-basin                                      | C.C.A. | Annual  | Annual   | Irriga-   | Delta |
|-----|--------------------------------------------------------|--------|---------|----------|-----------|-------|
| No  | State/Category                                         |        | Irriga- | Utilisa- | tion      |       |
|     |                                                        |        | tion    | tion     | Intensity |       |
| 1   |                                                        | (ha)   | (ha)    | (MCM)    | (%)       | (m)   |
| (1) | (2)                                                    | (3)    | (4)     | (5)      | (6)       | (7)   |
| 1   | Upper Cauvery sub-basin                                |        | - 10%   |          |           |       |
|     | (Area lie fully in Karnataka)                          |        |         |          |           |       |
|     | EXISTING PROJECTS                                      |        |         |          | 340       |       |
|     | I. Major projects:                                     |        |         | 1 1      |           | -     |
| н   | II. Medium projects:                                   |        |         |          |           |       |
|     | 21 Nos. of Anicut channels<br>Located upstream KRS Dam |        | 36800   | 612.30   | 100       | 1.66  |
|     | III. Minor projects                                    |        | 90378   | 876.70   | 100       | 0.97  |
|     | Total                                                  |        | 127178  | 1489.00  |           |       |
|     | ONGOING PROJECTS                                       |        |         |          |           |       |
|     | I. Major projects                                      |        |         |          |           |       |
|     | i) Hemavathi project                                   | 61,000 | 61,000  | 339.72   | 100       | 0.556 |
|     | ii) Yagachi project                                    | 21,450 | 21,450  | 163.02   | 100       | 0.760 |
|     | iii) Harangi project                                   | 52,611 | 66372   | 471.24   | 126       | 0.71  |
|     | II. Medium projects                                    |        |         |          |           |       |
| :   | i) Votehole project                                    | 7,487  | 7,487   | 67.38    | 100       | 0.90  |
| ;   | ii) Chiklihole project                                 | 2,752  | 3,481   | 31.33    | 126       | 0.90  |
| İ   | III) Minor projects                                    | 2,900  | 2,900   | 28.13    | 100       | 0.97  |
| ;   | Total                                                  | 148300 | 162790  | 1,100.82 | -         | -     |
| ı   | FUTURE PROJECTS                                        |        |         |          |           |       |
|     | I. Major project                                       |        |         |          |           |       |
| ļ   | i) Cauvery reservoir project                           | 40,500 | 40,500  | 433.35   | 100       | 1.07  |
|     | Lakshmanthirta project                                 | 2800   | 2800    | 29.96    | 100       | 1.07  |
|     | III. Minor projects                                    | -      | _       | NIL      | -         | _     |
|     | Sub-total                                              | 43300  | 43300   | 463      |           |       |
|     | Grand total                                            |        |         |          |           |       |

| (1) | (2)                                                     | (3)   | (4)   | (5)    | (6)   | <b>(</b> 7) |
|-----|---------------------------------------------------------|-------|-------|--------|-------|-------------|
| 2   | Kabini sub-basin                                        |       |       |        |       |             |
|     | EXISTING PROJECTS                                       |       |       |        |       |             |
|     | I. Major projects:                                      |       |       |        |       |             |
| İ   | a) Karnataka                                            |       |       |        |       |             |
|     | i) Nagu Reservoir                                       | 10526 | 10526 | 217.91 | 100   | 2.07        |
|     | b) Tamilnadu                                            | -     | -     | NIL    | -     | -           |
|     | c) Kerala                                               | -     | -     | NIL    |       | -           |
|     | II) Medium projects:                                    |       |       |        |       |             |
|     | a) Karnataka                                            |       |       |        |       |             |
|     | i) Hebballa Reservoir                                   | 1214  | 1214  | 16,60  | 100   | 1.37        |
|     | ii) Nallur Ammanikere                                   | 1619  | 1300  | 6.23   | 80    | 0.48        |
|     | iii) Anicut Channels                                    | 6555  | 6555  | 310.98 | 100   | -           |
| ]   | (2 Nos.) on Kabini                                      | -     |       |        | 2 . 5 |             |
|     | iv) Anicut Channels on<br>Lakshmanathirtha              | 1400  | 1400  | 25.20  | 100   | 1.80        |
|     | v) Command of Anicut<br>Channels on Cauvery river       | 180   | 180   | 3.24   | 100   | 1.80        |
|     | b) Tamilnadu                                            |       |       | NIL    |       |             |
|     | c) Kerala                                               |       |       | NIL    |       |             |
|     | III) Minor projects                                     |       |       |        |       |             |
|     | i) Tanks                                                | 3723  | 3876  | 27.74  | 104   | 0.70 (kh.)  |
|     | ii) Other Sources                                       | 28    | 285   | 1.28   | 101 . | 0.45        |
|     | b) Tamilnadu                                            |       |       | NIL    |       |             |
|     | c) Kerala                                               |       |       |        |       |             |
|     | i) Tanks                                                | 64    | 121   | 0.92   | 189   | 0.45 (kh.)  |
| }   | ii) Other sources                                       | 6633  | 12469 | 56.11  | 188   | 0.45        |
| }   | Total                                                   | 32195 | 37926 | 666.21 |       |             |
| Ì   | ONGOING PROJECTS                                        |       |       |        |       |             |
| Ì   | I. Major projects                                       |       |       |        |       |             |
|     | a) Karanataka                                           |       |       |        |       |             |
| ]   | i) Kabini project stage-I                               | 12020 | 23262 | 224.65 | 195   | 0.97        |
|     | ii) Taraka project                                      | 8903  | 8903  | 193.2  | 100   | 2.17        |
|     | iii) Extension under Krishna-<br>rajasagar (stage-I)    | 33600 | 41700 | 297.33 | 124   | 0.71        |
|     | b) Tamilnadu                                            | -     | -     | -      | -     | -           |
| ]   | c) Kerala                                               |       |       |        |       |             |
|     | iv) Kuttiyadi Augmentation Scheme/Banasurasagar project | 3800  | 7600  | 69.92  | 200   | 0.92        |

| 1) | (2)                        | (3)   | (4)   | (5)           | (6) | (7)      |
|----|----------------------------|-------|-------|---------------|-----|----------|
| _  | Kabini sub-basin           |       |       |               |     |          |
| Ì  | II. Medium projects        |       |       |               |     |          |
| Ì  | a) Karanataka              | _     | -     | NIL           | -   | -        |
| ľ  | b) Tamilnadu               | -     | _     | NIL           | -   | -        |
| Ī  | c) Kerala                  |       |       |               |     |          |
| ſ  | i) Karapuzha project       | 4650  | 9300  | <b>8</b> 5.56 | 200 | 0.92     |
|    | III) Minor                 |       |       |               |     |          |
| [  | a) Karanataka              | 223   | 223   | 1.56          | 100 | 0.70     |
| [  | b) Tamilnadu               | -     | -     | NIL           | -   | -        |
| j  | c) Kerala                  |       |       | NIL           | -   | -        |
| 1  | Total                      |       | 90988 | 872.22        | -   |          |
|    | FUTURE PROJECTS            |       |       |               |     |          |
|    | I. Major projects          |       |       |               |     |          |
| ļ  | a) Karanataka              |       |       |               |     |          |
| ļ  | i) Kabini project stage-II | 19692 | 29538 | 336.73        | 150 | 1.14     |
| ļ  | b) Tamilnadu               |       | -     | NIL           |     | -        |
|    | c) Kerala                  |       |       | NIL           |     | -        |
| ļ  | II. Medium projects        |       |       | 1.74.1        |     |          |
|    | a) Karanataka              |       |       |               |     |          |
| Ì  | i) Kudrehundi halla        | 2000  | 2500  | 28.5          | 125 | 1.14     |
|    | ii) Anicut channels        | 180   | 180   | 2.05          | 100 | 1.14     |
|    | b) Tamilnadu               |       |       |               |     |          |
| Ī  | c) Kerala                  |       |       |               |     |          |
|    | iii) Vythiri               | 4000  | 5000  | 57.00         | 125 | 1.14     |
|    | iv) Kallampatti Puzha      | 3000  | 3750  | 42.75         | 125 | 1.14     |
|    | v) Tirunelli               | 4860  | 6075  | 69.26         | 125 | 1.14     |
|    | vi) Manjat                 | 2800  | 3500  | 39.90         | 125 | 1.14     |
|    | vii) Narasipuzha           | 3800  | 4750  | 54.15         | 125 | 1.14     |
|    | viii) Chandali puzha       | 2500  | 3125  | 35.63         | 125 | 1.14     |
|    | lx) Noolpuzha              | 4250  | 5313  | 60.57         | 125 | 1.14     |
|    | x) Perungatpuzha           | 4000  | 5000  | 57.00         | 125 |          |
| }  |                            | 2200  | 2750  | 31.35         | 125 | 1.14     |
| }  | xi) Chengat                | 1200  |       |               |     | 1.14     |
| }  | xii) Kandananthodu         | - i   | 1500  | 17.10         | 125 | 1.14     |
| }  | xiii) Kurichiyal           | 3000  | 3750  | 42.75         | 125 | 1.14     |
| ļ  | xiv) Thondar               | 3040  | 3800  | 43.32         | 125 | 1.14     |
|    | xv) Chembinathodu          | 2100  | 2625  | 29.93         | 125 | 1.14     |
|    | III) Minor                 |       |       |               |     |          |
| }  | a) Karanataka              | -     | -     | NIL           | -   | -        |
|    | b) Tamilnadu               | -     | •     | NIL           |     | <u> </u> |
|    | c) Kerala                  |       |       |               |     |          |
|    | i) Vellakil                | 400   | 400   | 3.52          | 100 | 0.88     |
|    | ii) Pullakhod              | 400   | 400   | 3.52          | 100 | 0.88     |
| ,  | iii) Kollavi               | 1000  | 1000  | 8.8           | 100 | 0.88     |
|    | iv) L I. Schemes           | 8100  | 8100  | 71.28         | 100 | 0.88     |
|    | Total                      | 72522 |       |               |     |          |
|    | Grand total                |       |       |               |     |          |

| ) ] | (2)                           | _ (3)  | (4)    | (5)     | (6)    | (7)  |
|-----|-------------------------------|--------|--------|---------|--------|------|
| 3   | Shimsha sub-basin             |        |        |         |        |      |
|     | (Area lie fully in Karnataka) |        |        |         |        |      |
|     | EXISTING PROJECTS             |        |        |         |        |      |
|     | I.Major projects:             |        |        |         |        |      |
|     | i) K.R.S.projects             | 68029  | 68029  | 1272.14 | 100.00 | 1.87 |
|     | (Visveswarayya Canal)         |        |        |         |        |      |
|     | II. Medium projects           |        |        |         |        |      |
|     | i) Marconhally project        | 6073   | 6073   | 112.96  | 100.00 | 1.86 |
|     | ii) Mangala reservoir project | 1636   | 2486   | 16.90   | 152.00 | 0.68 |
|     | iii) Kanva project            | 2024   | 2024   | 34.00   | 100.00 | 1.68 |
|     | iv) Shimsha Anicut Channels   | 3078   | 3078   | 55.40   | 100.00 | 1.80 |
| •   | III) Minor projects           |        |        |         |        |      |
|     | i) Tanks                      | 33108  | 47146  | 330.02  | 142.40 | 0.70 |
|     | ii) Other Sources             | 1818   | 2081   | 9.36    | 114.50 | 0.45 |
|     | Total                         | 115766 | 130917 | 1830.78 |        | -    |
|     | ONGOING PROJECTS              |        |        |         |        |      |
|     | I. Major projects             |        |        |         |        |      |
|     | i) Hemavathi Project          | 179280 | 179280 | 1001    | 100    | 0.56 |
|     | II) Medium projects           |        |        |         |        |      |
|     | i) lggalur project            | 3797   | 5024   | 45.72   | 132    | 0.91 |
|     | III) Minor projects           |        |        |         |        |      |
|     | i) Tanks                      | 1284   | 1284   | 8.99    | 100    | 0.70 |
|     | Total                         | 184361 | 185588 | 1055.71 |        | _    |
|     | FUTURE PROJECTS               |        |        | 4 7 3   |        |      |
|     | I. Major projects             |        |        |         |        |      |
|     | i) KRS Stage-II(Visvesw       | 13200  | 19800  | 182.00  | 150    | 0.92 |
|     | arayya Canal extension)       |        |        |         |        |      |
|     | II. Medium projects           | 5000   | 46.00  |         | 105    | 0.00 |
|     | i) Upper Shimsha project      | 5000   | 46.00  | 25.00   | 125    | 0.92 |
|     | ii) Shimsha Anicut Channels   | 3078   | 3848   | 35.00   | 125    | 0.92 |
|     | III) Minor projects           | -      | -      | NIL     | -      |      |
|     | Total                         | 20278  | 28648  | 263.00  |        |      |

| (2)                  |                                       | (3)   | (4)   | (5)    | (6)     | (7)     |
|----------------------|---------------------------------------|-------|-------|--------|---------|---------|
| Arkavathi sub-basii  | 1                                     |       |       |        |         | · · · · |
| EXISTING PROJECT     | CTS                                   |       |       |        |         |         |
| I. Major projects:   |                                       |       |       |        |         |         |
| a) Karnataka         | · · · · · · · · · · · · · · · · · · · |       | -     | NIL    | -       | -       |
| b) Tamilnadu         |                                       | -     | -     | NIL    | -       | •       |
| II. Medium projec    | ts                                    |       |       |        |         |         |
| a) Karanataka        |                                       |       | -     |        |         |         |
| i) Byramangala proj  | ect                                   | 1619  | 1619  | 28.33  | 100     | 1.75    |
| b) Tamilnadu         |                                       |       | 1-    | NIL    | -       |         |
| III) Minor projects  |                                       |       |       | L. A.  |         |         |
| a) Karanataka        |                                       |       |       |        |         |         |
| i)) Suvarnavathi C.  | hannels                               | 332   | 332   | 5.98   | 100     | 1.80    |
| ii) Tanks            | 100                                   | 15088 | 19454 | 136.18 | 129     | 0.70    |
| iii) Other sources   | 7. 7                                  | 1323  | 1834  | 8.25   | 139     | 0.45    |
| b) Tamilnadu         |                                       |       |       |        | 35, 323 |         |
| i) Tanks             |                                       | 333   | 333   | 2.33   | 100     | 0.70    |
| Total                |                                       | 18695 | 23572 | 181.07 |         | ٠.      |
| ONGOING PROJE        | CTS                                   |       |       |        |         |         |
| I. Major projects    |                                       |       |       |        |         |         |
| a) Karanataka        |                                       |       |       | NIL    |         |         |
| b) Tamilnadu         |                                       |       |       | NIL    | - 1     | -       |
| II. Medium projec    | ts                                    |       |       |        |         |         |
| a) Karanataka        |                                       |       |       |        |         |         |
| i) Manchanabele      |                                       | 3845  | 3845  | 21.92  | 100     | 0.57    |
| ii) Arkavathi Reserv | oir e                                 | 8560  | 8560  | 89.02  | 100     | 1.04    |
| iii) Iggalur project |                                       | 250   | 500   | 4.60   | 200     | 0.92    |
| b) Tamilnadu         | 270                                   | -     |       | NIL    | -       | _       |
| III) Minor           |                                       |       |       |        |         |         |
| a) Karanataka        | J. D. L.                              | 129   | 129   | 0.9    | 100     | 0.7     |
| i) Tanks             |                                       | 884   | 884   | 6.19   | 100     | 0.70    |
| b) Tamilnadu         |                                       |       | -     | NIL    | -       | -       |
| Total                |                                       | 13539 | 13789 | 121.73 | -       |         |
| FUTURE PROJECT       | rs                                    |       |       |        |         |         |
| I. Major projects    |                                       |       |       |        |         |         |
| a) Karanataka        |                                       | -     | -     | NIL    | -       |         |
| b) Tamilnadu         |                                       | -     | -     | NIL    | -       |         |
| II. Medium projec    | ts                                    |       |       |        |         |         |
| a) Karanataka        | <u> </u>                              |       |       |        |         |         |

