STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS

A DISSERTATION

submitted in partial fulfilment of the requirements for the award of the degree of

MASTER OF URBAN AND RURAL PLANNING

By

BINOY ABRAHAM

DEPARTMENT OF ARCHITECTURE AND PLANNING
UNIVERSITY OF ROORKEE
ROORKEE - 247 667 (INDIA)

JANUARY, 1996

UNIVERSITY OF ROORKEE
ROORKEE

NO.ACD/(PG)/ 611/A-184/M.E.Diss. Dated: 22-1-96

Bof & Head
Arch Deptt.

12.92
24.1.96

Enclosed please find herewith three/~~four~~ copies of M.E./~~M.Tech./M.U.R.P./M.Arch./M.Phil~~ dessertation of Sri BINOY ABRAHAM for further necessary action at your end please.

Copies of dissertation of above student have been checked and found correct.

22/1/96
ASSTT.REGISTRAR(ACD.)

Encl: As above.

CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in dissertation entitled"**STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS**" in partial fulfillment of the requirement for the award of the degree of Master of Urban & Rural Planning submitted in the Department of Architecture & Planning, University of Roorkee, Roorkee, is an authentic record of my own work carried out for a period of seven months from June 1995 to Jan. 1996 under the supervision of **Sri R.K. Jain**, Department of Architecture & Planning, University of Roorkee, Roorkee.

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

Binoy

(BINOY ABRAHAM)

Dated : 16-01-1996.

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

Roorkee

19-01-1996

Rijain

(R.K. Jain)

Reader
Department of Architecture & Planning
University of Roorkee
Roorkee-247 667
INDIA

ACKNOWLEDGEMENTS

I take this opportunity to express my deep sense of gratitude to my guide **Sri R.K. Jain**, Department of Architecture & Planning, University of Roorkee, Roorkee for his constant encouragement, support and expert guidance throughout this work.

Further, I express my special thanks to Sri. R. Sankar, Prof. Dr. Nazamuddin, Dr. (Mrs.) S. Sahu. Prof. K.C. Kambo, Sri B.B. Garg and Sri R.D. Singh for their useful suggestions from time to time. I also wish to thank the authorities of G.I.D.A, G.C.D.A and T.P Department, Ernakulam, Kerala for the assistance in providing necessary help during data collection. I am also indebted to Dr. J. Isac, Principle, M.A. College of Engineering, Kothamangalam and Head of Civil Engineering Department for their kind support and assistance in fulfilling this course.

Thanks are also due to the members of the staff, and all my friends who helped me to complete this dissertation.

Finally the author wishes to extend his gratitude to his wife, parents and other members of the family for the constant inspiration and encouragement.

Roorkee

16-01-96

Binoy

(BINOY ABRAHAM)

CONTENTS

LIST OF FIGURES

LIST OF TABLES AND CHARTS

INTRODUCTION

About 30% of the area of Cochin City consists of a waterbody formed by water channels, the vembaned lake and Cochin Lake. The confluence of the river Periyar in the Arabian sea has given rise to a number of islands in the backwaters of Cochin. These clusters of islands have emerged as a high green oasis endowed with breath taking beauty almost unparalleled in attractiveness. The main islands close to the city are THANTHONNITHRUTH, MULAVUKAD, VALLARPAODAM and VYPEEN (Fig. 1.1) islands together are called GoshreeIslands. These islands together are having a population of 1,88,808 persons as per 1991 census report.

1.2 IDENTIFICATION OF THE PROBLEM

Though these islands are situated in close proximity to the mainland, they are not connected to the main land by road or bridge access. Therefore these islands has remained under developed with the population not being able to enjoy either the economic or social benefits of the development that is continuously taking place in the mainland. The inhabitants have remained cut off from the mainstream of life in almost all respects and live in comparative poverty.

The inhabitants have to face the difficulties spawned by their seclusion every day. For they have to depend on the Ernakulam mainland for their medical, educational and employment needs. It is estimated that around 40,000 people cross the backwaters to reach the mainland every day by ferry service alone. The people also have to frequently resort to country crafts for their commuting purposes. Thousands of students, workers and office going people from the islands are dependant on the ferry service for their daily journeys to the mainland and back. These journeys