| (1)          | (2)                                                                                  | (3)      | (4)    | (5)    | (6) | (7)        |
|--------------|--------------------------------------------------------------------------------------|----------|--------|--------|-----|------------|
|              | Arkavathi sub-basin                                                                  |          |        |        |     |            |
|              | i) Additional area to bring total area of irrigation to 30%of cultural area          | -        | 19495  | 105.27 | -   | 0.54       |
|              | b) Tamilnadu                                                                         | -        | -      | NIL    | -   | -          |
|              | III) Minor projects                                                                  |          |        |        |     |            |
|              | a) Karanataka                                                                        |          |        |        |     |            |
|              | i) Suvarnavathi Channels                                                             | 332      | 332    | 1.53   | 100 | 0.46       |
|              | a) Additional area to bring<br>total area of irrigation to 30%<br>of culturable area | j        | 19494  | 89.68  | •   | 0.46       |
|              | b) Tamilnadu                                                                         | s-Excu   |        | NJL    |     | •          |
|              | Total                                                                                |          | 39321  | 196.48 |     | -          |
|              | Grand total                                                                          |          |        |        |     |            |
| 5            | Middle Cauvery sub-basin                                                             |          |        |        |     |            |
| ]            | (Area lie fully in Karnataka)                                                        |          |        |        |     |            |
|              | EXISTING PROJECTS                                                                    |          |        |        |     |            |
|              | 1.Major projects:                                                                    |          |        |        |     |            |
| !            | i) K. R. S.projects                                                                  | 11283    | 11283  | 210.99 | 100 | 1.87       |
|              | II. Medium projects                                                                  | 00470    | 00.450 | 400 44 | 100 |            |
|              | i) Anicut Channels below KRS Dam (8 No)                                              | 23470    | 23470  | 422.44 | 100 | 1.80       |
|              | ii) Madhavamantri Anicut                                                             | 1874     | 1874   | 33.73  | 100 | 1.80       |
|              | Channel                                                                              | 107      |        | 35.75  |     | 1.00       |
|              | iii) Gundal project                                                                  | 2066     | 2066   | 37.19  | 100 | 1.80       |
|              | III) Minor projects                                                                  |          |        |        |     |            |
|              | ii) Tanks & other sources Kharif Rabi Other Sources                                  | 4205     | 5359   | 43.28  | 127 | 0.7<br>1.1 |
| j            | ii) Other Sources                                                                    | 610      | 717    | 3.23   | 117 | 0.45       |
|              | Total                                                                                | 47556    | 48817  | 790.48 | 100 |            |
|              | ONGOING PROJECTS                                                                     |          |        |        |     |            |
|              | I. Major projects                                                                    |          |        |        |     |            |
|              | i) Hemavathi Project                                                                 | 24699    | 24699  | 138.31 | 100 | 0.56       |
|              | ii) Extension under KRS<br>Stage-I                                                   | 28100    | 40800  | 226.54 | 145 | 0.56       |
|              | iii) KRS Stage-II-<br>Visweswaraya Canal                                             | 1915     | 1915   |        | -   | -          |
|              | iv) Kabini project-Stage-I                                                           | 22860    | 44058  | 425.48 | 193 | 0.96       |
|              | II. Medium projects                                                                  | -        | -      | NIL    |     | •          |
|              | III) Minor projects                                                                  | <u> </u> |        |        |     |            |
| <u> </u><br> | i) Tanks                                                                             | 466      | 466    | 3.26   | 100 | 0.70       |
| L            | Total                                                                                | 78040    | 111938 | 793.59 |     |            |

| (1) | (2)                                                          | (3)    | (4)      | (5)    | (6)  | (7)                |
|-----|--------------------------------------------------------------|--------|----------|--------|------|--------------------|
| -   | Middle Cauvery sub-basin                                     |        |          |        |      |                    |
|     | FUTURE PROJECTS                                              |        |          |        |      |                    |
|     | I. Major projects                                            |        |          |        |      |                    |
|     | i) Kabini project stage-I                                    | 5537   | 8305     | 95.55  | 150  | 1.14               |
|     | II. Medium projects                                          |        |          |        | -    |                    |
|     | i) 8 Nos. of Anicut Channels<br>below KRSDam                 | 23470  | 5668     | 67.00  | 25   | 1.14               |
|     | ii) Lokapavani project                                       | 3000   | 3750     | 43.00  | 125  | 1.14               |
|     | III) Minor projects                                          |        |          | NIL    | -    | -                  |
|     | Total                                                        | 32007  | 17923    | 205.00 | -    | -                  |
|     | Grand total                                                  |        |          |        |      |                    |
| 6   |                                                              |        |          |        |      |                    |
| _   | EXISTING PROJECTS                                            |        |          |        |      |                    |
|     | I. Major projects:                                           |        |          |        |      |                    |
|     | a) Karnataka                                                 |        |          | NIL    | -    | _                  |
|     | b) Tamilnadu                                                 |        |          | NIL    |      | -                  |
|     | II. Medium projects                                          |        |          |        |      |                    |
|     | a) Karanataka                                                |        |          |        | 100  |                    |
|     | i) Suvarnavathi project                                      | 6756   | 6756     | 102.02 | 1.51 |                    |
|     | b) Tamilnadu                                                 |        | _        | NIL    |      |                    |
|     | III) Minor projects                                          |        |          |        |      |                    |
|     | a) Karanataka                                                |        |          |        |      |                    |
|     | i) Chikkahole project                                        | 1650   | 1650     | 19.81  | 100  | 1.2                |
|     | ii) Tanks & other sources                                    | 1319   | 1674     | 13.12  | 127  | 1.2                |
|     | Kharif Rabi Other Sources                                    | 1319   | 1074     | 13.12  | g C  | 0.7<br>1.1<br>0.45 |
|     | b) Tamilnadu                                                 |        |          |        |      |                    |
|     | ii) Tanks & other sources<br>Kharif<br>Rabi<br>Other Sources | 38     | 53       | 0.4    | 139  | 0.7<br>1.1<br>0.45 |
|     | Total                                                        | 9763   | 10133    | 135.35 | -    |                    |
|     | ONGOING PROJECTS                                             |        |          |        |      |                    |
|     | I. Major projects                                            |        |          |        |      |                    |
|     | a) Karanataka                                                |        |          |        |      |                    |
|     | i) Kabini project stage-I                                    | 10850  | 20904    | 201.87 |      | 0.97               |
|     | b) Tamilnadu                                                 |        | -        | NIL    |      | <u>-</u>           |
|     | II. Medium projects                                          |        |          |        |      |                    |
|     | a) Karanataka                                                |        | -        | NIL    | -    |                    |
|     | b) Tamilnadu                                                 |        | <u> </u> | NIL    | -    | <u> </u>           |
|     | III) Minor                                                   | 1.00   | 120      |        | 100  |                    |
| -   | a) Karanataka<br>b) Tamilnadu                                | 129    | 129      | 0.9    | 100  | 0.7                |
|     | <del></del>                                                  | -      |          | NIL    | -    |                    |
|     | Total                                                        | 10,979 | 21,033   | 202.77 | -    |                    |

| (1) | (2)                       | (3)           | (4)                                              | (5)          | (6)              | (7)           |
|-----|---------------------------|---------------|--------------------------------------------------|--------------|------------------|---------------|
|     | Suvarnavathi sub-basin    |               |                                                  |              |                  |               |
|     | FUTURE PROJECTS           |               |                                                  |              |                  |               |
| į   | I. Major projects         |               |                                                  |              |                  |               |
|     | a) Karanataka             |               |                                                  |              |                  |               |
|     | i) Kabini project stage-I | 16941         | 25411                                            | 289.69       | 150              | 1.14          |
|     | b) Tamilnadu              |               | -                                                | NIL          | -                |               |
|     | II. Medium projects       |               |                                                  |              |                  |               |
|     | a) Karanataka             | -             |                                                  | NIL          | -                | *             |
|     | b) Tamilnadu              |               |                                                  | NIL          | - 1              | -             |
|     | III) Minor projects       |               |                                                  |              |                  |               |
|     | a) Karanataka             | 129           | 129                                              | 0.9          | 100              | 0.7           |
|     | i) Hebbanalla             | 800           | 800                                              | 7.04         | 100              | 0.88          |
|     | b) Tamilnadu              |               |                                                  | NIL          |                  |               |
|     | i) Bellahalla project     | 500           | 500                                              | 4.4          | 100              | 88.0          |
|     | Total Grand total         | 18241         | 26711                                            | 301.13       |                  |               |
| 7   | Palar sub-basin           |               |                                                  |              |                  |               |
| ,   | EXISTING PROJECTS         |               | ļ ———                                            | <del>}</del> |                  |               |
|     | I. Major projects         |               |                                                  | <b></b>      |                  |               |
|     | a) Karanataka             |               |                                                  | NIL          |                  |               |
|     | b) Tamilnadu              | <u> </u>      | -                                                | NIL          |                  | -             |
|     | II. Medium projects       |               | ļ — — — — — — — — — — — — — — — — — — —          |              |                  |               |
|     | a) Karanataka             | <del></del>   |                                                  | NIL          |                  |               |
|     | b) Tamilnadu              | <u> </u>      | <del>                                     </del> | NIL          |                  |               |
|     | III) Minor                |               |                                                  | 7            |                  |               |
|     | a) Karanataka             |               | <del> </del>                                     |              |                  |               |
|     | i) Tanks                  | 1334          | 1334                                             | 9.00         | 100              | 0.7-kh        |
|     |                           |               |                                                  |              |                  | 1.1-rabi      |
|     | ii) Other Sources         | 188           | 188                                              | 0.85         | 100              | 0.45          |
|     | b) Tamilnadu              |               |                                                  |              |                  |               |
|     | i) Tanks                  | 60            | 85                                               | 1.00         | 142.00           | 0.70-kh       |
|     | 7, 1                      |               |                                                  |              | 1.2.00           | 1.10-rabi     |
|     | ii) Other Sources         | 199           | 300                                              | 1.35         | 151              | 0.45          |
|     | Total                     | 1781          | 1907                                             | 12.20        |                  |               |
|     | ONGOING PROJECTS          |               | 1707                                             | 12.20        | -                |               |
|     | I. Major projects         | <del></del>   | <u> </u>                                         |              |                  |               |
|     | a) Karanataka             |               | <del>-</del> -                                   | NIL          | -                |               |
|     | b) Tamilnadu              |               | <del> </del>                                     | NIL          | <del>  -</del> - | <del></del>   |
|     | II. Medium projects       | <del>- </del> | <u> </u>                                         |              | -                |               |
|     | a) Karanataka             | <del></del>   | † <del>.</del> –                                 | NII.         | <u> </u>         |               |
|     | i) Uduthore halla         | 6397          | 6597                                             | 34.96        | 100              | 0.53          |
| •   | b) Tamilnadu              | -             | -                                                | NIL          | -                | <del></del> - |

| (l) | (2)                                                                              | (3)           | (4)          | (5)   | (6)          | (7)                                   |
|-----|----------------------------------------------------------------------------------|---------------|--------------|-------|--------------|---------------------------------------|
|     | Palar sub-basin                                                                  |               |              |       |              |                                       |
|     | III) Minor                                                                       |               |              |       |              |                                       |
|     | a) Karanataka                                                                    |               |              | NIL   | -            | <b>-</b>                              |
|     | b) Tamilnadu                                                                     | •             | -            | NIL   |              | <u>.</u>                              |
|     | Total                                                                            | 6597          | 6597         | 34.96 |              |                                       |
|     | FUTURE PROJECTS                                                                  |               |              |       |              | ·                                     |
| ļ   | I. Major projects                                                                |               |              |       |              |                                       |
| ,   | a) Karanataka                                                                    |               | -            | NIL   | -            | -                                     |
| ١   | b) Tamilnadu                                                                     |               | -            | NIL   | -            | -                                     |
| I   | II. Medium projects                                                              |               |              |       |              | · · · · · · · · · · · · · · · · · · · |
|     | a) Karanataka                                                                    |               | -            | NIL   | -            |                                       |
|     | i) Chengawadi                                                                    | 26 <b>0</b> 0 | 3250         | 37.05 | 125          | 1.14                                  |
|     | b) Tamilnadu                                                                     |               |              |       |              |                                       |
|     | i) Additional area to bring total area of irrigation to 30% of culturable area   | 6.            | 7522         | 85.75 | 35           |                                       |
|     | III) Minor projects                                                              |               |              |       |              |                                       |
|     | a) Karanataka                                                                    |               |              |       | 1000         |                                       |
|     | i) Minnathuhalla                                                                 | 1200          | 1200         | 10.56 | 100          | 0.88                                  |
|     | ii) Dodihalla                                                                    | 1200          | 1200         | 10.56 | 100          | 0.88                                  |
| Ē   | iii) Additional area to bring total area of irrigation to 30% of culturable area |               | 266          | 2.34  |              | 0.88                                  |
|     | b) Tamilnadu                                                                     |               |              |       |              |                                       |
|     | iv) Maniyarpallam                                                                | 900           | 900          | 7.92  | 100          | 0.88                                  |
|     | v) Additional area to bring total area of irrigation to 30% of culturable area   |               | 7522         | 66.19 | 100          | 0.88                                  |
|     | Total                                                                            | 21860         | 220.37       |       |              |                                       |
|     | Grand total                                                                      |               |              |       |              |                                       |
| 8   | Chinnar sub-basin                                                                |               |              | 100   | (            |                                       |
|     | EXISTING PROJECTS                                                                |               |              |       |              |                                       |
|     | I. Major projects                                                                |               |              |       |              |                                       |
|     | a) Karanataka                                                                    | _             |              | NIL   | -            |                                       |
|     | b) Tamilnadu                                                                     |               |              | NIL   | -            |                                       |
| ,   | II. Medium projects                                                              |               |              |       | <u> </u>     |                                       |
| Ì   | a) Karanataka                                                                    |               | <del> </del> | NIL   | <del> </del> |                                       |
|     | b) Tamilnadu                                                                     |               | ļ            | 1416  |              | <del></del>                           |
| 1   | i) Thoppaiyar Reservoir                                                          | 2157          | 2162         | 10.20 | 100          | 0.50                                  |
|     | <del></del>                                                                      | 213/          | 2157         | 10.79 | 100          | 0.50                                  |
|     | III) Minor                                                                       |               |              |       |              | <b></b>                               |
| }   | a) Karanataka                                                                    | ·             | -            | NIL   | -            |                                       |
|     | b) Tamilnadu                                                                     |               |              |       |              |                                       |
| L   | i) Chinnar Reservoir                                                             | 757           | 757          | 9.08  | 100          | 1.20                                  |

| (1) | (2)                                          | (3)      | (4)      | (5)      | (6)                                       | (7)      |
|-----|----------------------------------------------|----------|----------|----------|-------------------------------------------|----------|
| (-) | Chinnar sub-basin                            | <u></u>  |          |          | <u> `                                </u> |          |
|     | ii) KasarigulihallReservoir                  | 1619     | 1619     | 8.10     | 100                                       | 0.50     |
| 1   | iii) Nagavathi Reservoir                     | 807      | 807      | 4.04     | 100                                       | 0.50     |
|     | iv) Tanks                                    | 8305     | 8305     | 116.27   | 100                                       | 1.40     |
|     | <del></del>                                  | 13645    | 13645    | 148.28   |                                           | 1.40     |
|     | Total                                        | 13043    | 13043    | 140.20   |                                           | <u> </u> |
|     | ONGOING PROJECTS                             |          | <u> </u> |          |                                           |          |
|     | I. Major projects                            | -        |          | NIL      | -                                         | -        |
|     | II. Medium projects                          | •        | -        | NIL      | -                                         |          |
|     | III) Minor                                   | -        | -        | NIL      |                                           | -        |
|     | FUTURE PROJECTS                              |          |          |          |                                           |          |
|     | I. Major projects                            |          |          |          |                                           |          |
|     | a) Karanataka                                | -        | -        | NIL      |                                           | -        |
|     | b) Tamilnadu                                 | -        |          | NIL      |                                           |          |
|     | II. Medium projects                          |          |          |          |                                           |          |
|     | a) Karanataka                                |          | "        | NIL      |                                           | -        |
|     | b) Tamilnadu                                 |          |          |          |                                           |          |
|     | i) Additional area to bring total            | 2.25     | 24878    | 291.07   | N. 1816                                   | 1.17     |
|     | area of irrigation to 30% of culturable area |          |          |          | 100                                       | 1-7      |
|     | III) Minor projects                          |          |          |          |                                           | -        |
|     | a) Karanataka                                |          |          |          |                                           |          |
|     | i) Doddahalla reservoir                      | 971      | 971      | 8.64     | 100                                       | 0.89     |
| !   | ii) Sastramuttu scheme                       | 437      | 437      | 3.89     | 100                                       | 0.89     |
|     | iii) Tank across                             | 30       | 30       | 0.27     | 100                                       | 0.89     |
|     | Vellamalaipallam                             |          |          |          |                                           |          |
|     | iv) Tank across Chinnar                      | 884      | 884      | 7.87     | 100                                       | 0.89     |
|     | v) Tank across Perumpallam<br>Odai           | 123      | 123      | 1.09     | 100                                       | 0.89     |
| •   | vi) Additional area to bring                 | 24878    | 24878    | 221.41   | 100                                       | 0.89     |
| İ   | total area of irrigation to 30%              | 24070    | 24070    | 221.41   | 100                                       | 0.09     |
|     | of culturable area                           |          |          | 100      | 100                                       |          |
|     | b) Tamilnadu                                 |          | -        | NIL      |                                           | -        |
| 1   | Total                                        |          | 52201    | 534.24   |                                           |          |
| ļ   | Grand total                                  |          |          |          |                                           |          |
| 9   | Bhavani sub-basin                            | -        |          |          |                                           | 1        |
|     | EXISTING PROJECTS                            |          |          |          |                                           |          |
|     | I. Major projects                            |          |          |          |                                           |          |
|     | a) Karanataka                                | -        | -        | NIL      | <del>-</del>                              | -        |
|     | b) Tamilnadu                                 |          |          |          | -                                         |          |
|     | i) Kodiveri Anicut                           | 11048    | 19830    | 531.44   | 179                                       | 2.68     |
|     | ii) Lower Bhavani                            | 36794    | 32410    | 395.40   | 100                                       | 1.22     |
| -   | iii) Mettur Channels                         | 797      | 797      | 12.03    | 100                                       | 1.51     |
|     | c) Kerala                                    | -        | -        | NIL      | -                                         | -        |
|     | <del> </del>                                 | <u> </u> | <u> </u> | <u> </u> | <del>_</del>                              | L        |

| (1)  | (2)                                                                            | (3)  | (4)   | (5)     | (6)      | (7)                                   |
|------|--------------------------------------------------------------------------------|------|-------|---------|----------|---------------------------------------|
|      | Bhavani sub-basin                                                              |      |       |         |          |                                       |
|      | II. Medium projects                                                            |      |       |         |          |                                       |
|      | a) Karanataka                                                                  | -    | -     | NIL     | -        | -                                     |
|      | b) Tamilnadu                                                                   | -    | -     | NIL     | -        |                                       |
|      | c) Kerala                                                                      | -    |       | NIL     | -        | <del>.</del>                          |
|      | III) Minor                                                                     |      |       |         |          |                                       |
|      | a) Karanataka                                                                  | -    | 200   | 2.80    | -        | 1.4                                   |
| ا    | b) Tamilnadu                                                                   |      |       |         |          | · · · · · · · · · · · · · · · · · · · |
| į    | i) Gunderipallam                                                               |      | 1001  | 12.21   | -        | 1.22                                  |
|      | ii) Varattapallam                                                              |      | 1210  | 15.73   | -        | 1.30                                  |
|      | iii) Tanks                                                                     | -    | 3756  | 52.58   | -        | 1.40                                  |
|      | c) Kerala                                                                      |      | 680   | 11.29   | -        | 1.66                                  |
|      | Total                                                                          |      | 59884 | 1033.48 |          |                                       |
|      | ONGOING PROJECTS                                                               |      |       |         |          |                                       |
|      | I. Major projects                                                              |      |       |         |          |                                       |
|      | a) Karanataka                                                                  |      |       | NIL     |          | -                                     |
|      | b) Tamilnadu                                                                   |      |       | NIL     |          |                                       |
|      | c) Kerala                                                                      |      |       | NIL     | 100 - To | -                                     |
|      | II. Medium projects                                                            |      |       |         |          |                                       |
|      | a) Karanataka                                                                  |      |       | NIL     |          | -                                     |
|      | b) Tamilnadu                                                                   |      |       | NIL .   |          |                                       |
|      | c) Kerala                                                                      |      |       |         |          |                                       |
|      | i) Attapady                                                                    | 8300 | 8387  | 119.93  | 101      | 1.43                                  |
|      | III) Minor Projects                                                            |      |       |         |          |                                       |
|      | a) Karanataka                                                                  |      |       | NIL     | -        |                                       |
|      | b) Tamilnadu                                                                   |      |       |         |          |                                       |
|      | i) Perumpallam reservoir                                                       |      | 1400  | 6.02    |          | 0.43                                  |
|      | c) Kerala                                                                      |      | -     | NIL     |          |                                       |
|      | Total                                                                          |      | 9787  | 125.95  |          |                                       |
|      | FUTURE PROJECTS                                                                |      |       |         |          |                                       |
|      | I. Major projects                                                              |      |       |         |          |                                       |
|      | a) Karanataka                                                                  |      | -     | NIL     |          | •                                     |
|      | b) Tamilnadu                                                                   | -    |       | NIL     |          | <u> </u>                              |
|      | c) Kerala                                                                      |      |       | NIL     |          |                                       |
| <br> | II. Medium projects                                                            |      |       |         |          |                                       |
|      | a) Karanataka                                                                  |      |       |         |          |                                       |
|      | Additional area to bring total area of irrigation to 30% of culturable area    | 1442 | 1643  | 17.42   | 125      | 1.06                                  |
|      | b) Tamilnadu                                                                   |      |       |         |          |                                       |
|      | i) Additional area to bring total area of irrigation to 30% of culturable area | 4066 | 5082  | 53.87   | 125      | 1.06                                  |
|      | c) Kerala                                                                      |      |       |         |          |                                       |
|      | iii) Arali irrigation project                                                  | 1000 | 1250  | 13.25   | 125      | 1.06                                  |
|      |                                                                                |      | L     |         |          |                                       |

| (1) | (2)                                                                                    | (3)      | (4)   | (5)    | (6)         | (7)  |
|-----|----------------------------------------------------------------------------------------|----------|-------|--------|-------------|------|
|     | Bhavani sub-basin                                                                      |          |       |        |             |      |
|     | III) Minor projects                                                                    |          |       |        |             |      |
|     | a) Karanataka                                                                          |          |       |        |             |      |
|     | iii) Additional area to bring<br>total area of irrigation to 30%<br>of culturable area | -        | 1642  | 13.96  | 100         | 0.85 |
|     | b) Tamilnadu                                                                           |          |       |        |             |      |
|     | ii) Tank across Periapallam                                                            | 102      | 102   | 0.87   | 100         | 0.85 |
|     | iii) Reservoir across<br>Valukkupparaipallam                                           | 954      | 954   | 8.11   | 100         | 0.85 |
|     | iv) Remodeling of<br>Thaddalapalli Channel                                             | 145      | 145   | 1.23   | 100         | 0.85 |
|     | v) Reservoir across<br>Kombulapallam                                                   | 469      | 469   | 3.99   | 100         | 0.85 |
|     | vi) Reservoir across<br>Bollipallam                                                    | 174      | 174   | 1.48   | 100         | 0.85 |
|     | vi) Rainfed tanks (10 Nos.)                                                            | 1497     | 1497  | 12.72  | 100         | 0.85 |
|     | v) Additional area to bring total area of irrigation to 30% of culturable area         | 5081     | 5081  | 43.19  | 100         | 0.85 |
|     | c) Kerala                                                                              |          |       | NIL    | -           |      |
|     | Total                                                                                  |          | 18039 | 170.09 |             |      |
|     | Grand total                                                                            |          |       |        |             |      |
| 10  | Noyil sub-basin                                                                        |          |       |        |             | 7    |
|     | (Area lie fully in Tamilnadu                                                           |          |       |        |             |      |
|     | EXISTING PROJECTS                                                                      |          |       |        | 30.3        |      |
|     | I. Major projects                                                                      |          |       |        |             |      |
|     | i) Noyil River Channels                                                                |          | 6920  | 96.88  | 116         | 1.40 |
|     | ii) P.A.P.System                                                                       |          | 14857 | 157.48 | 42          | 1.06 |
|     | iii) Lower Bhavani Project                                                             | 20888    | 18399 | 224,47 | 88          | 1.22 |
|     | iv) Kalingarayan Anicut                                                                |          | 251   | 5.02   | <del></del> | 2.00 |
|     | П. Medium projects                                                                     |          |       |        |             |      |
|     | i) Noyil Reservoir Schme                                                               |          | 3895  | 24.15  | 100         | 0.62 |
|     | III) Minor Projects                                                                    | j        | ·<br> |        |             |      |
|     | i) Tanks                                                                               |          | 2778  | 38.89  | 100         | 1.40 |
|     | Total                                                                                  | <u>;</u> | 47100 | 546.89 | -           |      |

| (1)      | (2)                                                                              | (3)  | (4)   | (5)    | (6)      | (7)           |
|----------|----------------------------------------------------------------------------------|------|-------|--------|----------|---------------|
|          | Noyil sub-basin                                                                  |      |       |        |          | <del></del> - |
|          | ONGOING PROJECTS                                                                 |      |       |        | <u> </u> |               |
|          | I. Major projects                                                                | -    | -     | NIL    | -        | -             |
|          | II. Medium projects                                                              |      |       |        |          |               |
|          | i) Noyil Orathupalayam<br>Reservoir Schme                                        | 4200 | 4200  | 17.44  | 100      | 0.42          |
|          | III) Minor Projects                                                              |      |       |        |          |               |
|          | i) Chinna Vedampatti Tank                                                        | 397  | 397   | 2.3    | 100      | 0.58          |
|          | Total                                                                            | 4597 | 4597  | 19.74  | _        | •             |
|          | FUTURE PROJECTS                                                                  |      |       |        |          |               |
|          | I. Major projects                                                                |      |       |        |          |               |
|          | i) Anamalaiyar diversion (From periyar basin)                                    | 2    | 2979  | 23     | 50       |               |
|          | II. Medium projects                                                              |      |       |        |          |               |
|          | Additional area to bring total area of irrigation to 30% of culturable area      |      | 7913  | 66.47  | 0.84     | 1             |
|          | III) Minor Projects                                                              |      |       |        |          |               |
|          | i) Mannarai and Anaipalay<br>anicut diversion scheme                             |      | 501   | 3.00   |          | 0.65          |
|          | ii) Rainfed tanks                                                                |      | 782   | 5.00   | 100      | 0.65          |
|          | iii) Additional area to bring total area of irrigation to 30% of culturable area |      | 7914  | 51.00  | 815      | 0.65          |
|          | Total                                                                            |      | 20089 | 148.47 |          |               |
| 11       | Amaravathi sub-basin                                                             |      |       |        |          |               |
|          | EXISTING PROJECTS                                                                |      |       |        |          |               |
|          | I. Major projects                                                                |      |       |        |          |               |
|          | a) Tamilnadu                                                                     |      |       |        |          |               |
|          | i) Old Amaravathi Channel                                                        |      | 19628 | 341.53 | -        | 1.74          |
|          | ii) Amaravathi Reservoir                                                         |      | 10118 | 159.86 |          | 1.58          |
|          | iii) P.A.P. System                                                               | -    | 57202 | 435    | •        |               |
|          | b) Kerala                                                                        |      |       | NIL    |          | -             |
|          | II. Medium projects                                                              |      |       |        | \        |               |
|          | a) Tamilnadu                                                                     | , _  |       |        |          |               |
|          | i) Palar-Porandalar Scheme                                                       | -    | 6063  | 78.82  | -        | 1.30          |
|          | ii) Varadamanadhi Scheme                                                         | -    | 2105  | 27.37  | -        | 1.30          |
|          | iii) Upper Reservoir                                                             | -    | 2454  | 40     | -        | 1.63          |
| <u> </u> | b) Kerala                                                                        | -    | -     | NIL    | <u> </u> | -             |