VYPIN ISLAND

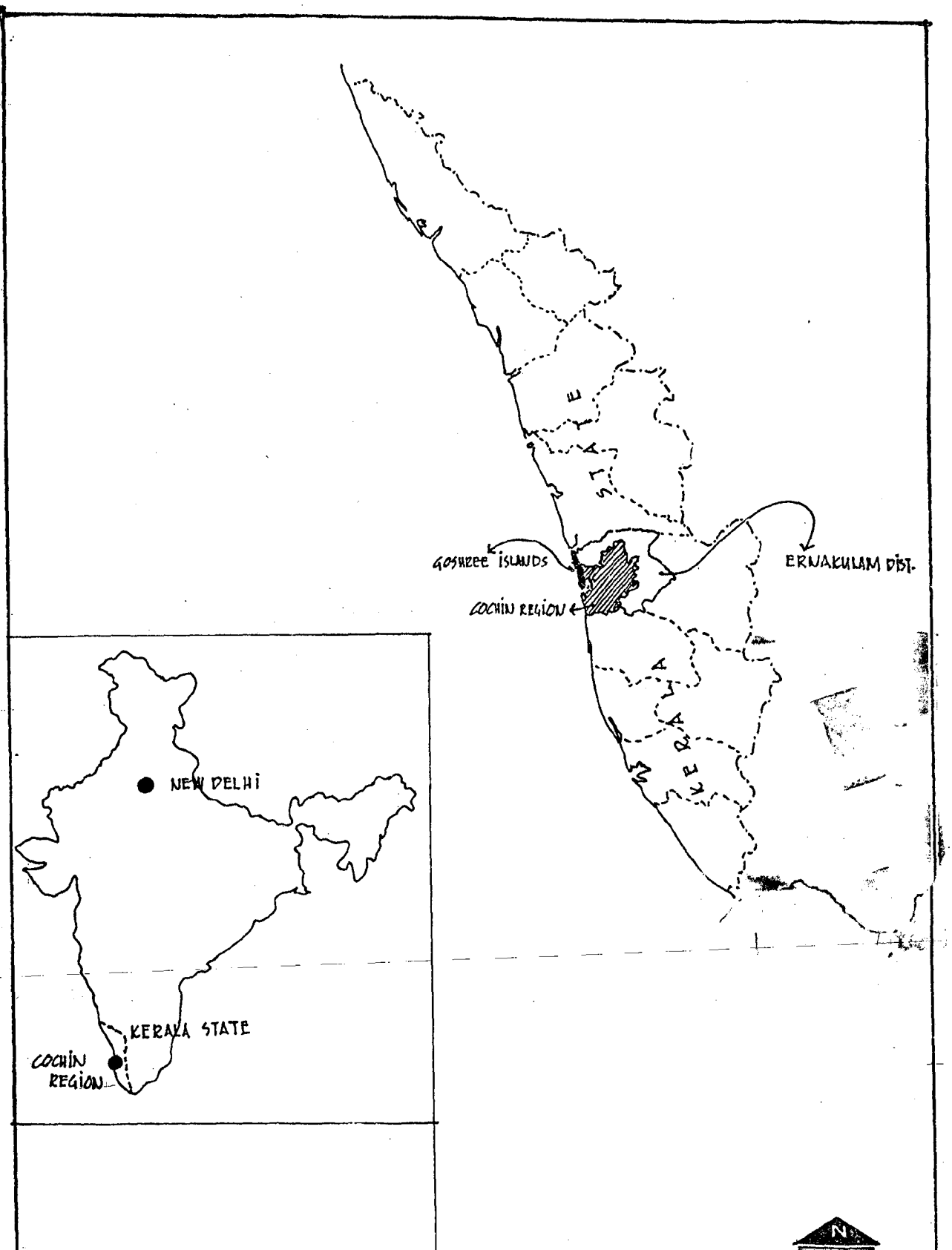


FIG. 1.1.a

STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS

LOCATION MAP

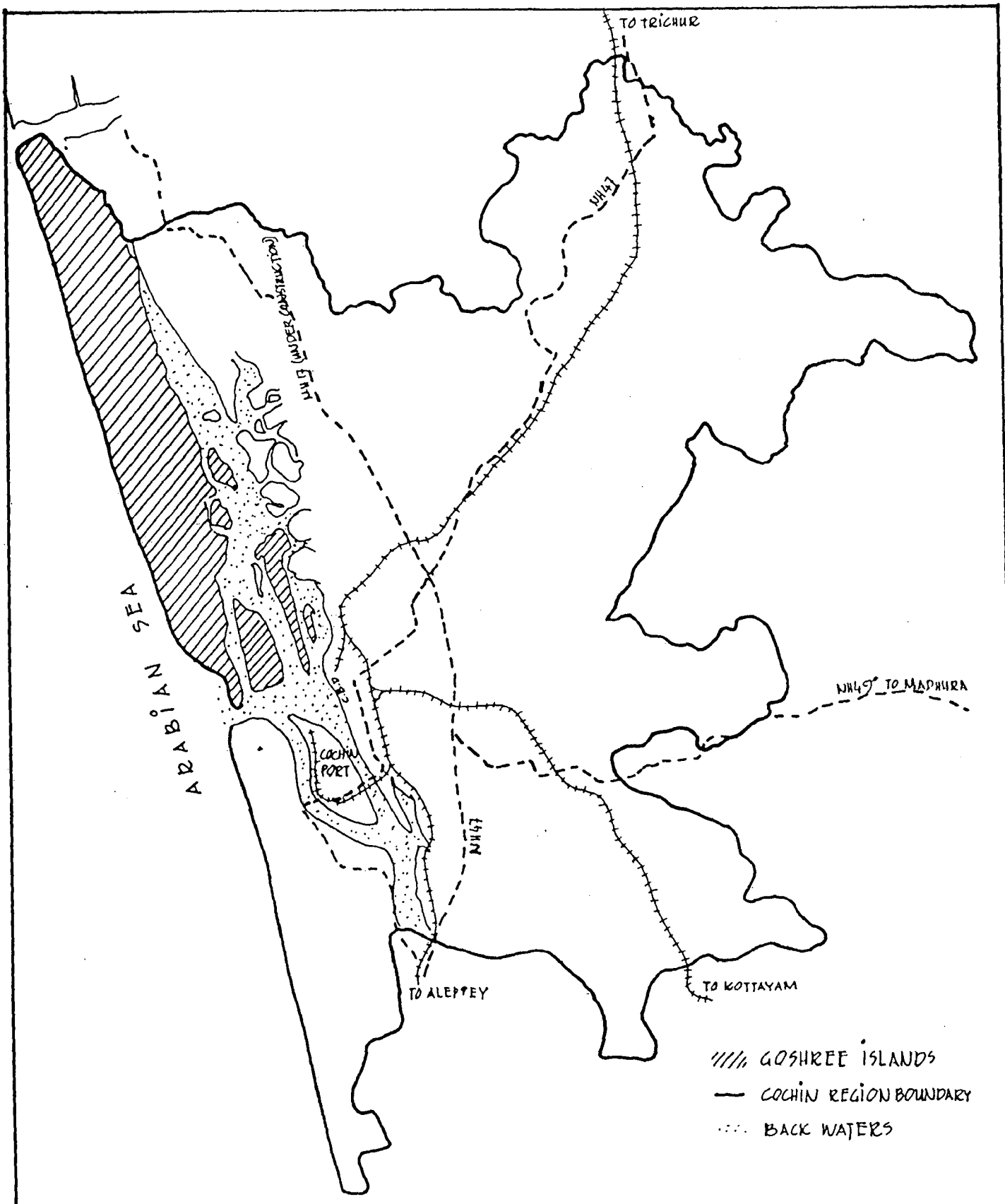
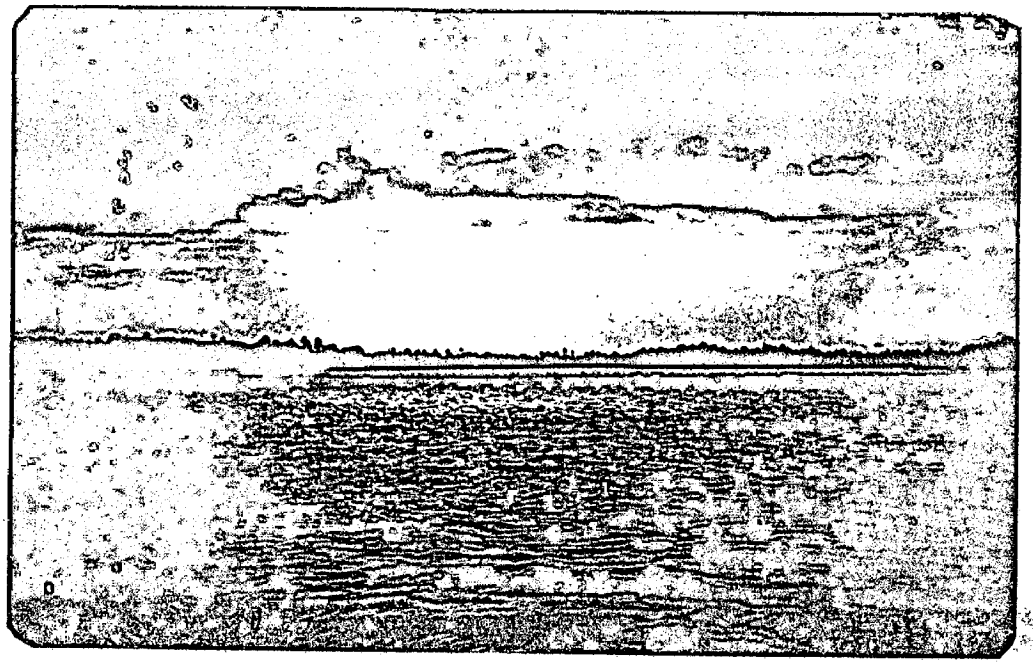
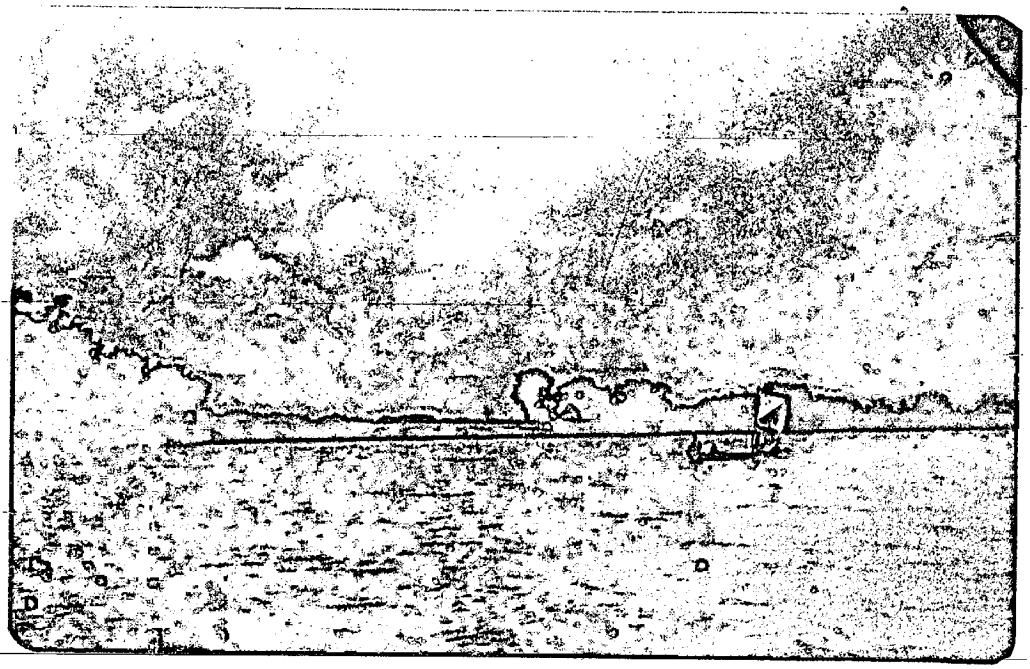
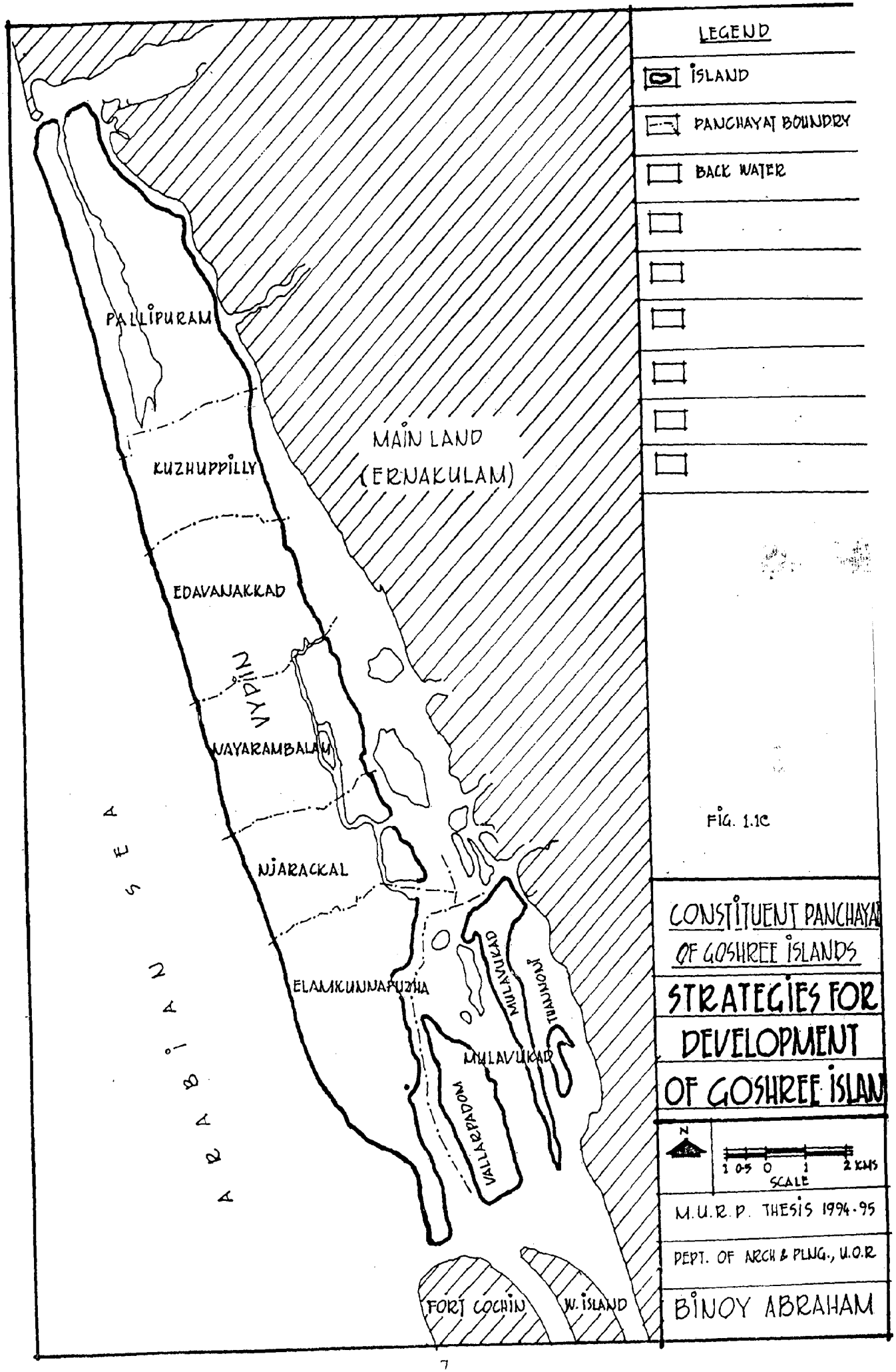


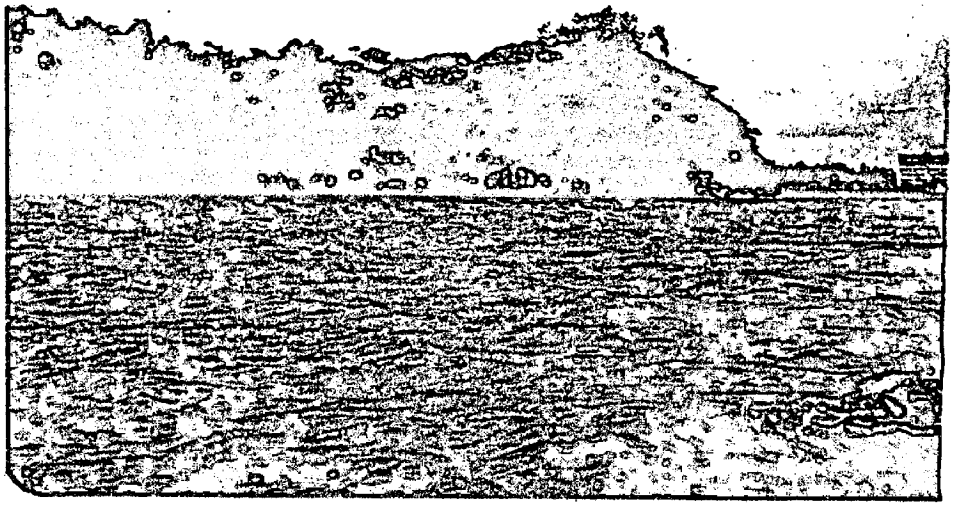
Fig.1.1b. GREATER COCHIN DEVELOPMENT AUTHORITY AREA.