| (1)      | (2)                                          | (3)         | (4)                                            | (5)                                   | (6)            | (7)                                   |
|----------|----------------------------------------------|-------------|------------------------------------------------|---------------------------------------|----------------|---------------------------------------|
| <u> </u> | Amaravathi sub-basin                         |             | , ,                                            | · · · · · · · · · · · · · · · · · · · |                |                                       |
|          | III) Minor Projects                          |             | 1-                                             | ,                                     |                | · · · · · · · · · · · · · · · · · · · |
|          | a) Thailand                                  |             | <u> </u>                                       |                                       | -              |                                       |
|          | i) Parappalar Scheme                         | -           | 936                                            | 12.17                                 | 1.3            |                                       |
|          | ii) Vattamalai Karai Odai                    | •           | 1200                                           | 15.60                                 | _              | 1.40                                  |
|          | iii) Tanks                                   | _           | 18058                                          | 252.81                                |                | 1.40                                  |
|          | b) Kerala                                    |             |                                                |                                       |                |                                       |
|          | iv) Riverfed Scheme                          |             | 3000                                           | 57.00                                 |                | 1.90                                  |
|          | Total                                        |             | 120764                                         | 1420.16                               |                |                                       |
|          | ONGOING PROJECTS                             |             | - · <u>- · · - · · · · · · · · · · · · · ·</u> |                                       |                |                                       |
|          | I. Major projects                            |             |                                                |                                       |                |                                       |
|          | a) Thailand                                  |             |                                                | NIL                                   | _              | -                                     |
|          | b) Karalla                                   |             |                                                | NIL                                   | -              | -                                     |
|          | II. Medium projects                          |             |                                                | NIL                                   | -              |                                       |
|          | a) Thailand                                  |             | 1                                              | 1,112                                 |                |                                       |
|          | i) Kodaganar Scheme                          |             | 2313                                           | 24.75                                 |                | 1.07                                  |
|          | b) Kerala                                    |             | 2313                                           | NIL                                   |                | •                                     |
|          | Total                                        |             | 3811                                           | 39.58                                 |                |                                       |
|          | III) Minor Projects                          |             | 2011                                           | NIL                                   |                |                                       |
|          | a) Thailand                                  |             | 1                                              |                                       |                |                                       |
|          | i) Kudhirayar Scheme                         |             | 1498                                           | 14.83                                 |                | 0.99                                  |
|          | b) Kerala                                    |             | 1470                                           | NIL                                   |                | - 0.77                                |
|          | Total                                        |             | 3811                                           | 39.58                                 |                |                                       |
|          | FUTURE PROJECTS                              |             | 3011                                           | 37.30                                 |                |                                       |
|          | I. Major projects                            |             |                                                |                                       |                |                                       |
|          | a) Thailand                                  |             |                                                | NIL                                   |                | -                                     |
|          | i) Anamalaiyar diversion                     |             | 3846                                           | 40.00                                 |                |                                       |
|          | b) Kerala                                    |             | 3640                                           | NIL                                   | _              |                                       |
|          | II. Medium projects                          |             | -                                              | IVIL                                  | -              |                                       |
|          | a) Thailand                                  |             |                                                |                                       |                |                                       |
|          |                                              |             | 3191                                           | 42.00                                 |                |                                       |
|          | i) Naganjiyar Reservoir                      |             | 21651                                          | 42.00<br>285.79                       | 1              | 1.32                                  |
|          | ii) Additional area to bring total           |             | 21031                                          | 203.19                                | .000           | 1.32                                  |
|          | area of irrigation to 30% of culturable area |             |                                                |                                       | Sec. 10.       |                                       |
|          | b) Kerala                                    |             |                                                | NIL                                   |                |                                       |
|          |                                              |             |                                                | INIL                                  | -              |                                       |
|          | III) Minor Projects a) Thailand              |             |                                                |                                       |                | · ··· · · · · · · · · · · · · · · · · |
|          |                                              |             | 1101                                           | 12.28                                 |                |                                       |
|          | i) Pachiyar ii) Chinnakkarai Odai            |             | 1181                                           | 12.28                                 |                |                                       |
|          |                                              |             | 345                                            | 3.59                                  |                | 1.04                                  |
|          | iii) Additional area to bring total          |             | 21651                                          | 225.17                                | -              | 1.04                                  |
|          | area of irrigation to 30% of                 |             | land or                                        |                                       | 1              |                                       |
|          | culturable area                              |             |                                                |                                       | -              |                                       |
|          | b) Kerala                                    |             | 1000                                           |                                       |                | · <del></del>                         |
|          | iv) Thalaryar                                |             | 1902                                           | 19.78                                 |                |                                       |
|          | v) Chanalar                                  | <del></del> | 1710                                           | 17.78                                 | <del>  -</del> |                                       |
|          | vi) Chamabakkad                              |             | 1336                                           | 13.89                                 | <b> </b>       |                                       |
|          | vii) Vebbavada                               |             | 405                                            | 4.21                                  |                |                                       |
|          | viii) Ottamavam                              |             | 243                                            | 2.53                                  |                |                                       |
|          | ix) Pulandialiaka                            |             | 405                                            | 4.21                                  |                |                                       |
|          | x) Padagiri                                  |             | 162                                            | 1.68                                  |                | ·                                     |
|          | Total                                        |             | 58028                                          | 672.91                                | <u> </u>       |                                       |

| ( E I I I I I I I I I I I I I I I I I I | Tirumanimuttar sub-basin (Area lie fully in Tamilnadu EXISTING PROJECTS  I. Major projects  i) Mettur Canals  ii) Lower Bhavani Project  iii) Salem Tiruchi Channels  iv) Kattalai Canal Scheme  v) Kalingarayan Anicut  II. Medium projects  III) Minor Projects  ii) Tanks  Total  ONGOING PROJECTS | 18212<br>95105<br>28841<br>30879<br>5713 | 17415<br>33026<br>19245<br>23405<br>15532 | 262.97<br>402.92<br>350.26<br>425.97<br>329.28<br>NIL | 100<br>100<br>158<br>160<br>272 | 1.51<br>1.22<br>1.82<br>1.82<br>2.12  |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|-------------------------------------------|-------------------------------------------------------|---------------------------------|---------------------------------------|
|                                         | EXISTING PROJECTS  I. Major projects  i) Mettur Canals  ii) Lower Bhavani Project  iii) Salem Tiruchi Channels  iv) Kattalai Canal Scheme  v) Kalingarayan Anicut  II. Medium projects  III) Minor Projects  i) Tanks  Total  ONGOING PROJECTS                                                        | 95105<br>28841<br>30879<br>5713          | 33026<br>19245<br>23405<br>15532          | 402.92<br>350.26<br>425.97<br>329.28                  | 100<br>158<br>160               | 1.22<br>1.82<br>1.82<br>2.12          |
|                                         | I. Major projects  i) Mettur Canals  ii) Lower Bhavani Project  iii) Salem Tiruchi Channels  iv) Kattalai Canal Scheme  v) Kalingarayan Anicut  II. Medium projects  ii) Tanks  Total  ONGOING PROJECTS                                                                                               | 95105<br>28841<br>30879<br>5713          | 33026<br>19245<br>23405<br>15532          | 402.92<br>350.26<br>425.97<br>329.28                  | 100<br>158<br>160               | 1.22<br>1.82<br>1.82<br>2.12          |
| i<br>i<br>v                             | i) Mettur Canals ii) Lower Bhavani Project iii) Salem Tiruchi Channels iv) Kattalai Canal Scheme v) Kalingarayan Anicut II. Medium projects ii) Tanks Total ONGOING PROJECTS                                                                                                                          | 95105<br>28841<br>30879<br>5713          | 33026<br>19245<br>23405<br>15532          | 402.92<br>350.26<br>425.97<br>329.28                  | 100<br>158<br>160               | 1.22<br>1.82<br>1.82<br>2.12          |
| i<br>i<br>v                             | ii) Lower Bhavani Project iii) Salem Tiruchi Channels iv) Kattalai Canal Scheme v) Kalingarayan Anicut II. Medium projects III) Minor Projects i) Tanks Total ONGOING PROJECTS                                                                                                                        | 95105<br>28841<br>30879<br>5713          | 33026<br>19245<br>23405<br>15532          | 402.92<br>350.26<br>425.97<br>329.28                  | 100<br>158<br>160               | 1.22<br>1.82<br>1.82<br>2.12          |
| i<br>i<br>v                             | ii) Lower Bhavani Project iii) Salem Tiruchi Channels iv) Kattalai Canal Scheme v) Kalingarayan Anicut II. Medium projects III) Minor Projects i) Tanks Total ONGOING PROJECTS                                                                                                                        | 28841<br>30879<br>5713                   | 19245<br>23405<br>15532                   | 350.26<br>425.97<br>329.28                            | 158<br>160                      | 1.82<br>1.82<br>2.12                  |
| i<br>i<br>I                             | iii) Salem Tiruchi Channels iv) Kattalai Canal Scheme v) Kalingarayan Anicut II. Medium projects III) Minor Projects i) Tanks Total ONGOING PROJECTS                                                                                                                                                  | 30 <b>8</b> 79<br>5713                   | 23405<br>15532<br>-                       | 425.97<br>329.28                                      | 160                             | 1.82<br>2.12                          |
| i<br>I<br>I                             | iv) Kattalai Canal Scheme v) Kalingarayan Anicut II. Medium projects III) Minor Projects i) Tanks Total ONGOING PROJECTS                                                                                                                                                                              | 5713                                     | 15532                                     | 329.28                                                |                                 | 1.82<br>2.12                          |
| I<br>I                                  | V) Kalingarayan Anicut  II. Medium projects  III) Minor Projects  i) Tanks  Total  ONGOING PROJECTS                                                                                                                                                                                                   |                                          |                                           |                                                       | 272                             | 2.12                                  |
| I<br>I<br>i                             | II. Medium projects  III) Minor Projects  i) Tanks  Total  ONGOING PROJECTS                                                                                                                                                                                                                           |                                          |                                           |                                                       | -                               |                                       |
| i                                       | III) Minor Projects  i) Tanks  Total  ONGOING PROJECTS                                                                                                                                                                                                                                                | 38235                                    | 38235                                     |                                                       |                                 |                                       |
| i                                       | i) Tanks<br>Total<br>ONGOING PROJECTS                                                                                                                                                                                                                                                                 | 38235                                    | 38235                                     |                                                       |                                 |                                       |
| 7                                       | Total ONGOING PROJECTS                                                                                                                                                                                                                                                                                |                                          | JULJJ                                     | 535.29                                                | 100                             | 1.40                                  |
|                                         |                                                                                                                                                                                                                                                                                                       |                                          | 146858                                    | 2306.69                                               |                                 | -                                     |
|                                         | <del></del>                                                                                                                                                                                                                                                                                           |                                          |                                           |                                                       |                                 |                                       |
| 1                                       | I. Major projects                                                                                                                                                                                                                                                                                     |                                          |                                           | NIL                                                   |                                 | -                                     |
| I                                       | II. Medium projects                                                                                                                                                                                                                                                                                   |                                          |                                           | NIL                                                   |                                 |                                       |
| I                                       | III) Minor Projects                                                                                                                                                                                                                                                                                   |                                          |                                           | NIL                                                   |                                 |                                       |
| 7                                       | Total Total                                                                                                                                                                                                                                                                                           |                                          |                                           | NIL                                                   |                                 |                                       |
| F                                       | FUTURE PROJECTS                                                                                                                                                                                                                                                                                       |                                          |                                           |                                                       |                                 |                                       |
| 1                                       | I. Major projects                                                                                                                                                                                                                                                                                     |                                          |                                           | NIL                                                   |                                 |                                       |
|                                         | II. Medium projects                                                                                                                                                                                                                                                                                   |                                          |                                           |                                                       |                                 |                                       |
| i                                       | i) Reservoir across Ayyar                                                                                                                                                                                                                                                                             |                                          | 2500                                      | 30.75                                                 | -                               | 1.23                                  |
| t                                       | ii) Additional area to bring total area of irrigation to 30% of culturable area                                                                                                                                                                                                                       |                                          | 18264                                     | 224.65                                                | 10                              | 1.23                                  |
| 1                                       | III) Minor Projects                                                                                                                                                                                                                                                                                   |                                          |                                           |                                                       |                                 |                                       |
| i                                       | i) Across Chittar                                                                                                                                                                                                                                                                                     |                                          | 854                                       | 7.43                                                  |                                 | 0.87                                  |
| l t                                     | ii) Additional area to bring total area of irrigation to 30% of culturable area                                                                                                                                                                                                                       | -                                        | 18264                                     | 158.9                                                 | 5                               | 0.87                                  |
| 7                                       | Total Total                                                                                                                                                                                                                                                                                           |                                          | 39882                                     | 421.73                                                | -                               | -                                     |
| 13 <i>I</i>                             | Ponnanai Ar sub-basin                                                                                                                                                                                                                                                                                 |                                          |                                           |                                                       |                                 |                                       |
| (                                       | (Area lie fully in Thailand                                                                                                                                                                                                                                                                           |                                          |                                           |                                                       |                                 | <u></u>                               |
| <b>⊢</b>                                | EXISTING PROJECTS                                                                                                                                                                                                                                                                                     | ··                                       |                                           |                                                       |                                 |                                       |
| 1                                       | I. Major projects                                                                                                                                                                                                                                                                                     |                                          |                                           |                                                       |                                 |                                       |
| l <del>[-</del>                         | i) Salem Tiruchi Channels                                                                                                                                                                                                                                                                             |                                          | 1996                                      | 36.00                                                 | 158                             | 1.82                                  |
| <del> </del>                            | ii) Kattalai Canal Scheme                                                                                                                                                                                                                                                                             | 30879                                    | 19705                                     | 359.00                                                | 160                             | 1.82                                  |
| <b>}</b> —                              | II. Medium projects                                                                                                                                                                                                                                                                                   |                                          | -                                         |                                                       |                                 | · · · · · · · · · · · · · · · · · · · |
| I }                                     | i) New Kattalai HLC                                                                                                                                                                                                                                                                                   | ·                                        | 4229                                      | 72.00                                                 | 100                             | 1.71                                  |

| (1) | (2)                                                                             | (3)         | (4)            | (5)    | (6)         | (7)      |
|-----|---------------------------------------------------------------------------------|-------------|----------------|--------|-------------|----------|
|     | Ponnanai Ar sub-basin                                                           |             |                |        |             |          |
| Ì   | III) Minor Projects                                                             |             |                |        |             |          |
|     | i) Ponnanai Ar Reservoir                                                        | 850         | 850            | 10.03  | 100         | 1.18     |
| 1   | i) Tanks                                                                        |             | 13123          | 183.72 | 100         | 1.40     |
|     | Total                                                                           | <del></del> | 39 <b>9</b> 03 | 660.75 |             |          |
|     | ONGOING PROJECTS                                                                |             | <u>.</u> _     |        |             |          |
| .   | I. Major projects                                                               | •           | <u>-</u>       | NIL    | •           | <u>-</u> |
| Ì   | II. Medium projects                                                             |             |                | NIL    | -           | -        |
|     | III) Minor Projects                                                             |             |                | NIL    | -           | -        |
|     | Total                                                                           |             |                | NIL    | -           | -        |
|     | FUTURE PROJECTS                                                                 |             |                |        |             |          |
| :   | I. Major projects                                                               |             |                | NIL    |             | -        |
|     | II. Medium projects                                                             |             |                |        | _ ```       |          |
|     | i) Additional area to bring total area of irrigation to 30% of culturable area  |             | 1327           | 17.65  | 1           | 1.33     |
|     | III) Minor Projects                                                             |             |                |        |             |          |
|     | i) Minnakkaradu Tank                                                            | 67          | 67             | 0.72   | 100         | 1.07     |
|     | ii) Additional area to bring total area of irrigation to 30% of culturable area |             | 1326           | 14.19  |             | 1.07     |
|     | Total                                                                           |             | 2720           | 32.56  |             |          |
| 14  | Upper Coleroon Sub-basin                                                        |             |                |        |             |          |
|     | (Area lie fully in Thailand                                                     |             |                |        |             |          |
|     | EXISTING PROJECTS                                                               |             |                |        | 387.4       |          |
|     | I. Major projects                                                               |             |                |        | 30° C       |          |
|     | i) Salem Tiruchi Channels                                                       | 15398       | 24329          | 443    | 158         | 1.82     |
|     | II. Medium projects                                                             |             |                |        |             |          |
|     | i) Nandiyar Channels                                                            | 3837        | 3978           | 56     | 125         | 1.40     |
|     | ii) Sidhamalli reservoir                                                        | 2056        | 2056           | 14     | 100         | 0.70     |
|     | iii) Pullambadi                                                                 | 8944        | 8944           | 139    | 100         | 1.55     |
|     | III) Minor Projects                                                             |             |                |        |             |          |
|     | i) Upper Reservoir                                                              | 723         | 723            | 4      | 100         | 0.50     |
|     | Total                                                                           | 42187       | 51914          | 822    |             |          |
|     | ONGOING PROJECTS                                                                |             |                |        | <del></del> |          |
|     | I. Major projects                                                               | -           | -              | NIL    | -           | <u> </u> |
|     | II. Medium projects                                                             | -           | -              | NIL    | -           | -        |
|     | III) Minor Projects                                                             | -           | -              | NIL    | -           | -        |
|     | Total                                                                           | -           | -              | NIL    | -           | -        |

| ) | (2)                                                                                   | (3)    | (4)   | (5)  | (6)  | (7)  |
|---|---------------------------------------------------------------------------------------|--------|-------|------|------|------|
|   | Upper Coleroon Sub-basin                                                              |        |       |      |      |      |
|   | FUTURE PROJECTS                                                                       |        |       |      |      |      |
|   | I. Major projects                                                                     | -      | _     | NIL  | -    |      |
|   | II. Medium projects                                                                   |        |       |      |      |      |
|   | i) Kottarai reservoir scheme                                                          | -      | 3056  | 53   | -    | 1.75 |
|   | ii) Additional area to bring<br>total area of irrigation to 30%<br>of culturable area | -      | 6657  | 116  | -    | 1.75 |
|   | Total                                                                                 |        |       |      |      |      |
|   | III) Minor Projects                                                                   | 2      |       |      |      |      |
|   | i) Anicut across Andiodai                                                             | 216    | 216   | 3    | 1.32 | -    |
|   | ii) Tank near Kiliyanallur                                                            | 164    | 164   | 2    | 1.32 | -    |
| į | iii) Anaipadivari reservoir                                                           | 1034   | 1034  | 14   | 1.32 | -    |
|   | iv) Additional area to bring<br>total area of irrigation to 30%<br>of culturable area | , Sec. | 6657  | 88   | 1.32 | -    |
|   | Total                                                                                 |        | 17784 | 276  | 1000 | -    |
| 5 | Lower Coleroon sub-basin                                                              |        |       |      |      |      |
|   | (Area lie fully in Thailand                                                           |        |       |      |      |      |
|   | EXISTING PROJECTS                                                                     |        |       |      |      |      |
|   | I. Major projects                                                                     |        |       |      |      |      |
|   | i) Lower Coleroon Anicut<br>Scheme                                                    |        | 66007 | 1077 | 123  | 1.63 |
|   | II. Medium projects                                                                   | -      |       | NIL  |      | -    |
|   | III) Minor Projects                                                                   |        |       |      |      |      |
|   | i) Riverfed and rainfed<br>Schemes                                                    |        | 4236  | 59   | 100  | 1.40 |
|   | Total                                                                                 |        | 70243 | 1136 |      | -    |
|   | There are no ongoing and                                                              |        |       |      |      |      |
|   | Identified future major,                                                              |        |       | 4.3  |      |      |
| į | Medium or minor schemes in sub-basin.                                                 | Lin    |       |      |      |      |

| (1) | (2)                                                 | (3)    | (4)             | (5)  | (6) | (7)  |
|-----|-----------------------------------------------------|--------|-----------------|------|-----|------|
| 16  | Cauvery Delta sub-basin                             |        |                 |      |     |      |
|     | (Area lie fully in Tamilnadu                        |        |                 |      |     |      |
|     | EXISTING PROJECTS                                   |        |                 |      |     |      |
|     | I. Major projects                                   |        |                 |      |     |      |
|     | i) Kattalai Canal Scheme                            | 3935   | 62 <b>9</b> 6   | 115  | 160 | 1.82 |
|     | ii) Cauvery Mettur project<br>(Grand Anicut Canal)  | 59898  | 75488           | 1012 | 126 | 1.34 |
|     | iii) Cauvery Delta Scheme                           | 377990 | 5 <b>2</b> 2063 | 7487 | 138 | 1.43 |
| •   | II. Medium projects                                 |        |                 |      |     |      |
|     | i) New Kattalai High level<br>Canal                 | 4108   | 4108            | 70   | 100 | 1.71 |
|     | III) Minor Projects                                 |        |                 |      |     |      |
|     | i) Riverfed and rainfed<br>Schemes                  | 27919  | 27919           | 391  | 100 | 1.40 |
| }   | Total                                               | 473850 | 635874          | 9075 |     |      |
| }   | There are no ongoing and                            |        |                 |      |     |      |
|     | Identified future major,                            |        |                 |      |     |      |
|     | Medium or minor schemes in Cauvery Delta sub-basin. |        |                 |      | 300 |      |



Table III.2: Cauvery River Basin: Computation of Human Population Projected to 2050AD

|        |                |         | HUN     | MAN POPUL | ATION DUR | ING THE Y | 'EAR 1981 |         |         |
|--------|----------------|---------|---------|-----------|-----------|-----------|-----------|---------|---------|
| SI.No. | Sub-basin      | Karna   | taka    | Tamil     | nadu      | Kera      | ıla       | Tot     | al      |
| _      |                | Rural   | Urban   | Rural     | Urban     | Rural     | Urban     | Rural   | Urban   |
| 1      | 2              | 3       | 4       | 5         | 6         | 7         | 8         | 9       | 10      |
| l      | Upper Cauvery  | 1652645 | 383247  | 0         | 0         | 0         | 0         | 1652645 | 383247  |
| 2      | Kabini         | 729808  | 713705  | 16140     | 0         | 511531    | 0         | 1257479 | 713705  |
| 3      | Suvarnavathi   | 217804  | 47132   | 48410     | 0         | 0         | 0         | 266214  | 47132   |
| 4      | Middle Cauvery | 572681  | 80622   | 0         | 0         | 0         | 0         | 572681  | 80622   |
| 5      | Shimsha        | 1858539 | 414980  | 0         | 0         | 0         | 0         | 1858539 | 414980  |
| 6      | Arkavathi      | 832301  | 3326576 | 30502     | 0         | 0         | 0         | 862803  | 3326576 |
| 7      | Chinnar        | 27469   | 0       | 716552    | 17470     | 0         | 0         | 744021  | 17470   |
| 8      | Palar          | 153379  | 0       | 238505    | 0         | 0         | 0         | 391884  | 0       |
| 9      | Bhavani        | 25261   | 0       | 951234    | 465554    | 125625    | 0         | 1102120 | 465554  |
| 10     | Noyil          | 0       | 0       | 686673    | 1156590   | 0         | 0         | 686673  | 1156590 |
| 11     | Tirumanimuttar | 0       | 0       | 2296415   | 1302514   | 0         | 0         | 2296415 | 1302514 |
| 12     | Amaravathi     | 0       | 0       | 1476482   | 491845    | 39479     | 0         | 1515961 | 491845  |
| 13     | Ponnani Ar     | 0       | 0       | 450436    | 645479    | 0         | 0         | 450436  | 645479  |
| 14     | Upper Coleroon | 0       | 0       | 808365    | 155511    | 0         | 0         | 808365  | 155511  |
| 15     | Lower Coleroon | 0       | 0       | 549641    | 62543     | 0         | 0         | 549641  | 62543   |
| 16     | Cauvery Delta  | 0       | 0       | 2467839   | 934422    | 0         | 0         | 2467839 | 934422  |
|        | Total          | 6069887 | 4966262 |           |           |           |           |         |         |

|        |                | I       | PROJECTED | HUMAN   | POPULATI | ON FOR T | HE YEAR | R 2050 A.D. |         |         |
|--------|----------------|---------|-----------|---------|----------|----------|---------|-------------|---------|---------|
| SI.No. | Sub-basin      | Karn    | ataka     | Tamil   | nadu     | Kera     | ıla     | Total       | Total   |         |
|        | 11 2 70        | Rural   | Urban     | Rural   | Urban    | Rural    | Urban   | Rural       | Urban   | Total   |
| 1      | 2              | 11      | 12        | 13      | 14       | 15       | 16      | 17          | 18      | 19      |
| l      | Upper Cauvery  | 1852896 | 2861851   | 0       | 0        | 0        | 0       | 1852896     | 2861851 | 4714747 |
| 2      | Kabini         | 1041194 | 2770894   | 23027   | 0        | 729785   | 0       | 1794006     | 2770894 | 4564900 |
| 3      | Suvarnavathi   | 233322  | 440470    | 51859   | 0        | 0        | 0       | 285181      | 440470  | 725651  |
| 4      | Middle Cauvery | 658399  | 1016916   | 0       | 0        | 0        | 0       | 658399      | 1016916 | 1675315 |
| 5      | Shimsha        | 2069164 | 3195884   | 0       | 0        | 0        | 0       | 2069164     | 3195884 | 5265048 |
| 6      | Arkavathi      | 3678025 | 5889007   | 134791  | .0       | 0        | 0       | 3812816     | 5889007 | 9701823 |
| 7      | Chinnar        | 25587   | 0         | 667457  | 1070428  | 0        | 0       | 693044      | 1070428 | 1763472 |
| 8      | Palar          | 355197  | 0         | 552334  | 0        | 0        | 0       | 907531      | 0       | 907531  |
| 9      | Bhavani        | 32702   | 0         | 1231433 | 2203679  | 162629   | 0       | 1426764     | 2203679 | 3630443 |
| 10     | Noyil          | 0       | 0         | 1677581 | 2591074  | 0        | 0       | 1677581     | 2591074 | 4268655 |
| 11     | Tirumanimuttar | 0       | 0         | 3275440 | 5059012  | 0        | 0       | 3275440     | 5059012 | 8334452 |
| 12     | Amaravathi     | 0       | 0         | 1779746 | 2822370  | 47588    | 0       | 1827334     | 2822370 | 4649704 |
| 13     | Ponnani Ar     | 0       | 0         | 997409  | 1540527  | 0        | 0       | 997409      | 1540527 | 2537936 |
| 14     | Upper Coleroon | 0       | 0         | 877238  | 1354920  | 0        | 0       | 877238      | 1354920 | 2232158 |
| 15     | Lower Coleroon | 0       | 0         | 557157  | 860547   | 0        | 0       | 557157      | 860547  | 1417704 |
| 16     | Cauvery Delta  | 0       | 0         | 3096448 | 4782556  | 0        | 0       | 3096448     | 4782556 | 7879004 |
|        | Total          |         |           |         |          |          | 0       |             |         |         |