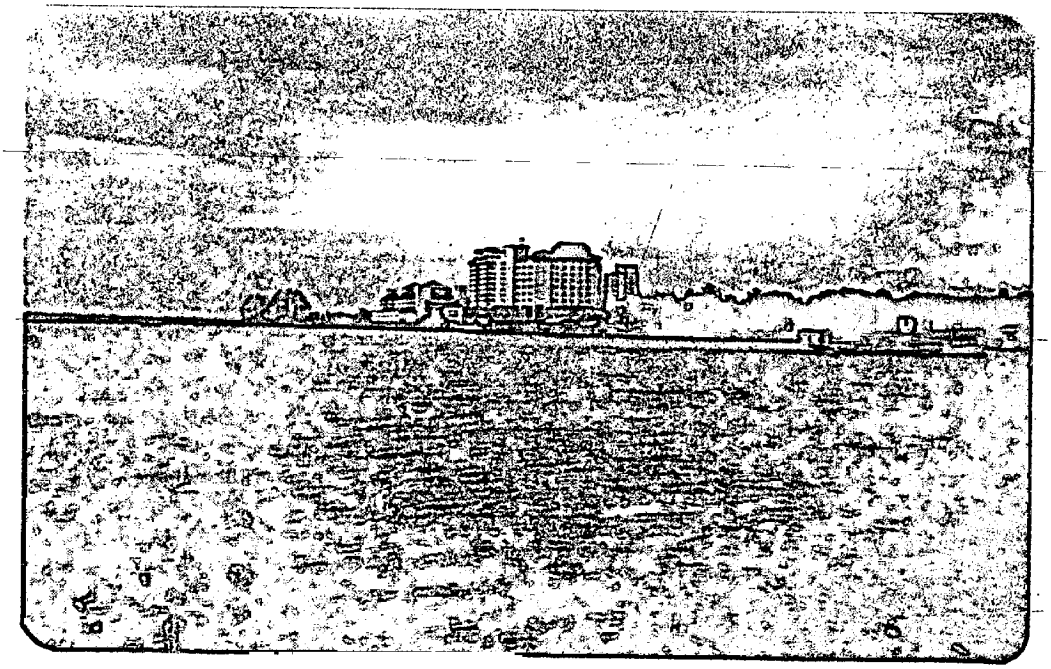
VIEWS OF VALLARPADOM ISLAND




LEGEND
ISLAND
PANCHAYAT BOUNDRY
BACK WATER
PALLIPURAM
KUZHUPPILLY
EDAVANAKKAD
VYPIN
NAYARAMBALAM
NJARACKAL
ELAMKUNNAPUZHA
MULAVUKAD
MULAVUKAD
VALLARPADOM
FORT COCHIN
W. ISLAND
MAIN LAND
(ERNAKULAM)
ARABIAN SEA
FIG. 1.1C
CONSTITUENT PANCHAYAT
OF GOSHREE ISLANDS
STRATEGIES FOR
DEVELOPMENT
OF GOSHREE ISLAN
N
1 0.5 0 1 2 KMS
SCALE
M.U.R.P. THESIS 1994-95
DEPT. OF ARCH & PLNG., U.O.R
BINOY ABRAHAM



MULAVUKADU ISLAND



C.B.D. ERNAKULAM

become particularly hazardous during rainy season. The oveloaded boats have to ferry between the island and the mainland very often in inclement weather conditions and also through the shipping channels characterised by strong undercurrents. Instances of boat tragedies are also not very uncommon.

Another draw-back of the boat services is that they are not available during night hours. This places the inhabitants of the islands who are solely dependant on the mainland for medical and health facilities in a very helpless situation. Almost daily, people requiring immediate expert medical attention die because they are unable to reach the hospitals in the Cochin City during night hours.

In view of the acute difficulties faced by islanders a new body called the Goshree Islands Development Authority (GIDA) has been formed by the kerala Government. This Authority was framed on 18th May 1994. As the first phase towards development, the GIDA is planning to connect the island to the mainland by constructing bridges. Once the islands are connected to the main land, the uncontrolled development will take place along the traffic corridor of the island. The hawk eyed speculator, who buys the agricultural lands cheap, parcels it out and sells it either undeveloped or inadeaquately developed as building plots. Individual builders neither have the will andresources nor the capacity to develop common services.

As a result of this substandard development, the requirements of water supply, drainage educational and recreational facilities, traffic and

transportation facilities will increase considerably. Coupled with the increasing congestion these create acute problems of transportation and communication, public health, sanitation etc.

Therefore a set of strategies is required for guiding the uncontrolled development of these islands.

1.3 OBJECTIVE OF STUDY

The strategies for development is to be prepared with the following objectives.

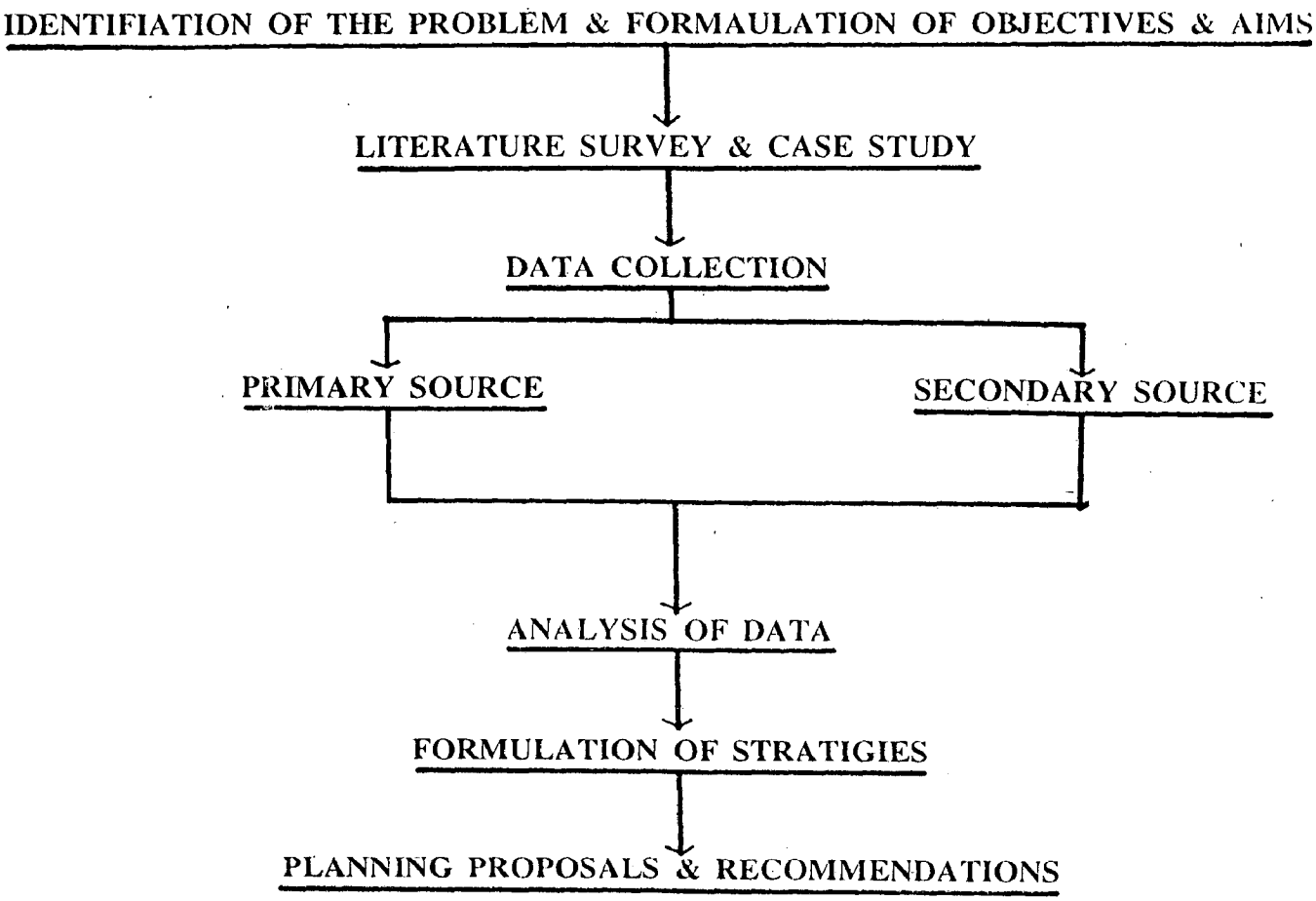
* An efficient system of circulation within the island and to outside, using all modes of transportation to the maximum advantage.
* The development of each part of the island to optimum standards for maximum economy.
* The provision of safe, sanitary and comfortable housing to meet the needs of all families with adequate facilities and necessary services.

1.4 SCOPE AND LIMITATIONS

a)The study, analysis and proposals are limited to the four islands namely (i) VYPIN (ii) VALLARPADOM, (iii) MULAVUKAD and (iv) THANTHONNI.

b) The study and analysis limited mainly to the datas collected from the secondary sources.

1.5 METHODOLOGY



II

LITERATURE SURVEY

THRESHOLD THEORY

CHAPTER - II

THRESHOLD THEORY

This theory is based on the fact that after a town has grown to a certain extent, no further growth can take place without crossing certain thresholds of investment. Assuming a particular standard of environment, it require an input of capital investment for its extension, which can vary according to the topographical situation, and in return provides different kind of benefits for the user. All thresholds can be exceeded but the cost analysis in each alternative helps to make a decision which satisfies the aspirations of the community and remains within their economic power.

2.1 ORIGIN AND HISTORY

'Threshold Theory' or the 'Urban Threshold Analysis' as it was called in the beginning, was originated, and pioneered by Professor Boleslaw Mailisz in 1963, in Poland. Though its evolution can be attributed to specific problems and needs, as they existed at that time in the field of 'physical' planning, yet its empirical nature and scope was realized soon after it was first put into practice. The prime motivation in the formulation of this theory was the existence of a communication gap between the 'physical' planners and the 'economists' and the resultant failure of the physical plans on the economic front in their implementation. For a long time the physical plans were criticized as 'irrational' and lacking in the 'economic realism'. Imagination and institution, the two attributes on which the physical planners depended heavily came under heavy criticism for their subjectivity and the

increasingly complex nature of the planning process itself make the physical planners aware, the need of a more objective approach to planning where some sort of a 'rationale' could be worked out to assess the economic implications of physical planning. with the onset of the fast urbanization it also became necessary to work out alternatives in urban expansions and all these factors make the physical planners to concentrate on developing methodologies and analytical means that would provide them means to bridge the gap between the science of economics and that of town planning.

"B. Malisz's threshold theory was generated by the need to develop effective co-operation between physical planners and economists, to help in the 'dialogue' between various planning levels and to refine long-term planning methodology. Though the analytical method aimed basically in evaluating various alternatives available in town expansion plans, by taking into consideration physical limitations or 'thresholds' that existed due to a number of factors such as topography, land uses, technological infrastructure etc; the theoretical basis offered a wide scope for its application at various planning levels. Before considering its empirical theoretical base, however, it is necessary to understand the context in which it was applied to deal with the urban growth phenomena and the impact of 'thresholds' in the urban growth.

2.2 URBAN GROWTH PHENOMENA

In dealing with the urban growth process it was observed that 'costs' incurred in the urban development depended mainly on three major factors viz.

(a) topographic limitations

(b) land use pattern and limitations due to it

(c) limitations due to technology of infrastructure

These limitations were termed as development 'thresholds', or constraints in the physical growth of the town. The nature of these constraints are not absolute, i.e. they are not impossible to overcome but involve additional costs or threshold costs, over the above the normal costs if development has to occur. As such in the urban expansion explicit identification of such development thresholds can enable the planners to evaluate alternate directions and patterns of town, 'forms', in order to assess the relative development costs likely to be incurred by adopting any of them. The costs reflected through such an analysis are, however, threshold costs and not running costs. It is hence possible to know the per capita costs of development of any given area. when applied to a number of urban centres it is possible to compare the cost of inhabitating a single new habitant in any one of them. This then would provide a rationale for deciding the development potential and forming priorities based on this. Urban threshold analysis, thus, was the first effort at relating the physical plan to the economics of urban development phenomenon.