Table III.3: Cauvery River Basin- Live Stock Population Projected to 2050AD

| Sub-basin         National (1983)         (1982)           Upper Cauvery         1832217         0           Kabini         711434         8777           Suvarnavathi         711434         8777           Suvarnavathi         177049         483106           Shimsha         1751920         0           Arkavathi         873525         29695           Chinnar         274301         314262           Bhavani         28405         774997           Noyil         0         544854           Tirumanimuttar         0         1435190           Ponnani Ar         0         445058           Upper Coleroon         0         683367           Lower Coleroon         0         316646           Cauvery Delta         0         1757547           Total         70tal         70tal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Ē   |                | Kamataka | Tamilradu | Voral    | Ē,      | Annual | Ś         | Projected population to 2050 AD | on to 2050 AD |          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|----------------|----------|-----------|----------|---------|--------|-----------|---------------------------------|---------------|----------|
| Vaper Cauvery         1832217         0         1832217         1.00         3568691         0         0           Kabini         711434         8777         181849         92066         1.00         1885692         17266         357737         1           Suvamavathi         177049         483106         0         660155         1.00         344246         950377         0         0           Shimsha         1751920         0         1.00         3412293         0         0         0         3412293         0         0         0           Arkavathi         873525         22665         0         903220         1.00         1701404         58417         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                             | ż Ś | Sub-basin      | (1983)   | (1982)    | (1982)   | Total   | growth | Karnataka | Tamilnadu                       | Kerala        | Total    |
| Kabini         711434         8777         181849         902060         1.00         1385692         17266         357777         1           Suvarnavathi         177049         483166         0         660155         1.00         344846         950377         0         1           Middle Cauvery         503488        0         0         503488         1.00         880666         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                                                                                                              | -   | Upper Cauvery  | 1832217  | 0         | 0        | 1832217 | 1.00   | 3568691   | 0                               | 0             | 3568691  |
| Suvannavathi         177049         483106         0         660155         1.00         980666         950377         0           Shimsha        0         0         503488         1.00         980666         0         0           Arkavathi         873525         25695         0         778661         1.00         1701404         58417         0           Chinmar         21047         737614         0         78865         1.00         40994         1451051         0           Blarvani         224301         314262         0         58856         1.00         534268         1451051         0           Noyil         0         544854         0         58856         1.00         55326         618223         0           1         Trinmaninuttar         0         2113326         0         2113326         0         445938         1.00         0           2         Amaravathi         0         1435190         23893         1459083         1.00         875328         0         0           3         Lower Coleroon         0         316646         1.00         0         6223138         47003         0           4                                                                                                                                                                                                                                                                                                                                     | 2   | Kabini         | 711434   | 8777      | 181849   | 902060  | 1.00   | 1385692   | 17266                           | 357737        | 1760695  |
| Shimsha         1.00         980666         0         0         503488         1.00         980666         0         0         3412293         0         0         3412293         0         0         3412293         0         0         3412293         0         0         3412293         0         0         3412293         0         0         3412293         0         0         3412293         0         0         0         3412293         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <th>3</th> <th>Suvarnavathi</th> <th>177049</th> <th>483106</th> <th>0</th> <th>660155</th> <th>00.1</th> <th>344846</th> <th>950377</th> <th>0</th> <th>1295223</th>                                                                                                                                                                                 | 3   | Suvarnavathi   | 177049   | 483106    | 0        | 660155  | 00.1   | 344846    | 950377                          | 0             | 1295223  |
| Shimsha         1751920         0         1751920         1.00         3412293         0         0           Arkavathi         873525         29695         0         903220         1.00         1701404         58417         0           Chinnar         21047         737614         0         78861         1.00         40994         1451051         0           Bhavani         2214301         314262         0         58853         1.00         53326         182439         149420         0           Moyil         0         544854         0         54854         1.00         0         1445420         0           1         Trimanimuttar         0         2113326         1.00         0         4157382         0         6           2         Amaravathi         0         1435190         1.45083         1.00         0         2823338         47003           3         Dounani Ar         0         445058         1.00         0         1344335         0         683367         0         815646         1.00         0         1344335         0         622913         47003         0           4         Lower Coleroon         0                                                                                                                                                                                                                                                                                                                               | 4   | Middle Cauvery | 503488   | 0 .       | 0        | 503488  | 1.00   | 999086    | 0                               | 0             | 999086   |
| Arkavathi         873525         29695         0         903220         1.00         1701404         58417         0           Chinnar         21047         737614         0         758651         1.00         40994         1451051         0           Palar         274301         314262         0         588563         1.00         55326         618223         0           Moyil         0         544854         0         544854         1.00         0         1071845         0           I Tirumanimuttar         0         2113326         1.00         0         4157382         0           Amaravathi         0         1435190         23893         145083         1.00         0         2823338         47003           Mounani Ar         0         445058         1.00         0         1344335         0           J Lower Coleroon         0         683367         1.00         0         1344335         0           S Cauvery Delta         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.           T Otal         0         17648         0         176646         1.00         0         3569481 p                                                                                                                                                                                                                                                                                                                | S   | Shimsha        | 1751920  | 0         | С        | 1751920 | 1.00   | 3412293   | 0                               | 0             | 3412293  |
| Chinnar         21047         737614         0         758651         1.00         40994         1451051         0           Palar         22430         314262         0         588563         1.00         534268         618223         0           Bhavani         28405         774997         75955         879357         1.00         55326         1524591         149420           Dowyil         0         244884         0         544854         0         2113326         1.00         0         4157382         0           Amaravathi         0         113326         1.00         0         4157382         0         6           Amaravathi         0         1435190         23893         1459083         1.00         0         4157382         0           A Dipper Coleroon         0         683367         1.00         0         13443335         0         683367         1.00         0         622913         0           Lower Coleroon         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.         0           A Lotal         0         1764         0         1757547         1814478         1.00                                                                                                                                                                                                                                                                                                              | 9   | Arkavathi      | 873525   | 29695     | 0        | 903220  | 1.00   | 1701404   | 58417                           | 0             | 1759821  |
| Palar         274301         314262         0         588563         1.00         55326         618223         0           Bhavani         28405         774997         75955         879357         1.00         55326         1524591         149420           Noyil         0         544854         0         544854         1.00         0         117345         0           1         Tirumanimuttar         0         113326         1.00         0         4157382         0           2         Amaravathi         0         1435190         23893         1459083         1.00         0         2823338         47003           3         Ponnani Ar         0         445058         1.00         0         875528         0           4         Upper Coleroon         0         683367         1.00         0         622913         0           5         Lower Coleroon         0         316646         0         3116646         1.00         0         622913         0           5         Cauvery Delta         0         1757547         Pd. 56931         1814478         1.00         0         3569481 pd.         0                                                                                                                                                                                                                                                                                                                                                       | 1   | Chinnar        | 21047    | 737614    | 0        | 758661  | 1.00   | 40604     | 1451051                         | 0             | 1492045  |
| Bhavani         28405         774997         75955         879357         1.00         55326         1524591         149420         149420           0         Noyil         0         544854         0         544854         1.00         0         1071845         0           1         Tirumanimuttar         0         2113326         1.00         0         4157382         0           2         Amaravathi         0         1435190         23893         1459083         1.00         0         4157382         0           3         Ponnani Ar         0         445058         1.00         0         875528         0         0           4         Upper Coleroon         0         683367         1.00         0         1344335         0           5         Lower Coleroon         0         316646         0         316646         0         316646         0         3569481 pd.         0           5         Cauvery Delta         0         1757547         Pd. 56931         1814478         1.00         0         3569481 pd.         0         0                                                                                                                                                                                                                                                                                                                                                                                                                      | ∞   | Palar          | 274301   | 314262    | 0        | 588563  | 1.00   | 534268    | 618223                          | 0             | 1152491  |
| Noyil         0         544854         0         544854         1.00         0         1071845         0           Tirumanimuttar         0         2113326         1.00         0         4157382         0           Amaravathis         0         1435190         23893         1459083         1.00         0         4157382         0           Ponnani Ar         0         445058         1.00         0         875528         0           Upper Coleroon         0         683367         1.00         0         1344335         0           Lower Coleroon         0         316646         0         311646         1.00         0         622913         0           Cauvery Delta         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.         0           Total         1         1         1         1         1         1         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 6   | Bhavani        | 28405    | 774997    | 75955    | 879357  | 1.00   | 55326     | 1524591                         | 149420        | 1729337  |
| Tirumanimuttar         0         2113326         0         2113326         1.00         0         4157382         0           Amaravathi         0         1435190         23893         1459083         1.00         0         2823338         47003         3           Ponnani Ar         0         445058         1.00         445058         1.00         0         875528         0           Upper Coleroon         0         683367         0         683367         1.00         0         1344335         0           Lower Coleroon         0         316646         0         3116646         1.00         0         622913         0           Cauvery Delta         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.         0           Total         1         1         1         1         1         1         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10  | Noyil          | 0        | 544854    | 0        | 544854  | 1.00   | 0         | 1071845                         | 0             | 1071845  |
| Amaravathi         0         1435190         23893         1459083         1.00         0         2823338         47003         3           Ponnani Ar         0         445058         1.00         0         875528         0         0           Upper Coleroon         0         683367         0         683367         1.00         0         1344335         0           Lower Coleroon         0         316646         0         3116646         1.00         0         622913         0           Cauvery Delta         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.         0           Total         1         1         1         1         1         1         1         1         1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | =   | Tirumanimuttar | 0        | 2113326   | 0        | 2113326 | 1.00   | 0         | 4157382                         | 0             | 4157382  |
| Ponnani Ar         0         445058         0         445058         1.00         0         875528         0           Upper Coleroon         0         683367         1.00         0         1344335         0           Lower Coleroon         0         316646         0         3116646         1.00         0         622913         0           Cauvery Delta         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.         0           Total         3369481 pd.         3369481 pd.         0         3369481 pd.         "><th>12</th><td>Amaravathi</td><td>0</td><td>1435190</td><td>23893</td><td>1459083</td><td>1.00</td><td>0</td><td>2823338</td><td>47003</td><td>2870341</td></t<> | 12  | Amaravathi     | 0        | 1435190   | 23893    | 1459083 | 1.00   | 0         | 2823338                         | 47003         | 2870341  |
| Upper Coleroon         0         683367         1.00         0         1344335         0           Lower Coleroon         0         316646         0         3116646         1.00         0         622913         0           Cauvery Delta         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.         0           Total         3369481 pd.         3369481 pd.         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0                                                                                                                                                                                                                                                                     | 13  | Ponnani Ar     | 0        | 445058    | 0        | 445058  | 1.00   | 0         | 875528                          | 0             | 875528   |
| Lower Coleroon         0         316646         0         3116646         1.00         0         622913         0           Cauvery Delta         0         1757547         Pd. 56931         1814478         1.00         0         3569481 pd.         0         3           Total         Total         3569481 pd.         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0<                                                                                                                                                                                                                                                                                            | 4   | Upper Coleroon | 0        | 683367    | 0        | 683367  | 00-1   | 0         | 1344335                         | 0             | 1344335  |
| Cauvery Delta         0         1757547         Pd.56931         1814478         1.00         0         3569481 pd.         0           Total         Total                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 15  | Lower Coleroon | 0        | 316646    | 0        | 3116646 | 1.00   | 0         | 622913                          | 0             | 622913   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 16  | Cauvery Delta  | 0        | 1757547   | Pd.56931 | 1814478 | 1.00   | 0         | 3569481 pd.                     | 0             | 3569481  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |     | Total          |          |           | Ś        |         |        |           |                                 |               | 35184219 |

Table III.4: Cauvery River Basin - Domestic Water Demands

|                                        | Ground           | 14 | 0             |        | 61          | 0              | 0       | 2         | 35      | 18    | 43      | 42    | 118            | 74         | 29         | 24             | 13             | 72            | 490   |
|----------------------------------------|------------------|----|---------------|--------|-------------|----------------|---------|-----------|---------|-------|---------|-------|----------------|------------|------------|----------------|----------------|---------------|-------|
|                                        | Surface (        | 13 | 0             | 1      | 0           | 0              | 0       | 2         | 98      | 7     | 177     | 210   | 412            | 229        | 126        | 110            | 70             | 389           | 1819  |
| ıadu                                   | Total            | 12 | 0             | 2      | 61          | 0              | 0       | 4         | 121     | 25    | 220     | 252   | 530            | 303        | 155        | 134            | 83             | 461           | 2309  |
| Tamilnadu                              | Live<br>stock    | 11 | 0             | 1      | . 81        | 0              | 0       | r         | 26      | 11    | 28      | 20    | 9/             | 51         | 16         | 12             | 9              | 33            | 299   |
|                                        | Urban            | 01 | 0             | 0      | 0           | 0              | 0       | 0         | 78      | 0     | 161     | 681   | 370            | 206        | 113        | 66             | 63             | 349           | 1628  |
| 1                                      | Rural            | 6  | 0             |        | 1           | 0              | 0       | 3         | 17      | 14    | 31      | 43    | 84             | 46         | 26         | 22             | 14             | 62            | 381   |
| 5                                      | Ground<br>water  | ∞  | 88            | 39     | 6           | 26             | 89      | 78        | -       | 15    | 2       | 0     | 0              | 0          | 0          | 0              | 0              | 0             | 347   |
|                                        | Surface<br>water | 7  | 233           | 215    | 35          | 83             | 259     | 477       | -       | 4     | 0       | 0     | 0              | 0          | 0          | 0              | 0              | 0             | 1307  |
| taka                                   | Total            | 9  | 321           | 254    | 44          | 109            | 348     | 555       | 2       | 19    | 2       | 0     | 0              | 0          | 0          | 0              | 0              | 0             | 1654  |
| Karnataka                              | Live             | 5  | 99            | 25     | 9           | 18             | 62      | 31        |         | 10    | 1       | 0     | 0              | 0          | 0          | 0              | 0              | 0             | 219   |
| 3                                      | Urban            | 4  | 209           | 202    | 32          | 74             | 233     | 430       | 0       | 0     | 0       | 0     | 0              | 0          | 0          | 0              | 0              | 0             | 1180  |
|                                        | Rural            | 3  | 47            | 27     | 9           | 17             | 53      | 94        |         | 6     |         | 0     | 0              | 0          | 0          | 0              | 0              | 0             | 255   |
| 4                                      | Suo-Dasiii       | 2  | Upper Cauvery | Kabini | Suvamavathi | Middle Cauvery | Shimsha | Arkavathi | Chinnar | Palar | Bhavani | Noyii | Tirumanimuttar | Amaravathi | Ponnani Ar | Upper Coleroon | Lower Coleroon | Cauvery Delta | Total |
| \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\ | 31.140.          | -  |               | 2      | 3           | 4              | 5       | 9         | 7       | 8     | 6       | 10    | 1.1            | 12         | 13         | 14             | 15             | 91            |       |

Table III.4 (Contd...)

| 012     | S. A. C.       |       |       | Kerala | ıla   | ì                |        | 5     | 6     | Total         | , let |         | -      |
|---------|----------------|-------|-------|--------|-------|------------------|--------|-------|-------|---------------|-------|---------|--------|
| SI.IVO. | Sub-bastii     | Rural | Urban | Live   | Total | Surface<br>water | Ground | Rural | Urban | Live<br>stock | Total | Surface | Ground |
| 1       | 2              | 3     | 4     | S      | 9     | 7                | ∞      | 6     | 10    | 11            | 12    | 13      | 14     |
| 1       | Upper Cauvery  | 0     | 0     | 0      | 0     | 0                | 0      | 47    | 209   | 33            | 321   | 233     | 88     |
| 2       | Kabini         | 18    | 0     | 9      | 24    | 6                | 15     | 46    | 202   | 32            | 280   | 225     | 55     |
| 3       | Suvarnavathi   | 0     | 0     | 0      | 0     | 0                | 0      | 7     | 32    | 24            | 63    | 35      | 28     |
| 4       | Middle Cauvery | 0     | 0     | 0      | 0     | 0                | 0      | 17    | 74    | 8             | 109   | 83      | 26     |
| 5       | Shimsha        | 0     | 0     | 0      | 0     | 0                | 0      | 53    | 233   | 62            | 348   | 259     | 68     |
| 9       | Arkavathi      | 0     | 0     | 0      | 0     | 0                | 0      | 97    | 430   | 32            | 559   | 479     | 80     |
| 7       | Chinnar        | 0     | 0     | 0      | 0     | 0                | 0      | 18    | 78    | 27            | 123   | 87      | 36     |
| 8       | Palar          | 0     | 0     | 0      | 0     | 0                | 0      | 23    | 0     | 2.1           | 44    | 11      | ££     |
| 6       | Bhavani        | 4     | 0     | 3      | 7     | 2                | 5      | 36    | 161   | 32            | 229   | 179     | 95     |
| 10      | Noyil          | 0     | 0     | 0      | 0     | 0                | 0      | 43    | 681   | 20            | 252   | 210     | 42     |
| 11      | Tirumanimuttar | 0     | 0     | 0      | 0     | 0                | 0      | 84    | 370   | 9/            | 530   | 412     | 811    |
| 12      | Amaravathi     | 1     | 0     |        | 2     | 1                | 1      | 47    | 206   | 52            | 305   | 230     | 75     |
| 13      | Ponnani Ar     | 0     | 0     | 0      | 0     | 0                | 0      | 26    | 113   | 91            | 155   | 126     | 29     |
| 14      | Upper Coleroon | 0     | 0     | 0      | 0     | 0                | 0      | 22    | 66    | 12            | 134   | 110     | 24     |
| 15      | Lower Coleroon | 0     | 0     | 0      | 0     | 0                | 0      | 14    | 63    | 9             | 83    | 70      | £1     |
| 16      | Cauvery Delta  | 0     | 0     | 0      | 0     | 0                | 0      | 62    | 349   | 33            | 461   | 389     | 72     |
|         | Total          | 23    | 0     | 10     | 33    | 12               | 21     | 629   | 2808  | 528           | 3996  | 3138    | 858    |

Table III.5: Cauvery River Basin- Computation of Regeneration from Domestic and Industrial Water Use

Unit: MCM

| SI. | Sul 1i-           | Karn       | ataka      | Tami     | ilnadu     | Ke       | rala       | To       | otal       |
|-----|-------------------|------------|------------|----------|------------|----------|------------|----------|------------|
| No. | Sub-basin         | Domestic   | Industrial | Domestic | Industrial | Domestic | Industrial | Domestic | Industrial |
| ]   | 2                 | 3          | 4          | 5        | 6          | 7        | 8          | 9        | 10         |
| 1   | Upper Cauvery     | 186        | 257        | 0        | 0          | 0        | 0          | 186      | 257        |
| 2   | Kabini            | 172        | 203        | 1        | 2          | 7        | 19         | 180      | 224        |
| 3   | Suvarnavathi      | 28         | 35         | 0        | 15         | 0        | 0          | 28       | 50         |
| 4   | Middle Cauvery    | <b>6</b> 6 | 87         | 0        | 0          | 0        | 0          | 66       | 87         |
| 5   | Shimsha           | 207        | 278        | 0        | 0          | 0        | 0          | 207      | 278        |
| 6   | Arkavathi         | 382        | 444        | 1        | 3          | 0        | 0          | 383      | 447        |
| 7   | Chinnar           | 1          | 2          | 69       | 97         | 0        | 0          | 70       | 99         |
| 8   | Palar             | 3          | 15         | 5        | 20         | 0        | 0          | 8        | 35         |
| 9   | Bhavani           | 1          | 2          | 142      | 176        | 1        | 6          | 144      | 184        |
| 10  | Noyil             | 0          | 0          | 168      | 202        | 0        | 0          | 168      | 202        |
| 11  | Tirumanimuttar    | 0          | 0          | 330      | 424        | 0        | 0          | 330      | 424        |
| 12  | Amaravathi        | 0          | 0          | 183      | 242        | 0        | 1          | 184      | 243        |
| 13  | Ponnani Ar        | 0          | 0          | 101      | 124        | 0        | 0          | 101      | 124        |
| 14  | Upper Coleroon    | 0          | 0          | 0        | 0          | 0        | 0          | . 0      | 0          |
| 15  | Lower<br>Coleroon | 0          | 0          | 0        | 0          | 0        | 0          | 0        | 0          |
| 16  | Cauvery Delta     | 0          | 0          | 0        | 0          | 0        | 0          | 0        | 0          |
|     | Total             | 1046       | 1323       | 1000     | 1305       | 9        | 26         | 2055     | 2654       |

Table III.6: Cauvery Basin - Details of Imports and Exports

| Booin from which imported/Booin Annual | Irrigation (ha) Utiliza | 5 |          |                                                          | From Chalakudy basin 57202 435.00 |                                                          | ar basin 41657 213.00 | 133813                       |                        | 3171                    |            | To S.B.Palar & Cauvery                                      | To S.B.Palar &Cauvery                         | To S.B.Palar &Cauvery                        | Soleroon 8944 139.00 | 24329                 |                      | elta 70.00                    | i)Cauvery Delta 1012.00 13.8. Cauvery and Vaigai | i)Lower Coleroon 66007 1077.00 117.00 | 522063               |                       | am 44500 527.00          | tha 1800 23.00         | V. 40.                     |
|----------------------------------------|-------------------------|---|----------|----------------------------------------------------------|-----------------------------------|----------------------------------------------------------|-----------------------|------------------------------|------------------------|-------------------------|------------|-------------------------------------------------------------|-----------------------------------------------|----------------------------------------------|----------------------|-----------------------|----------------------|-------------------------------|--------------------------------------------------|---------------------------------------|----------------------|-----------------------|--------------------------|------------------------|----------------------------|
| -                                      |                         |   |          |                                                          | From Chal                         | 7                                                        | From Perivar basin    | From Netra                   | From Periyar basin     | I I OIII LEITYAI DASIII |            | To S.B.Pal                                                  | To S.B.Pal                                    |                                              | To Upper Coleroon    | To Upper Coleroon     | Cauvery Delta        | Cauvery Delta                 | i)Cauvery Delta                                  | i)Lower Coleroon                      | Cauvery Delta        | Kuttiadi              | Valapattanam             | Bharathpuzha           | Bharathnuzha               |
| dia mittoria la mittoria               | basin of Cauvery basin  | 3 |          | 3                                                        | Amravathi sub-basin               |                                                          | Novil sub-basin       |                              | i) Noyil sub-basin     | n)Annavaun              |            | Kabini sub-basin                                            | Kabini sub-basin                              | Middle Cauvery sub-basin                     | Chinnar (Mettur dam) |                       | Chinnar (Mettur dam) | Chinnar (Mettur dam)          |                                                  | Chinnar (Mettur dam)                  | Chinnar (Mettur dam) | Kabini sub-basin      | Kabini sub-basin         | Bhawani sub-basin      | Bhawani sub-hasin          |
|                                        | Name of Project         | 2 | IIMPORTS | Parambikulam Aliyar System (T.Sholayur Kerala, Sholayar, | Parimbikulam, Tunnakkadavu,       | Prinvaripallam, Upper Aliyar and Lower Alivar reservoir) | Upper Nirar Project   | Netravathi-Hemavathi project | Annamalaiyar Diversion | Total                   | II EXPORTS | Bangalore City Water Supply (including CWSS Stage-I and II) | Bangalore City Water Supply<br>CWSS Stage-III | Bangalore City Water Supply<br>CWSS Stage-IV | Pullambadi Canal     | Salem-Tiruchi Channel | Kattalai Canal       | New High Level Kattalai Canal | Grand Anicut System                              | Water meant for Lower Coleroon Anicut | Cauvery Delta System | Banasurasagar project | Mananthavady M.P.project | Panthanthodu diversion | Kerala Bhawani H.E.Project |
| V.                                     | Š                       | _ |          | _                                                        |                                   |                                                          | 2                     | 3                            | 4                      |                         | 1          |                                                             | 2                                             | ო                                            | 4                    | 5                     | 9                    | 7                             | ∞                                                | 6                                     | 10                   | =                     | 12                       | 13                     | 14                         |

## THE LP LINDO FORM OF EQUATIONS

#### IV.1 GENERAL

In this research work the readily available LINDO SOFTWARE package of version 6.1, which is released in August 2001, by LINDO Systems, inc, 1415 North Dayton st. Chicago, IL, USA, having the maximum capacity of 4000 constraints and 8000 variables with 100 integer variables and 2000000 non zeros, was used to solve the LP model, as there are many constraints and variables to handle such a big problem.

The LP LINDO format for equations is prepared for running the model by writing the equations in the required form of equations for LINDO software version 6.1 2001 as given below.

The sample LINDO form of equation as given below is prepared for Kabini reservoir in Kabini sub-basin.

The nomenclature was done by using the first letter of name of the site, first two letters of the sub-basin name and maximum five letters of a variable because the LINDO software version 6.1 2001 takes maximum eight letter for the nomenclature for the model writing and running on it for getting the feasible solution of the problem.

The projectwise and vaiablewise notations used in the model running on the LINDO software are given in Tables 6.7 and 6.8, respectively.

For running and solving the Linear Programming model by using, LINDO SOFTWARE, the first objective function, i.e., to maximize the annual water utilization and the constraint equations are written in the following form of equations:

#### IV.2 OBJECTIVE FUNCTION

To maximize the total annual reservoir diversion (Annual water utilization) from a multipurpose reservoir for irrigation, domestic, industrial, hydropower, and environmental site i, for the proposed river basin system can be calculated as follows.

Let, KKB, i.e., K = Kabini project

and KB = Kabini Sub-Basin

#### Equation 5.2.1-a

Original equation 5.2.1-a is given below:

$$\begin{aligned} \text{Max.} Z &= \sum_{j=1}^{N} \sum_{i,j} \text{Ir}_{i,j} \\ \text{j = 1} & i = 1 \end{aligned} \qquad \begin{aligned} &\text{for lumped irrigation model } 5.2.1\text{-a} \\ &\text{for each i and i.} \end{aligned}$$

LINDO form of equation of 5.2.1-a is as follows:

MAX KKBIRD

#### IV.3 CONSTRAINTS

# IV.3.1 Reservoir Continuity Equation Constraints

#### **Equation 5.3.1.1**

The original equation 5.3.1.1 is as follows:

$$\begin{split} &K_{i,j,t}^{'} * S_{i,j,t} = S_{i,j,t-1} + I_{i,j,t} + F_{i,j,t} + \sum (\psi_{i,j,t}^{q,j_t} * TI_{i,j}^{q,j_t}) + \\ &\sum_{p=1}^{X_{i,j}} K_{p_i,j,t}^{''} (*\psi_{i,j,p}^{q,j_t} * OI_{i,j,p}^{q,j_t}) + P_{i,j,t} + I_{i,j,t} - O_{i,j,t}^{m} - O_{i,j,t} - O_{i,j,t}^{\text{Se}} \\ &- (\alpha_{i,j,t} * Iu_{i,j}^{*} + \beta_{i,j,t} * Iu_{i,j}^{m,hs}) + (\alpha_{i,j,t}^{*} * \alpha_{i,j,t} * Iu_{i,j}^{r}) + (\beta_{i,j,t}^{*} * \beta_{i,j,t} Iu_{i,j}^{m}) \\ &- \sum (\omega_{i,j}^{q,j_s} * TE_{i,j}^{q,j_s}) \end{split}$$

Rearranged equation 5.3.1.1 is as follows:

$$\begin{split} &K_{i,j,t}^{'} * S_{i,j,t} - S_{i,j,t+1} + O_{i,j,t} - F_{i,j,t} - P_{i,j,t} - \overline{I}_{i,j,t} + O_{i,j,t}^{se} \\ &- (\psi_{i,j,t}^{q,j_1} * TI_{i,j}^{q,j_1}) + \sum (\omega_{i,j,t}^{q,j_2} * TE_{i,j}^{q,j_2}) - + \alpha_{i,j,t} * \overline{Iu}_{i,j}^{rs} + \beta_{i,j,t} * \overline{Iu}_{i,j}^{mhs} \\ &- (\alpha_{i,j,t}^{"} * \alpha_{i,j,t} * \overline{Iu}_{i,j}^{r}) - (\beta_{i,j,t}^{"} * \beta_{i,j,t} * \overline{Iu}_{i,j}^{m}) + O_{i,j,t}^{m} - I_{i,j,t} = 0 \end{split}$$

LINDO form of equation of 5.3.1.1 is as follows:

$$\begin{split} &K_{i,j,t}^{+}*KKBSt-KKBS0+KKBOt-KKBFt-KKBPt-KKB \dot{I}t+kk@O_{Se}\\ &-\psi_{i,j,t}^{q,j_{1}}*KKBTI+\omega_{i,j,t}^{q,j_{2}}*KKBKUTTE+\alpha_{i,j,t}*KKBIURS+\\ &\beta_{i,j,t}KKBIUMHS-(\alpha_{i,j,t}^{+}*\alpha_{i,j,t})KKBIUR-(\beta_{i,j,t}^{+}*\beta_{i,j,t})KKBIUM\\ &+KKBOMt-KKBIt=0 \end{split}$$

#### **Equation 5.3.1.8**

Original equation 5.3.1.8 is as follows:

$$F_{i,j,t} = \sum_{w=1}^{z_{i,j}} \left[ Sp_{w,j,t} + (K_{w,j,t}^{"} * K_{w,j,t} * Ir_{w,j}^{'}) + (\beta_{w,j,t}^{"} * \beta_{w,j,t} * Ws_{w,j}^{'}) + \delta_{w,j,t}^{"} * O_{w,j,t}^{m} \right] + (\alpha_{i,j,t}^{"} * \alpha_{i,j,t} * Iu_{i,j}^{r}) + (\beta_{i,j,t}^{"} * \beta_{i,j,t} * Iu_{i,j}^{m})$$