Though originally devised for application at the urban level, the threshold concept had potential for application at the regional level too. In an indirect way , the local threshold analysis contributed to the regional analysis by way of a feedback where the development potentials of

a number of urban locations were known. Its use though in a slightly different context also became evident in which the technique could be used to identify the potential of a region in a particular activity, as tourism or industry etc. In general it can be said, that by varying the basic framework in its parameters, the theory has wide conceptual base for its application in a variety of ways and levels for a number of purposes. Its importance from the point of view of spatial planning lies in the fact that it opens new vistas in the physical planning process wherein some rationality can be infussed in it. It also appears promising in the task of identification of resource structure as well as constraints. The underlying aim of the application is that of providing a rational basis for the exercise of spatial planning. Spatial diversities in resources as well as constraints are elements that also give rise to diversities in growth potentialities too. It is in this area where the use of threshold theory is thought to be most appropriate. The conceptual contents of the theory can be widened effectively without loosing their basic character in the specific task of identification of existing spatial structure in physical as well as organizational elements. Potentialities of various spatial units would then greatly depend upon these structural elements. Before any endeavour is made, however, in implications involved of such an application it is necessary to study the applications of this theory in the past so as to bring it in proper perspective of the present study as such.

The main aim of elaborating the theoretical as well as the practical history of this theory is to draw certain guide lines for its application in the context of spatial planning. Though, it would be difficult to list

all the findings as brought out in these applications, an effort is made to list those which are thought to be more relevant to the scope of this study. These are,

(a) It is apparent that calculation of threshold costs may not be possible in all cases. But even the explicit identification of thresholds is of great value so far as problem identification is concerned.

(b) Instead of reducing all the factors to the cost element it should be possible to work out a way of quantifying them so as to make cumulative assessment of their impact on potential possible. In a physically homogeneous area where physical and socio-economic structure, do not vary drastically, this would to a great extent reflect potential of various aerial units.

(c) Though most of the applications have been limited only to physical analysis it should be possible, to integrate socio-economic factors of growth in it, to make it more effective in the context of developing nations, like India where such factors effect development potentialities to a great extent. As a matter of fact, this aspect becomes obligatory when viewed, in the background of the need of having an integrated and comprehensive approach at lower level planning.

2.4 RELEVANCE OF THRESHOLD THEORY IN THE CONTEXT OF SPATIAL PLANNING

The specific contributions that threshold theory can make in this regard are as given below :

(a) Threshold theory provides a 'spatio-sectoral' approach to planning, as, it tries to identify spatial characteristics in terms of constraints that have a direct bearing on the economics of development. With a slight modification, it should be able to identify constraints of 'organizational' or socio-economic nature, thus, enabling in the formulation of a rationalistic basis for decision making and stretegy formulation. It thus helps in bridging the gap between the physical and socio-economic aspects of plan making. An integrated spatial-sectoral approach based on it is thus possible.

(b) An important concern of spatial planning is, the identification of resource potential as well, as, limitations, of aerial units. Threshold theory can contribute in this regard as the threshold causing factors and their intensity indirectly reveal the potential of an area. This should help in providing a rationale for the 'decentralised centralization' policy.

(c) Resource allocation practices, particularly, at lower levels are still of an 'ad-hoc' nature and lack a scientific basis. This lacuna has been brought out quite strongly, by the Evaluation Committee set up by the Government of Maharashtra, which after going through the working of the Panchyat Raj bodies at lower levels, has made a note of this important need. The identification of various constraints can provide the needed scientific base for resource allocations.

As such, the theory has a lot of relevance in the context of spatial planning and, with a widening of its conceptual base to include the 'organizational' elements, it can provide a basis for the formulation of a suitable methodology based on it. Before the task of such an orientation is undertaken, however, it is also necessary to dwell upon certain limitations of the theory to define the parameters in a more clear manner.

2.5 LIMITATIONS

In its earlier applications and the subsequent studies the threshold theory was subjected to detailed appraisal and criticism. Efforts were also made to evaluate it against other techniques, such as, cost efficiency and cost benefit analysis, linear programming etc. The most important criticism against it was its pre-occupation with the cost part while leaving out the benefit part. In the words of W. Lean, an economist, "when a particular threshold is considered the benefits or returns must be considered". This point, however, was clarified by B. Malisz himself in which he states, that the theory should not be equated with cost benefit analysis and such methods as 'optimization' of costs is only a subsidiary aim of this analysis, the main aim being, to provide planners with means to work out alternative choices. the technique basically, is a decision aiding technique and can not replace decision making itself. As such, some judgments will have to be left of the planners discretion, the benefit part being one such. It has also been pointed out that by giving lesser stress on the cost calculation part, the theory can be made more potential in its uses.

One of the main problems in the endeavour to refine a technique to mathematical precision is the ensuing danger of its loosing its basic conceptual range, in order to satisfy the excacting demand put upon it. Precise quantification of the numerous factors of growth is one such problem faced in this technique. However a slight crudeness in the technique should be acceptable in the view of other benefits derived from it. The use of computer technology, too, can go along much in taking care of such technical difficulties.

2.6 Development Potential :

One of the aims of spatial planning is the optimal utilization of the scarce resources. Though the main aim of threshold analysis is not optimization yet, it can provide some basis for the optimal utilization of resources. If we consider the cumulative effect of thresholds, on overall development, in terms of resources, than, more number of thresholds would mean more requirement of resources or in other words, existence of a threshold could be said to have an adverse effect on the potential of development. Thus threshold analysis even without calculation of detailed costs could be said to be reflective of development potentials. It is on these premises that an effort can be made to devise a scale based on threshold analysis for the assessment of development potential of the areas under planning. Such an assessment would prove of great value in the policy of 'decentralised centralization' where it would be necessary to decide investment in one growth area vis-a-vis another, based on some rationale. It would also be of help, in identifying specific problem areas, in order to justify the aim of equitable distribution of resources.

As such a cumulative assessment of the quantum of thresholds, in selected factors that reflect, both physical, as well as, organizational aspects can provide the necessary rationale. In general it can be said, that the development potential would be inversely proportional to the quantum of thresholds existing in an area.

III

CASE STUDY

LAGOS

CHAPTER - III

CASE STUDY LAGOS

3.1 RECONNAISSANCE SURVEY

To identify the problems of any situation, it is essential to have a look at the background, the present set up and its future development policy.

According to the National Development plan 1962-63 of the Federation of Nigeria, some of the objectives are cited here.

"The objective is to achieve a modernised economy consistant with the democratic, political,and social aspirations of the people. This includes the achievement of a more equitable distribution of income both among people and the regions. The achievement of a substantial rate of growth of the economy coupled with social development will only make it possible to raise the average level of living and to provide for the Nigereian people the development means, increased employment opportunities, improved education and health for all people."

3.1.1 Historical Background

Lagos is the capital city and the main port of Nigeria, One piece of the historical evidence reveals that during the later half of 15th century, Portuguese named Lancelot defreitas stopped his caravel for provision and looking at so many uninhabited islands and water around him called it "Lagos" after Lagoons. At about the end of the 17th century, the Yoruba people started to develop Lagos and it became a commercial centre for normal trades and of slaves. Many consulates were established by various European countries and these two function i.e commercial

and diplomatic still dominate the activities of Lagos. Between 1860 and 1920, Lagos was greatly improved in its roads,buildings. public health transport,harbour facilities and the reclamation of swamps. The railway was established at Iddo in 1895, the tram way was opened in Lagos Island in 1902 and latter extended to the mainland.The harbour expansion was considered impossible at Lagos Island and Apapa docks came into being in 1926. With the increase in population and a deteriorating public health situation there was an outbreak of bubonic plague.The disaster gave birth to Lagos Executive Development Board (L.E.D.B.) in 1929 with its prime function being the planning authorities of Lagos. In a way the Board has done remarkable work in the past in light of the under developed situation.

3.1.2 Physical Structure

Lagos is distinctive with a picture of swampy islands, sand banks, lagoons and creeks of a vast inland country. It lies at the western most point of Nigerian Coast line. The Lagos lagoon is unique in West Africa is having a natural outlet to sea. Its depth is about 6 feet on the north but to the west of Lagos Island, 30 feet depth at Apapa enabled the harbour to develop. Most of the islands are few feet above mean sea level. Apapa port takes care of about 60 per cent of the country's total shipping. In 1962 there was space for 18 ships ranging between 400 to 600 feet long.

In addition there are marine buoys and pool anchorages for 10 ships.

The effect of long shore drifts due to the moles at the mouth of the harbour entrance, continuously shifts the material of Victoria beach. There is a

danger of the sea joining the lagoon unless the destruction is arrested.

The territory of the mainland is essentially flat and suffers from major problems of drainage being few feet above water. The land rises very gradually from Ebute Metta towards Yaba. Except for a sluggish stream at Suru-Lere there is no river in the city.

The city is on a recent geological formation of alluvium. Since most of the land is reclaimed the fertility of the soil is very low There are no minerals.The bearing capacities of the soils are low especially on the islands of Lagos. Victoria and Tkoyi and at the Apapa side. Buildings of more than two storeys must use raft or pile foundations.

'Lagos is situated on latitude 6^{O} $27^{'}$ north and longitude 3^{O} $20^{'}$ east and falls is an equatorial climate. The temperature hardly falls below 60^{O}F and most of the time it is well over 80^{O}F. Rain falls during all the months of the year but May, June and July is the rainy season accounting for 40 inches rain being 55 per cent of the yearly total. The main source of discomfort is the condition of high humidity, usually over 70 per cent and well over 90 per cent during or south-west. The only relief from general sultry conditions is the occasional guests of north-east less humid land breeze.

3.1.3 Existing Land Use Pattern

Due to the result of rapid populations increase and the expansive activities of the city, the growth or Lagos has crossed the former Federal Territory boundary. It is a city of low sky line, closely packed one or two storey houses and fairly wide straight roads. Except for buildings in the Central

Business district, most of the houses in Lagos are bungalows. Unlike other neighboring cities, the streets are laid on a grid-iron pattern. In spite of its location within the humid tropics, the city is tree less except for the former European Reservations at Dkoyi and Apapa. Apart from swamps, a few foot-ball grounds, cemeteries and the race course ground are the only open spaces in the city.

The major land uses are Residential, Industrial, Commercial, Administrative and Educational. Residential sectors alone account for above 70 per cent of the total built up area. The residences are usually grouped into residential districts.The general housing conditions with the exception of Mushlin,Somolu and Ajegunle-Araromi tend to improve from the centre of Alagos to the periphery. The impact of residential growth in the central area is caused by the expansion of commercial activities; where as the peripheral growth is due to the explosive character of the metropolitan expansions.

For the purpose of studying the city structure, the plan showing the existing Land Use is prepared with the help of various maps. The following ten observations are made which would help to
pinpoint the major problems facing the present and further growth of Metropolitan Lagos.

1. Lagos Island can be divided into two halves. The south half along harbour is the main civic, commercial and administration centre where as the north half is predominantly low-class residential with inadequate amenities and very high densities.

ii The main harbour is on Apapa and the majority of industry is on the island of Iddo and on the main-land at Ijora, apapa, Ebuta-Metta and at Ikeja.

iii The city growth follows continuously along the only N.W. railway and main road alignment. The development is sporadic and of mixed quality. North of former Federal Territory, municipal services are poor or non-existent.

iv The development on Ikoyi and victoria Islands is high-class residential. embassies and civic facilities with high standard of amenities.

v West of Apapa harbour is another high-class residential area. Further west are the worst slums of aiyetoro, Araromi and Ajegunle interspersed by swamps.

vi The bearing capacity of soil on all islands and at Apapa is very low.

vii The development on main-land is continuous having very little open space. The main recreational site is the beach of Victoria Island which is under erosion.

viii The main employment centre and the residential areas are far apart from each other except the recent high class residential development at Apapa and islands of Ikoyi and Victoria.

ix The harbour traffic to and from the rest of the country has to find its way through the built-up residential area of main-land.

x The land connection between the main commercial centre at Lagos Island and the harbour at Apapa is long.