Rearranged equation 5.3.1.8 is as follows:

$$\begin{split} F_{i,j,t} &= \sum_{w=1}^{Z_{i}} \left[ Sp_{w,j,t} + (K_{w,j,t}^{"} * K_{w,j,t} * Ir_{w,j}^{"}) + (\beta_{w,j,t}^{"} * \beta_{w,j,t} * W_{s_{w,j}}^{"}) + \delta_{w,j,t}^{"} * O_{w,j,t}^{m} \right] \\ &- (\alpha_{i,j,t}^{"} * \alpha_{i,j,t} * Iu_{i,j}^{r}) + (\beta_{i,j,t}^{"} * \beta_{i,j,t} * Iu_{i,j}^{m}) = 0 \end{split}$$

LINDO form of equation 5.3.1.1 is as follows:

$$KKBFt - \sum_{w=1}^{Zi, j} [wjSPt + (K_{w, j, t}^{"} * K_{w, j, t}) * wjIR' + (\beta_{w, j, t}^{"} * \beta_{w, j, t}) * wjWS + \delta_{w, j, t}^{"} * wjOMAt]$$

$$- (\alpha_{i, j, t}^{"} * \alpha_{i, j, t}^{"} * KKBIUMR) + (\beta_{i, j, t}^{"} * \beta_{i, j, t}^{"} * KKBIUM) = 0$$

LIMITS:

$$TI_{i,j}^{q,j_1} \le$$
 , i.e., KKBOIUC  $\le$ 

$$TE_{i,j}^{q,j_E} \le , i.e., KKBOESMS \le$$

If export is nil , i.e., NILOE

$$Iu_{i,j}^{nuth} \le$$
 , i.e., KKBIUMRH  $\le$ 

$$lu_{ij}^{n} \leq$$
 , i.e., KKBIURS  $\leq$ 

### **Equation 5.3.1.9**

Original equation 5.3.1.9 is as follows:

$$Ft_{i_t,j_t} = \sum KKBF_t$$

LINDO form of equation 5.3.1.9 is as follows:

### Equation 5.3,1.10

Original equation 5.3.1.10 is as follows:

$$OT_{i,j} = \sum KKBO_t$$

LINDO form of equation at 5.3.1.10 is as follows:

### Equation 5.31.2

Original equation 5.31.2 is as follows:

$$O_{i,j,t}^{m} - 0.01 * I_{i,j,t} = 0$$

LINDO Form of equation 5.3.1.2 is as follows:

$$KKBOMt - 0.01KKBIt = 0$$

### Equation.5.3.1.3

Original equation.5.3.1.3 is as follows:

$$Iu_{i,j}^{mh} + Iu_{i,j}^{ml} - Iu_{i,j}^{m} = 0$$

LINDO Form of equation 5.3.1.3 is as follows:

KKBIUMH + KKBIUML - KKBIUM = 0

Original equation 5.3.1.4 is as follows:

$$lu_{i,\,j}^{\,rg} + lu_{i,\,j}^{\,rs} - lu_{i,\,j}^{\,r} = 0$$

LINDO Form of equation 5.3.1.4 is as follows:

KKBIURG + KKBIURS - KKBIUR = 0

## Equation 5.3.1.5

Original equation 5.3.1.5 is as follows:

$$Iu_{i,j}^{rg} \le Og_{i,j}^{us} - (Iu_{i,j}^{ml} + Iu_{i,j}^{mhg})if - ve = 0$$

LINDO Form of equation 5.3.1.5 is as follows:

KKBIURG <= KKBOGUS - KKBIUML - KKBIUMHG, IF, -VE; =0

# **Equation 5.3.1.6**

Original equation 5.3.1.6 is as follows:

$$Iu_{i,i}^{mhg} - 0.5Iu_{i,i}^{mh} = 0$$

LINDO Form of equation 5.3.1.6 is as follows:

KKBIUMHG - 0.5KKBIUMH = 0

# **Equation 5.3.1.7**

Original equation 5.3.1.7 is as follows:

$$Iu_{i,i}^{mhs} - 0.5Iu_{i,i}^{mh} = 0$$

LINDO Form of equation 5.3.1.7 is as follows:

KKBIUMHS - 0.5 KKBIUMH = 0

## IV.3.2. Storage Limits Constraints

### Equation 5.3.2

Original equation 5.3.2 is as follows:

$$Yd_{i,j} \leq min_{i,j,t} \leq S_{i,j,t-1} \leq Ymax_{i,j,t} \leq Y_{i,j}$$

LINDO form of equation 5.3.2 is as follows:

### IV.4 RESERVOIR RELEASE CONSTRAINTS

### Equation 5.3.3.1

Original equation 5.3.3.1 is as follows:

$$O_{i,j,t} + I_{i,j,t}^{n} = Od_{i,j,t} + Sp_{i,j,t}$$

Rearranged equation 5.3.3.1 is as follows:

$$Od_{i,j,t} + Sp_{i,j,t} - O_{i,j,t} = I_{i,j,t}^*$$

LINDO form of equation 5.3.3.1 is as follows:

$$KKBODt + KKBSPt - KKBOt = KKBIt$$

## **Equation 5.3.3.2**

Original equation 5.3.3.2 is as follows:

$$\operatorname{Od}_{i,j,t} = \operatorname{Od}_{i,j,t}^{r} + \operatorname{Od}_{i,j,t}^{m}$$

Rearranged equation 5.3.3.2 is as follows:

$$Od_{i,i,t} - Od_{i,i,t}^{r} - Od_{i,i,t}^{m} = 0$$

LINDO form of equation 5.3.3.2 is as follows:

$$KKBODt - KKBODRt - KKBODMt = 0$$

#### Equation 5.3.3.3

Original equation 5.3.3.3 is as follows:

$$Og_{i, j, t}^{r} = K_{i, j, t} * Ir_{i, j}^{g}$$

Rearranged equation 5.3.3.3 is as follows:

Og 
$$_{i, j, t}^{r} - K_{i, j, t}^{s} * Ir_{i, j}^{s} = 0$$

LINDO form of equation 5.3.3.3 is as follows:

$$KKBOGRt - K_{i,j,t} * KKBIRG = 0$$

# **Equation 5.3.3.4**

Original equation 5.3.3.4 is as follows:

Od 
$$_{i,j,t}^{r} = K_{i,j,t} * Ir_{i,j}^{s}$$

LINDO form of equation 5.3.3.4 is as follows:

$$KKBODRt - K_{i,i,i} * KKBIRS = 0$$

Original equation 5.3.3.5 is as follows:

$$\mathrm{Og}^{\mathfrak{m}}_{i,j,t} = \xi_{i,j,t}(\phi^{U^g}_{i,j}\mathrm{Ws}^{U}_{i,j} + \phi^{I^g}_{i,j}\mathrm{Ws}^{I}_{i,j})$$

Rearranged equation 5.3.3.5 is as follows:

$$Og_{i,j,t}^{m} - \xi_{i,j,t}(\phi_{i,j}^{U^{g}}Ws_{i,j}^{U} + \phi_{i,j}^{I^{g}}Ws_{i,j}^{I}) = 0$$

LINDO form of equation 5.3.3.5 is as follows:

KKBOGMt - 
$$(\xi_{i,j,t} * \phi_{i,j}^{U^*} * KKBWSU) - (\xi_{i,j,t} * \phi_{i,j}^{I^*} * KKBWSI) = 0$$

### LIMITS:

Ws 
$$_{i,i}^{U} \leq$$
, i.e., KKBWSU  $\leq$ 

Ws 
$$\frac{1}{i,j} \le$$
, i.e., KKBWSI  $\le$ 

### **Equation 5.3.3.6**

Original equation 5.3.3.6 is as follows:

$$Od_{i,j,t}^{m} = \xi_{i,j,t}(\phi_{i,j}^{U^{s}}Ws_{i,j}^{U} + \phi_{i,j}^{I^{s}}Ws_{i,j}^{1})$$

Rearranged equation 5.3.3.6 is as follows:

Od 
$$_{i,j,i}^{m} - \xi_{i,j,i} (\phi_{i,j}^{U^{s}} Ws_{i,j}^{U} + \phi_{i,j}^{I^{s}} Ws_{i,j}^{I}) = 0$$

LINDO form of equation 5.3.3.6 is as follows:

KKBODMt-
$$(\xi_{i,j,t} * \phi_{i,j}^{U^*} * KKBWSU) - (\xi_{i,j,t} * \phi_{i,j}^{I^*} * KKBWSI) = 0$$

LIMITS:

Ws 
$$_{i,j}^{U} \le$$
 , i.e., KKBWSU  $\le$ 

$$Ws_{i,j}^{I} \leq , i.e., KKBWSI \leq$$

# **Equation 5.3.3.7**

Original equation 5.3.3.7 is as follows:

$$\operatorname{Ir}_{i,j}^{'} = \operatorname{Ir}_{i,j}^{8} + \operatorname{Ir}_{i,j}^{8}$$

Rearranged equation 5.3.3.7 is as follows:

$$Ir_{i,j}^{i} - Ir_{i,j}^{s} - Ir_{i,j}^{g} = 0$$

LINDO form of equation 5.3.3.7 is as follows:

# **Equation 5.3.3.8**

Original equation 5.3.3.8 is as follows:

$$Ws'_{i,j} = Ws^{u}_{i,j} + Ws^{I}_{i,j}$$

Rearranged equation 5.3.3.8 is as follows:

$$Ws_{i,i} - Ws_{i,i}^{U} - Ws_{i,i}^{I} = 0$$

LINDO form of equation 5.3.3.8 is as follows:

$$KKBWS'-KKBWSU-KKBWSI=0$$

#### 1.5 GROUND WATER AVAILABLILITY CONSTRAINTS

# Equation5.3.4-1

Original equation 5.3.4-1 is as follows:

$$\sum_{t} Og \ ^{m}_{i,j,\,t} + \sum_{t} Og \ ^{r}_{i,\,j,\,t} = Og \ ^{ds}_{i,\,j} \quad \text{for each } i,\,j \text{ and } t.$$

LINDO form of equation is as follows:

$$\sum$$
 KKBOGMt +  $\sum$  KKBOGRt = KKBOGDS

Not to be used equations 5.4-2 & 5.4-3

For each i and j.

# **Equation 5.3.4-2**

Original equation 5.3.4-2 is as follows:

$$Iu_{i, j}^{m, g} + Iu_{i, j}^{r, g} = Og_{i, j}^{us}$$

LINDO form of equation is as follows:

# **Equation 5.3.4-3**

Original equation 5.3.4-3 is as follows:

Og 
$$\underset{i, j}{us}$$
 + Og  $\underset{i, j}{ds}$  = Og  $\underset{i, j}{i}$  for each i and j.

LINDO form of equation is as follows:

### IV.6 SUB-BASINWISE ANNUAL IRRIGATION CONSTRAINTS

### **Equation 5.3.4.1**

Original equation 5.3.4.1 is as follows:

OC 
$$\frac{r}{i, j} = \sum_{t=1}^{12} \frac{r}{0d}$$

Rearranged equation 5.3.4.1 is as follows:

OC 
$$\begin{bmatrix} \mathbf{r} \\ \mathbf{i}, \mathbf{j} \end{bmatrix} - \begin{bmatrix} 12 \\ \sum \mathbf{Od} \end{bmatrix} = 0$$

LINDO form of equation 5.3.4.1 is as follows:

$$KKBOCR - \Sigma(KKBODRt) = 0$$

# IV.7 SUB-BASINWISE ANNUAL WATER SUPPLY CONSTRAINTS

# Equation 5.3.6

Original equation 5.3.6 is as follows:

$$OC_{i, j}^{m} = \sum_{t=1}^{12} Od_{i, j, t}^{m}$$

Rearranged equation 5.3.6 is as follows:

OC 
$$\lim_{i, j} - \sum_{t=1}^{12} 0d^{m}_{i, j, t} = 0$$

LINDO form of equation 5.3.6 is as follows:

KKBOCM - 
$$\Sigma$$
KKBODMt =0

# IV.8 SUB-BASINWISE CANAL CAPACITY CONSTRAINTS

#### Equation 5.3.7

Original equation 5.3.7 is as follows:

$$(OC_{i,j}^r + OC_{i,j}^m) - CC_{i,j} \le 0$$

Rearranged equation 5.3.7 is as follows:

$$(OC_{i,j}^r + OC_{i,j}^m) - CC_{i,j} \le 0$$

LINDO form of equation 5.3.7 is as follows:

LIMITS:

$$CC_{i,j} \leq$$
, i.e., KKBCC  $\leq$ 

### IV.9 LAND USE CONSTRAINTS

# Equation 5.3.8

Original equation 5.3.8 is as follows:

$$\lambda_{i,j,t}^{k} * A_{i,j}^{k} \leq TA_{i,j}$$

Rearranged equation 5.3.8 is as follows:

$$\lambda_{i,j,t}^{k} * A_{i,j}^{k} - TA_{i,j} \leq 0$$

LINDO form of equation 5.3.8 is as follows:

$$\lambda_{i,j,t}^{k} * KKBA_{i,j}^{k} - KKBTA_{i,j}^{k} \le 0$$

# IV.10 CROP WATER REQUIREMENT CONSTRAINTS

# Equation 5.3.9

Original equation 5.3.9 is as follows:

$$W_{i,j,t}^{k} * A_{i,j}^{k} \le K_{i,j,t} * Ir'_{i,j}$$

Rearranged equation 5.3.9 is as follows:

$$W_{i,j,t}^{\,k} * A_{i,j}^{\,k} - K_{i,j,t}^{\,\,*} * Ir_{i,j}^{\,\,*} \leq 0$$

LINDO form of equation 5.3.9 is as follows:

$$W_{i,j,t}^{k} * KKBA - K_{i,j,t} * KKBIRD \le 0$$



### **PUBLICATION**

A paper presented during the present study is reported as follows:

Patil, M. D., Sharma, N. and Ojha, C.S.P., "A Case Study of Transbasin Water Transfers Possibilities Between the Godavari and the Krishna Basin in India", presented at USCID International Conference on Transbasin Water Transfers, conducted by UNITED STATES COMMITTEE ON IRRIGATION AND DRAINAGE (USCID), 1616 Seventeenth Street, Suite 483, Denver, Colorado, U.S.A. June 26-30, 2001.