3.1.5 Communications

The communications are provided to carry traffic and by their provision traffic is developed. It should be one of the purposes of the plan to enable the community to be served by all form of transport efficiently and economically'. It one way, the geographical position of Lagos is very fortunate as it is a terminus for all traffic from the country. In contrast to most cities, there is no problem of 'through traffic' in Lagos. The city is connected with the rest of the country by two roads i.e. Agege-Abeokuta and Ikorodu-Shagamu. The two roads in fact meet entering the city to become the single access to Lagos Island.

On the other side, this geographical situation poses a serious problem of communications at micro level within the city. Lagos Island and Apapa port are situated at the extreme south and of the city development forming a 'cul-de-sac' situation for traffic movement. Within the city, the separation of residential areas from work places means daily travel to work. There are also movements for shopping, social calls and for goods distribution. Due to the physical configuration of the city, the pattern of the road network is problematic. Metropolitan Lagos consists of four islands, Victoria, Ikoyi, Lagos and Iddo is addition of the part of the mainland extending up to Agege. In each of the islands, the road network forms a closed system and is linkied by an inadequate number of bridges with other islands or the mainland. The alignment of the Yaba-Apapa railway line with three level-crossings tends to divide the traffic movement into further compartments much as if they are separate islands too. The roads link between the port establishment on Apapa and commercial come administrative centre on Lagoe Island is long, time consuming and tiresome. The most hazardous

situation is created by the movement of harbour goods traffic which has to find its way to and from the rest of the country through the main residential area of the city.

The first privately owned car appeared in Lagos at about 1908 when road linking Lagos with the rest of the country had advanced only 30 miles. In 1961 there was 16,864 licensed motor vehicles in the former Federal Territory. Of which 18 per cent were motor cycles, 30 per cent commercial vehicles and 60 per cent privately owned cars and taxis. Compared to the figures of a year before (1960), the increase was calculated for motor cycles as 42 per cent, for commercial vehicles as 20 per cent and for private cars as 12 per cent. During the ten year period of 1951 to 1961 the number of private cars increased almost 100 per cent. Lagos accounts for about a quarter of all private cars imported into the country. The increase in the number of vehicles results in increase in traffic volume and has subsequent period effects on the already low carrying capacity of roads and on the situation of a traffic bottleneck.

The problems of parking which grows with the growth of traffic is also acute. The inadequate parkings facilities tends to park the vehicles anywhere on road-sides leading to all sorts of inefficiencies in traffic movement. Public car parking space is available along Marina, on which are most of the business premises. The Central Re-development area is also used for temporary public parking. Besides car parking, lorry parking is also important specially near markets.

The pedal cycle is a common mode of transport being the most comfortable

and cheepest of its king. It is not of any importance for travel to work within Lagos Island but used extensively by young people living on the mainland and working on Apapa or Lagos Island.

There is a considerable amount of pedestrian traffic during peak hours. The people belonging to the lower socio-economic group, who can neither afford to keep a cycle nor pay for the bus, walk even up to 16 miles each way for daily work.

Between Lagos and other parts of Nigeria there is considerable trade and transportation by water. Regular cargo and creek services ply between Lagos and Dahomey. There exists a regular island creek service between Lagos and Dalta ports some 220 miles away and between towns of Okitipupa 100 miles east of Lagos for the transportation of timber and palm products. There is also coastal shipping between Lagos, Port Harcourt and Calabar. The regular ferry service from Marina on Lagos Island to Apapa is invaluable but creates congestion at the port entrance. In addition to that there are numerous private boats that private ferry services from and to Lagos.

The Lagos airport is situated near Agege about 10 miles north-west of Lagos Island. It is classified as a first-class International Airport and also cater for a large amount of internal traffic which is expected to grow in the future.

3.1.6 Public Utilities

The lack of proper public utilities is the biggest health hazard in addition to an ugly environment and inefficiency reflected in day to day life in

Lagos. Even the best medical care can not keep the population healthy without arresting the hazardous conditions generated by the poor environmental conditions and inadequate public services. The tremendous rate of industrialisation, the rapid growth and development of commerce and trade have not matched with similar progress on the sides of environmental conditions. The provision of most of these services are related to lower positions of administration and there are losses on many sides, due to the launching of piece meal projects.

Water supply :- Had there been no proper water collection, purification and piped distribution system, the situation in Lagos would have been much worse. The main supply is from Iju Water Works about 20 miles north-west of Lagos. The systems was first introduced in 1914, modified and enlarged subsequently. It satisfies the present needs at 30 gallons per head per day but with no reserve. The shortage is experienced during the dry months. However, there are a number of settlements that are not yet connected to the network of water mains. Some have only a few stand pipes in the streets and in some other settlements, the residents buy water from the selling station. With regard to the increases in population and industries, the present set-up would need a large scale extension of water works in the near further.

Sewage Disposal :- It is surprising to note that Lagos, the capital city of Nigeria, has no organised sewage system and so there are no sewage works in the city. At present, there are three different methods used in different areas to dispose the human soil from the premises. In the older parts of the city and most of Ebute-Metta, it is done by the privy system. The night soil men empty the pails and finally the matter it tipped into the Lagoon. This is a very unhygienic

and most unsatisfactory system. In few areas of Government quarters, the water-borne system discharges into septic tanks which is the most satisfactory of all the systems. It has the disadvantage of limited capacity and the problem of occasional removal of the sludge. A comprehensive sevarag system covering the whole Metropolitan Area is the most urgent need and no further time must be wasted to launch the scheme.

Storm Water Drainage:- The storm and waste water are allowed to drain in front of the premises. These drains are filed with rubbish and soil matter floatting around in the whole of Lagos. The offensive smell in everywhere and on rainy days these drains often get flooded and overflow on to roads and premises. In addition, these drains take up valuable street space in densely built up areas.

Refuse Collection and disposal:- The collection of household refuse in the former Federal Territory is well orgainsed. It is disposed either by incinerator on Lagos Island or by tipping. The incinerator creates smoke nuisance. Since the refuse is entirely organic, the tipping in the vicinity of residential areas is dangerous to health conditions. The transportation of refuse to outlying areas is costly but tipping could be advantageously carried out for raising the level of low-lying areas, reclamation and filling in of old workings. Another method of disposal could be composting which may cover the working coaste at least by creating humus to increase the soil fertility.

Industrial Wastes:- No proper thinking has so far been given to the problem of the disposal of Industrial Waste. Several industrial estates have grown up in and around Lagos. The number of factories in the Metropolitan Area is growing

fast and will continue. In the very near future, there would be an urgent need to have some satisfactory system of the disposal of industrial waste in the interest of public health.

Electric and Gas Supplies:- The old generating station is at Ijora where recently another one was set-up. These power stations operate on coal and oil. The electric cables within and outside the city are overhead, which is cheap but may be considered as undesirable within the capital city. Natural gas was discovered in the Eastern and the Mid-Western Regions of Nigeria. This gas is already supplied in storage tanks for household use and piped supply to the city is on its way.

Conclusion:- Public utilities and services are inadequate and in the past only a few projects were launched in isolation. A comprehensive plan in different services, phased over a period of time in order to make it financially feasible, must be worked out soon. It is the only solution to improve the general environment and to reduce the hazardous health conditions in which the city is trapped.

3.2 DEVELOPMENT PROBLEMS

The reconnaissance survey of this chapter helps to list down the set of problems facing the present and further development of Lagos. In doing so the findings of the United Nations Report on Metropolitan Lagos were used as basic background material.

1. Need for expansion

In the course of overall economic development, the physical city development programme must be launched along side.

There is an urgent need to improve the existing environmental conditions, to expand the city centre and harbour facilities.

The city must be planned in view to accommodate one million additional inhabitants expected to increase by the turn of the century.

II Physical Constrains

Lagos faces number of constrains for further expansion. These constrains are swampy land, sand banks,creeks,lagoon, eroding and silting, low bearing capacity of soil and aircraft noise.

III Land Shortage

There is an extreme competition for land.

There is an urgent need to create more land for various uses and to establish a controlled land market for housing.

There is no public land use policy to make stock of total urban land and avoid speculation.

IV Locational Factors.

There are extreme concentrations of various employment activities.

The existing residential areas, with the exception of a few high-class grades, are far away from the work-places.

The commuting hazards give rise to many socio-economic problems.

V. Communications

The road network is inefficient to the presence of many bottlenecks and level-crossings of rail and road.

The traffic to the main harbour and the city centre faces a 'cul-de-sec'situation in the uni-directional movement of traffic giving rise to congestion on roads and delays on all fronts.

The harbour through-traffic has to find its way through the build-up residential area creating hazardous conditions and delays.

The road or water communication link between the main harbour at Apapa and the commercial and administrative centre on Lagos Island is inadequate.

There is an extreme lack of parking facilities all over the place and particularly on Lagos Island.

The use or roads by different modes of transport and a bad road design make them inefficient

The growth in commercial vehicles and car ownership is increasing rapidly.

There is need to develop fast passenger water transport to supplement the road and railway transportation network.

VI Housing

There is an extreme shortage of housing.To improve the present situation and to meet the future demand, the construction of 6,000 units per year is

considered as minimum.

In case of the lower section of the community the environmental conditions of housing and household amenities are well below any desirable standard, and a very high tenancy rate exists in these areas.

The worst types of slums are in the central part of the city and at the periphery. The creation of new slums is a continuous process taking place due to the shortage of housing.

The family size is difficult to estimate in the fast social transformation taking place. On the average there are 3 persons per room.

There is almost complete segregation of residential areas between poor, middle and rich grades of the community.

There is a lack of incentives for individual savings and for public housing finance.

There is a need for a public housing programme to accommodate the newcomers and the displaced from rehabilitation areas on a short term basis.

VII. Social Structure

There are strong family ties which demand adequate housing to maintain this structure. This was not regarded in the new housing developments and in the slum clearance schemes so far.

The Lagos Town Council has not enough say in matters of local planning.

The economic power of self-employed craft on and orders is extremely limited. The illiteracy rate is very high, therefore, human resources are under developed.

There are no arrangements for adult education and vocational training in order to receive the newcomers.

VIII Community Services

The health services are mostly inadequate and not accessable to the poor sections of the community.

General education has to be expanded to meet the required needs.

The markets should be easily accessible from residential areas as they are the strong-holds of social, political as well as economical life.

IX Public Utilities

There is an urgent need to expand the water works to meet the future needs and to improve the present reserve capacity.

There is no proper sewage system covering the entire city and present human soil disposal into the Lagoon is most unhealthy.

The open storm water drainage system is unsatisfactory.

The refuse collection and the disposal arrangements need an efficient and

self paying system.

No proper thought has so far been spent on the disposal of industrial wastes with regard to the growth of industry.

X Planning and Administration

At present, the planning and administration of the city in directed by different authorities without sufficient co-ordination, leading to overlapping projects of total neglect on others areas.

3.3 GROWTH STRATEGIES

Under the enormous burden of physical constraints and the forces of expansion Lagos is facing, the following three strategies are considered. (Fig 3.3)

A. Counter Magnet at Agege.

B. Opening of a Growth Corridor East and West of Lagos.

C. Ring Development around the Lagoon.

These will be referred to as strategies A, B and C.

A. Counter Magnet at Agege

This growth strategy was recommended by the United Nations Commission on Metropolitan Lagos. It suggested to intensify the development on the existing north-west growth axis by limiting the access to the main traffic arteries at a few controlled points and establishing a satellite town at agege. The settlement at Agege with its own business centre is expected to act as counter magnet to Central Lagos. the strategy was facing least resistance as it followed the existing trends of linear growth. However, the success depends on the creation of a strong magnet which could counter-act as the existing magnetic force of Central

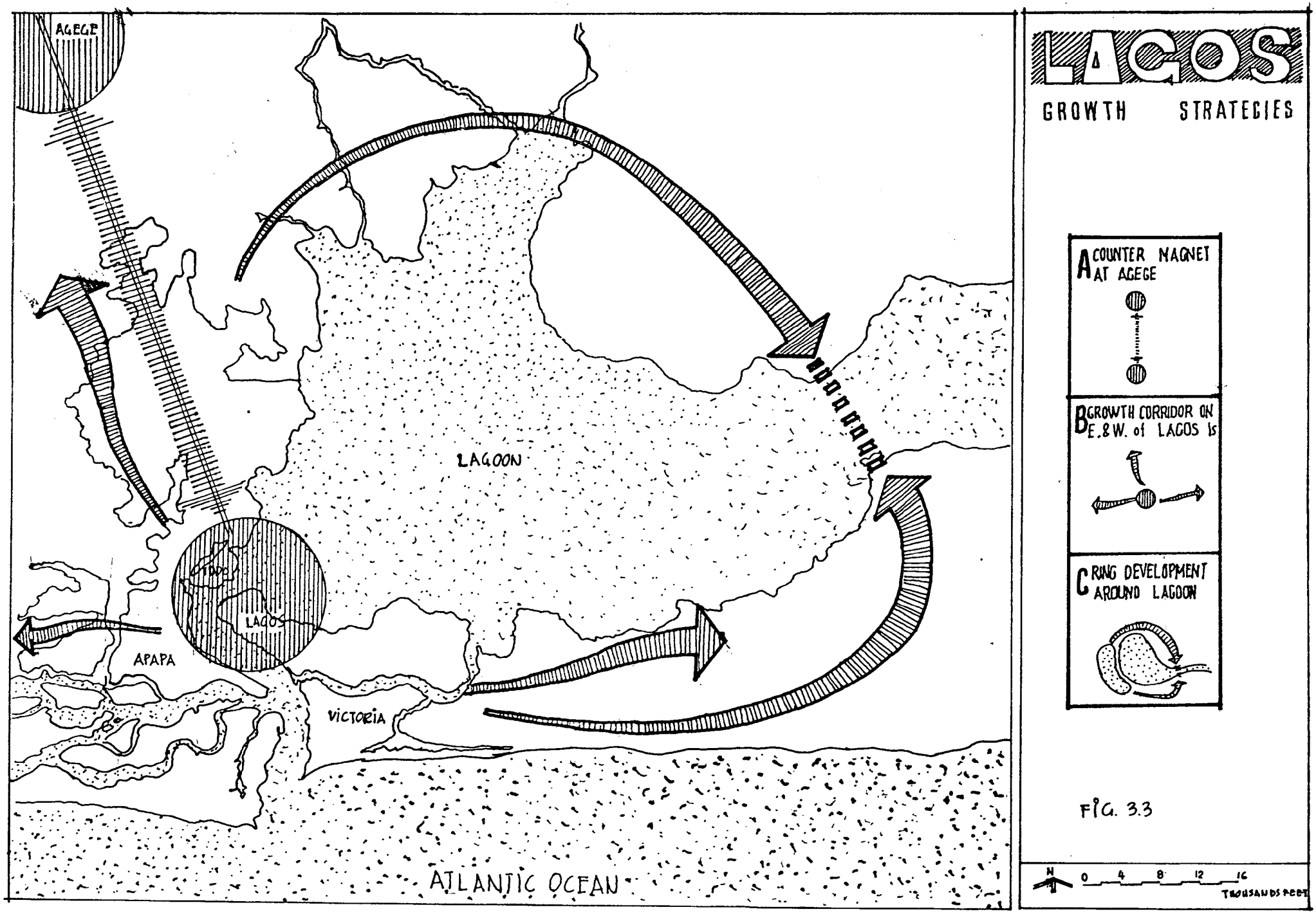

AGEGE
LAGOON
TBC
LAGOS
APAPA
VICTORIA
ATLANTIC OCEAN
LAGOS
GROWTH STRATEGIES
A COUNTER MAGNET AT AGEGE
B GROWTH CORRIDOR ON E. & W. of LAGOS Is
C RING DEVELOPMENT AROUND LAGOON
N
0 4 8 12 16
THOUSANDS FEET

FIG. 3.3

Lagos which took centuries to develop.

B. Opening of a Growth Corridor East and West of Lagoe

While recognising the fact that peculiar geographical island situation has lead to the growth of Lagos into a single north-west communication alignment which has given rise to various problem facing the present development, one might suggest to open up new directions for growth along with the existing one. This strategy could be a linear expansion from Apapa to the west having an excellent link with the main harbour and another linear expansion from Victoria and Ikoyi Islands along the coast line to the east. At its final stage the development would take the form of 'three-legged star' city plan, converging all roads to Central Lagos. This development would have the potentials of meeting the future demand of land requirements. However, the proposal suffers from the fact that inter communications between the three legs of the plan would be difficult to achieve because of the lagoon situation which required enormous investment into the construction of long distance viaducts.

C. Ring Development Around the Legoon

The proposal advocates for the growth of series of suburbs and their industrial Estates around the Lagoon (a vast sheet of protected water) to make use of the potentials it could provide. These suburbs would be served by a free motor way having limited access points. The newly constructed road to Ibadean vis Shagamu in the north and the road extension from Victoria and Ikoyi Islands in the south of the Lagoon would from the part of this circular motor way. The complete ring of a free-way is planned in connection with the proposed western bye-pass (discussed later) and the complete ring of a free-way is planned in connection with the proposed western bye-pass and the completion of a bridge at the narrow

width of the Lagoon on the east side at a time when it becomes necessary.

The strategy provides a vast scope for development to meet the future needs for expansion and it seems to be economically feasible. It would bring the people closer to the water, which has always been a source of enjoyment and recreation. It could also provide incentives to develop a water transportation to the water, which has always been a source of enjoyment and recreation. It could also provide incentives to develop a water transportation industry. This growth strategy is recommended by this study and it is investigated in comparison with others in the following pages. In the first phase, the development would start in close proximity to the existing built-up area and in the subsequent phases the ring could be completed.

3.4 EVALUATION OF GROWTH STRATEGIES

The expanding settlement is confronted from time to time with limitation caused by different thresholds. The first category is physio-graphic by nature which means reclamation of swamps and availability of land for development without requiring essential improvements and initial capital in-puts. There are other physical thresholds which come along with future expansion demanding simpler or major adjustments in the existing land-use pattern. the second category of thresholds are termed as 'technological' which are related to the cost of providing an infrastructure like water supply, sewage disposal and transportation network. The analysis deals with the possibility of either extending the existing infrastructure or to establish a complete new system while pursuing one alternative to other. The structural threshold deal with the reshaping of the existing areas or the establishment of a new area in order to meet the future, needs, like for example with central shooping areas.

The cost analysis of crossing the thresholds are based on per capita cost of the population which needs an up-to-date knowledge of buildings costs and of the exiting conditions of the environment. Due to the lack of such information the application of the threshold theory remains limited in this study. However, an attempt is made to highlight the various categories of threshold in each strategy and evaluate them in comparing advantages and disadvantages.

Physical Thresholds

Strategy A.

The existing land use pattern would require major adjustment.

Land is costly to acquire due to the close proximity of airport and other developments.

Strategy B.

Would require immediate reclamation of swamps on the west of Apapa.

Strategy C.

Would open up vast potentials for developments to meet the future requirements of land.

Immediate development can take place without much reclamation on south and north side of the Lagoon.

Technological Thresholds

Strategy A.

At Agege a new concentrated infrastructure of the magnitude of Lagos would be needed.

The existing transportation system will need major redesigning of existing communication network.

Strategy B.

Road transportation network would be required on the eastern and western side of Lagos Island.

Strategy C.

In the first place, the development can take place north and south of the Lagoon by extending the existing roads.

The ring road could be completed as needed in the future

Structural Thresholds

Strategy A.

Would require a huge city centre to achieve the objectives.

A strong magnet is difficult to create in a less industrialised situation without sufficient resources.

Strategy B.

Pressure on existing city centre would increase.

Strategy C.

A number of small centres can be created around the lagoon being linked with the centre of Lagos by a ring road and by water transportation.

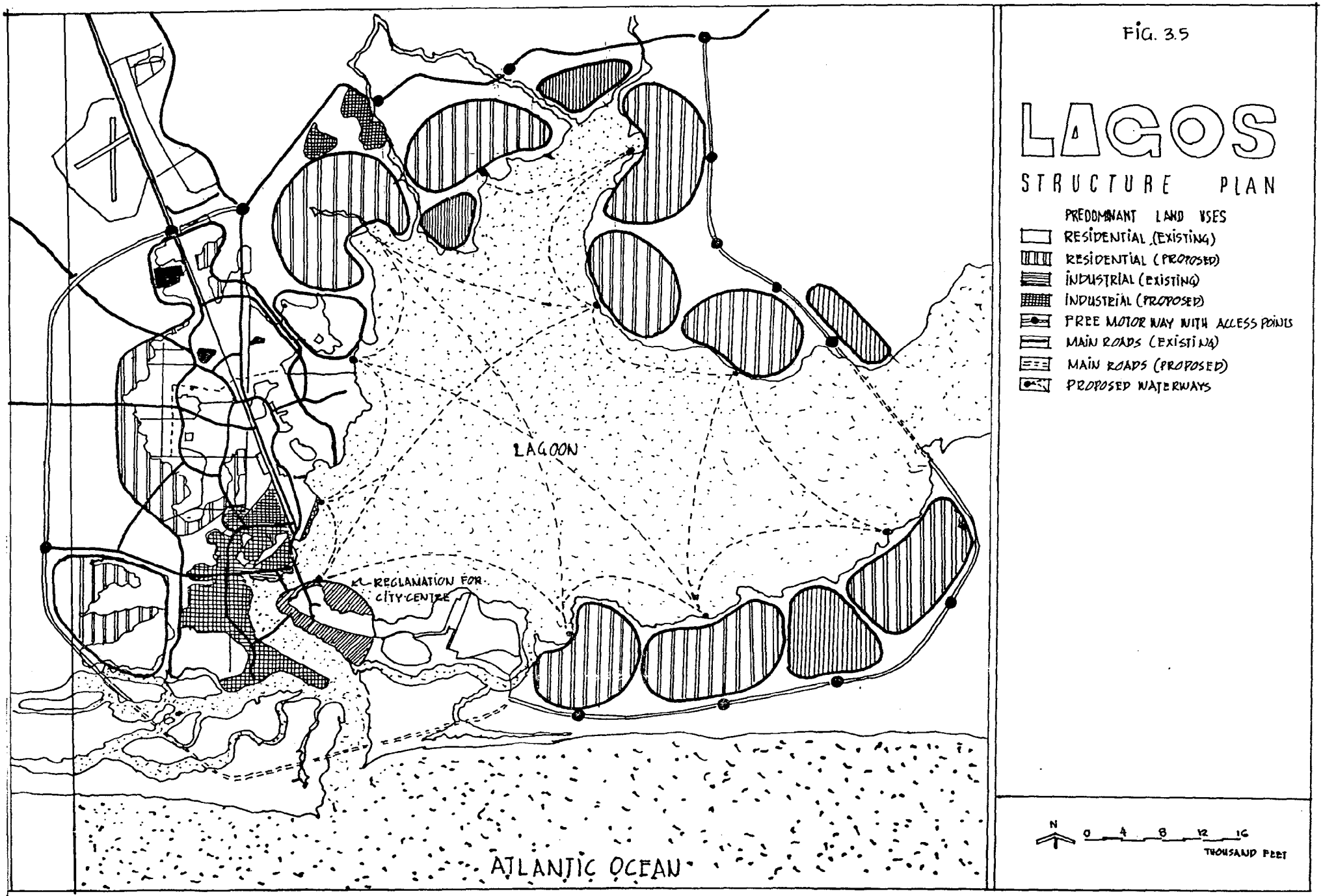


FIG. 3.5
LAGOS
STRUCTURE PLAN
PREDOMINANT LAND USES
RESIDENTIAL (EXISTING)
RESIDENTIAL (PROPOSED)
INDUSTRIAL (EXISTING)
INDUSTRIAL (PROPOSED)
FREE MOTOR WAY WITH ACCESS POINTS
MAIN ROADS (EXISTING)
MAIN ROADS (PROPOSED)
PROPOSED WATERWAYS
LAGOON
RECLAMATION FOR CITY CENTRE
ATLANTIC OCEAN
N
0 4 8 12 16
THOUSAND FEET

Threshold Common to All Strategies

Free-motor way west of the existing North-West road alignment to avoid harbour traffic from passing through the built-up area.

Bridge connecting lagos Island with Apapa harbour to improve the communication between them and to expand harbour facilities.

Reclamation of land for the city centre of Lagos Island.

3.5 STRUCTURE PLAN PROPOSALS

The Structure Plan was proposed as shown in Fig. no. 3.5 on the basis of analysis, performance standard and the assumptions made regarding the city's future. Here, the broad proposals are summarized as follows:

1. The future growth should take place in the form of self-contained residential cluster city development around the Lagoon at the average Gross Urban Density of 75 persons per acre.
2. Redevelopment programme of slums should be taken up. The slums of Ajegunle, Aiyetors and Araromi should have top priority.
3. Development of public housing at the south east of Baring shall be for accommodating newcomers and displaced from slum improvement schemes of the city.
4. The western bye-pass from Apapa should run as free motorway with limited access points and cloverleaf junctions at existing roads to Agege and Shagamu.
5. Improvement of road crossings and bottlenecks as indicated on the plan.
6. Ring and road as a free motor way from Victoria Island with limited access

points on the outer side of the proposed residential cluster around Lagoon.

7 The bridge at the narrow width of the Lagoon can be postponed until sufficient development around the Lagoon takes place.

8 An additional bridge connecting Lagos Island and Apapa harbour.

9 Reclamation from harbour-channel for additional bays for ships.

10 The expansion of the harbour for the distant future should take place on the reclaimed islands, south of the existing harbour.

11 Reclamation along the north-east edge of Lagos Island for expansion of the city centre.

12 Reservation of land for Market Gardening on both sides of the proposed western bye-pass to meet the food supply of the city.

13 Reservation of land for recreation,weekend cottages and small hotels on Victoria Island along the sea-coast.

14 Heavy industry should be discouraged in Lagos.

15 Development of a water transport system for passenger and goods traffic to improve the existing conditions and to create employment opportunities.

16. Sewage systems to cover the whole of the city on top priority basis. The proposed sewage system should also take care of the proposed development.

17 Plans for waste disposals, Industrial waste should be treated.

18 Reclamation of swamps near the built-up area in order to create open spaces within the city.

19 Community facilities like health, education and recreation distributed in form of a network for easy access.

20 To take up the planning responsibilities a Metropolitan Development Organization for Metropolitan Lagos and Regional Development Board for Lagos State should be created.

IV

STUDY AREA CHARACTERISTICS

CHAPTER IV

STUDY AREA CHARACTERISTICS

4.1 PHYSICAL CHARACTERISTICS

4.1.1 Location :

Vypin island is located at $9^0 58'$ North latitude and $76^0 10'$ East longitude. In between the main land and Vypin island, the other islands namely Vallarpadam, Mulavukad and Thanthonni are situated.

4.1.2 Climate

As in the rest of the state, these islands also have a tropical humid climate, with an oppressive hot season and abundant seasonal rainfall. The cold weather season of December-January gives a pleasant climate with clear skies, bright weather, cool nights and low temperature. The hot season begins in the second week of February and continues till May. During this period, the average minimun daily temperature is around 25^0C while the maximum goes upto 34^0C. The south-west monsoon period, locally known as Edavappathi, commences in the first week of June and continues upto September. The precipitation during this season is around 2000.mm.The north-east monsoon, locally known as Thulavarsham lasts till November, with an average precipitation of 400 mm. The atmosphere is generally humid throught the year, the relative humidity being over 70% in the coastal tract and slightly less towards the interior.

Land and sea breazes are also experienced almost throughout the year except during the south west monsoon. The land breeze is well developed during December and January and decreases in strength and duration during March.

4.1.3. Soils and Mineral Deposits.

The soil of these islands are sandy in nature. The sandy soil varies from sandy loam to pure sand which is highly porous with poor water retentivity. It is deficient in organic matter. Paddy and coconut are however grown in this soil. Economically important mineral deposits are not present in this soils.

4.2 SOCIAL CHARACTERISTICS

4.2.1 Sex Ratio

The sex Ratio, is the number of females per 1,000 males recorded, in 1991 census report for Kerala is 1040 where as for Goshree island it is 1042. The sex ratio recorded in 1981 census of Kerala as 1034 females for 1000 males was highest of the country and that of Goshree island was 1035.

The sex ratio of Goshree island has increased from 1035 in 1981 to 1042 in 1991. The migration of large number of males to Gulf countries for employment is perhaps the reason for this .

Coming to the panchayat wise sex ratio of these island, Kuzhippilly panchayat is having the largest female sex ratio (1062) followed by Njarackal (1053) Edavanakad (1051) Nayarambalam (1048) Pallippuram (1044) Elamkunnapuzha (1032) and Mulavukad (1026).

4.2.2 Housing and House hold size

Unlike other coastal areas which will be normally plain, these islands are having plain as well as slightly undulating topography with patches of marshy land. Spatial pattern follows any order. The degree of compactness of houses

varies from place to place.In certain area, houses are more loosely built but near landing places, houses are more compact. About 50% of the houses are merely huts with flimsy construction which only serve the purpose of providing shelter. Generally the houses are oriented towards east and north.There is no organisation or grouping of houses based on religion. Any kind of caste grouping or class agglomeration is not apparent due to the high density and since the dwellings are built on any available land due to excessive pressure on land.

The fishermen settlement is inhibited by kutcha structures constructed of local materials. The houses are nothing but an agglomeration of detachable homesteads. The plot size varies between 2 cents to 5 cents. The walls are made of either braided mats of coconut leaves, mud bricks or wood. Floors of these houses are plastered by clay and a mixture of cowdung and burnt coconut husk. Majority of the houses have two rooms, Generally floor area of these houses are less than 20 sq. metre with very little privacy.Generally there may be separate partition for cooking space. The rest of the space is used for all other purposes.Huts do not have proper ventilation. In some houses, separate provision for salting and curing of fish is available. The space among the houses are used for sun-drying of fish, net mending etc.

Some of the house in these islands are built according to the traditional style of Kerala. These dwelling units are called Nalupura. ie, built on four side of a central courtyard open to sky. This yard is known as Nadumuttam- meaning central yard. The buildings on the four sides are called Vadakkini (north wing) The-kkini (south wing) Kizhakkini (east wing) and padinjttini (west wing) respectively with respect to the position of the central yard.

4.2.3 Community and Social gatherings

The annual festival in the temples are usually participated by all the sectors of the population, the Hindus being obiviously motivated by the pious obligation to the diety and other by sheer curiosity and the fun associated with such functions. The social unity among villagers is clearly visible during such occasions. The temple premises (outside the walls) are also used for secular purposes such as political meeting, community gathering etc. It can be seen that these temple grounds had always been place of social gathering, though such gatherings were quite rare and not frequent.

For Christians, a chat outside their church after the usual sunday service is the main way of exchanging greetings. These weekly functions has enabled, the christians to have more contact with members of their community than the Hindus.

The population of islands belongs to three religious groups namely Hindus, Muslims and Christians and lives in harmony . About 40% of the population belongs to Hindu religion, 30% belongs to Muslims and 30% to christians. Most of the fisherman community belongs to the Christians and Hindu religion.

4.2.4 Literacy

As per census report 1991, the literacy rate in Goshree islands is 83.5 percent. May be because of the presence of enough number of educational facilities and movement organised for making people literate by certain social organisations. Kerala state became the first state to attain 100 percent literacy in 1993.

4.3 ECONOMIC CHARACTERISTICS

The available labour force in Goshree island is 25.2 of the total population. In all island except Mulavukad, primary sector is predominant. Fishing and agriculture augments the primary sector of these areas. Tertiary sector is also well developed in all these islands. The main income generating activities in these areas are Agriculture, Acqaculture, Fishing, Trade and commerce and Tourism (Fig. 4.3a and Fig. 4.3b).

4.3.1 Agriculture and Acquaculture

A large area under wetland is used for agriculture cum acquaculture. The high salinity of the soil adversely affect the normal paddy cultivation. These is lands have a system of paddy cultivation in the saline soils known locally as'pokkali cultivation'. The term 'pokkali' refers to a saline resistant paddy cultivated in Ernakulam district. The salient characteristics of pokkali fields are that paddy can be cultivated only during the monsoon season, from June to October, when the salinity is low. From November on-wards salinity builds up and high salinity makes paddy cultivation impossible. During this period these fields after harvesting is fitted with locally made sluice gates and waters of the high tide is let into the field. The prawn and fish seeds that enter the fields would be trapped and allowed to grow in the field. Before the commmencement of the next paddy season, the fields would be emptied and fish is harvested.

Because of the high cultivation cost and low yield, margin of profit is very narrow in pokkali cultivation. Thus prawn infiltration is the main source of income for the farmers. However the average prawn catches from pokkali fields have come down from 1069 kg/ha in 1970 s to 735 kg/ha by 1980.

The first brackish water fish farm in India was established in Njarakkal. The production from these farms, however, are poor.

Coconut cultivation is found to cover all the panchayats in this area on a mixed plantation basis.

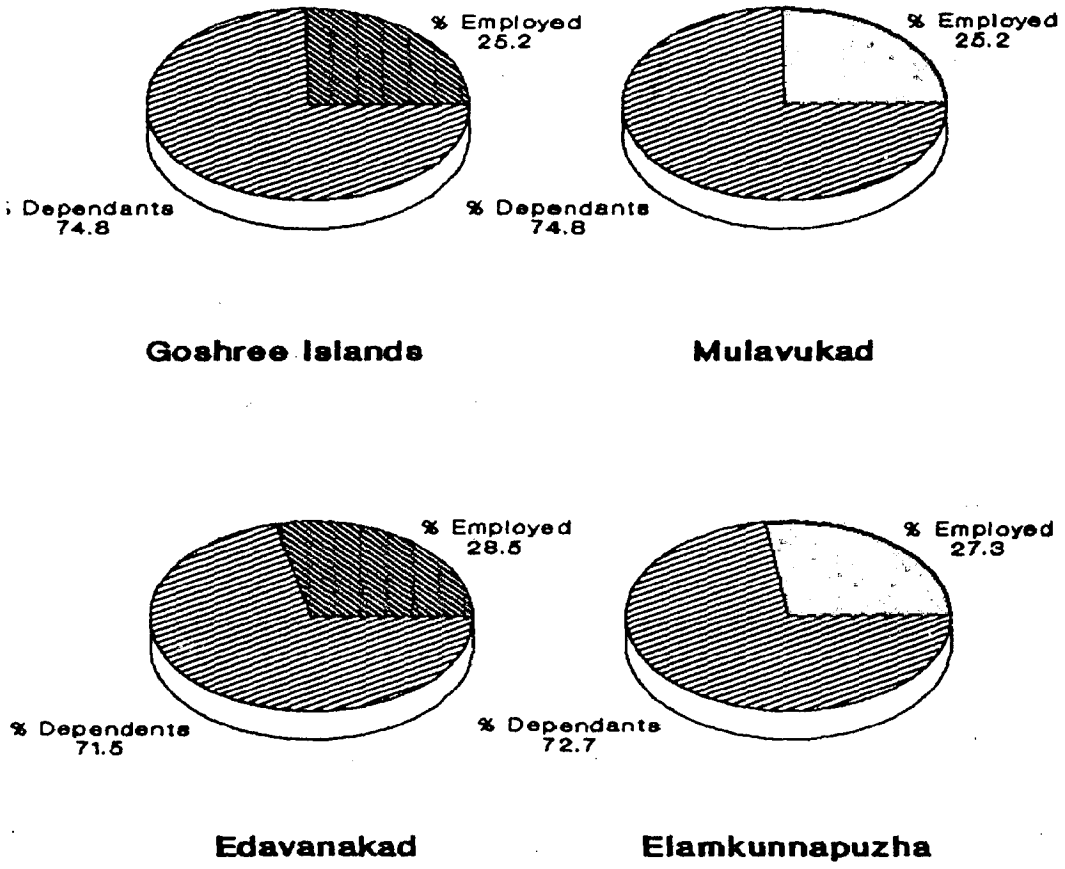
4.3.2 Fishing

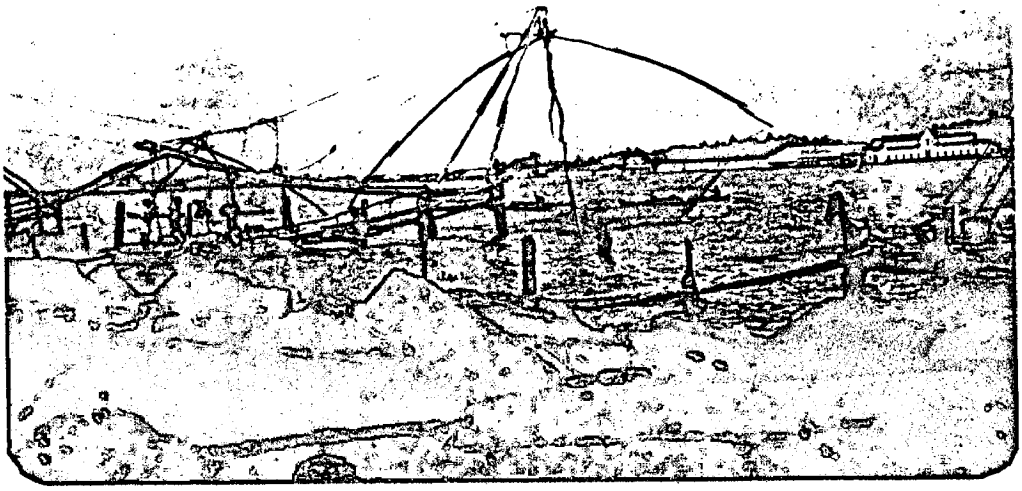
Fisheries is one of the most important resources of the area. Fishing has been a major occupation for the islanders. In islands like Vypin, it is the main ecomomic activity. The major fish landing places in the area include four in Puthuvypeen and one in Njarakkal. Most of the landing places are not connected by roads and the catches are transported by head loads, cycles or country crafts to the nearest road. Availability of transportation facilities in the landing places determine the mode of transport of fish to the market in lorries, cycles and headload. In Njarakkal only country crafts are available. Traditional methods of fishing like Chinese fishing nets and modern trawlers are used for fishing.

Cochin has been the traditional centre for the export of dry prawns during the last century. Most of the marine products are exported as frozen and canned items. Most of the freezing units are established near the Cochin port in Fort Cochin from where frozen products could be shipped to the world markets in ships. Peeling sheds are avaliable in the rural islands where there is an assured supply of women labour.

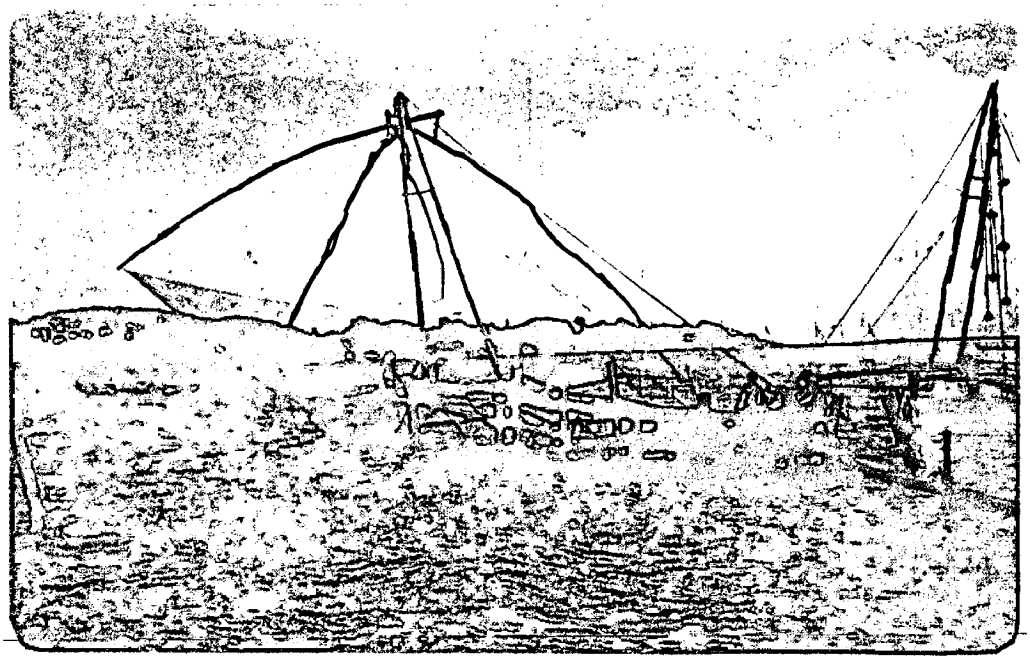
Employmment level

Fig. 4.3.a



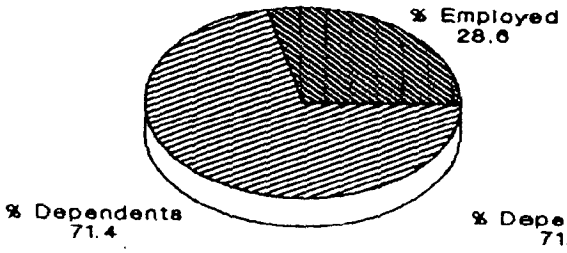


FISHING BY USING CHINESE NET (CHINA VALA)

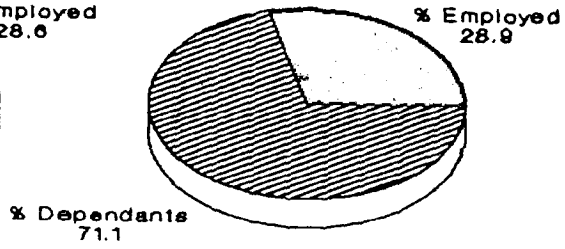


Employmment level

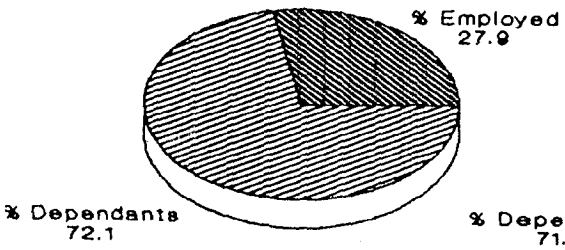
Fig- 4.3b



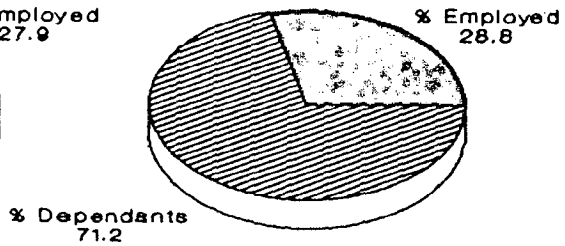
Pallipuram



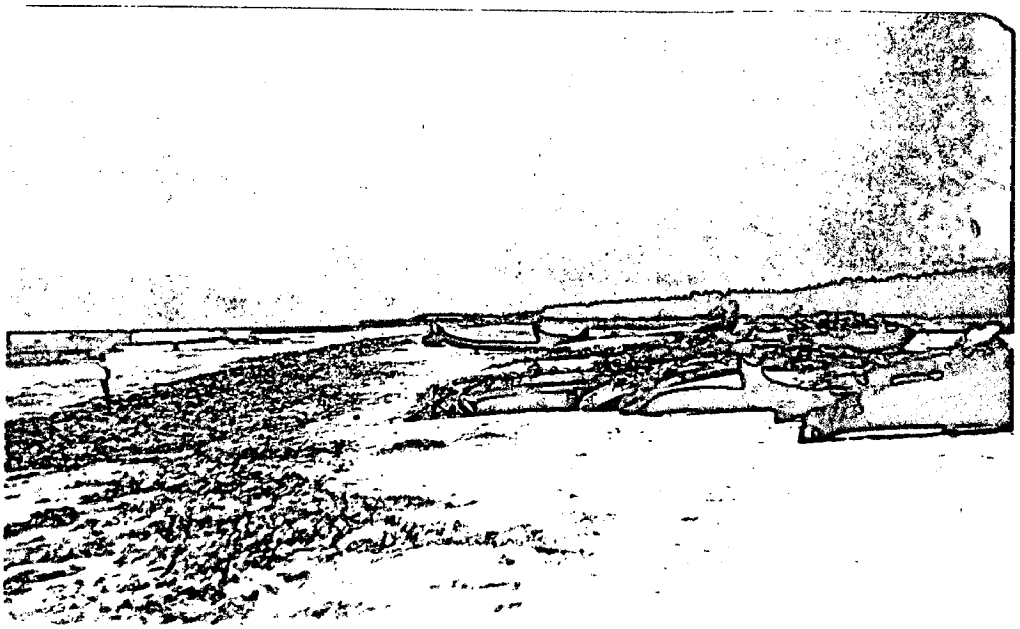
Kuzhippilly



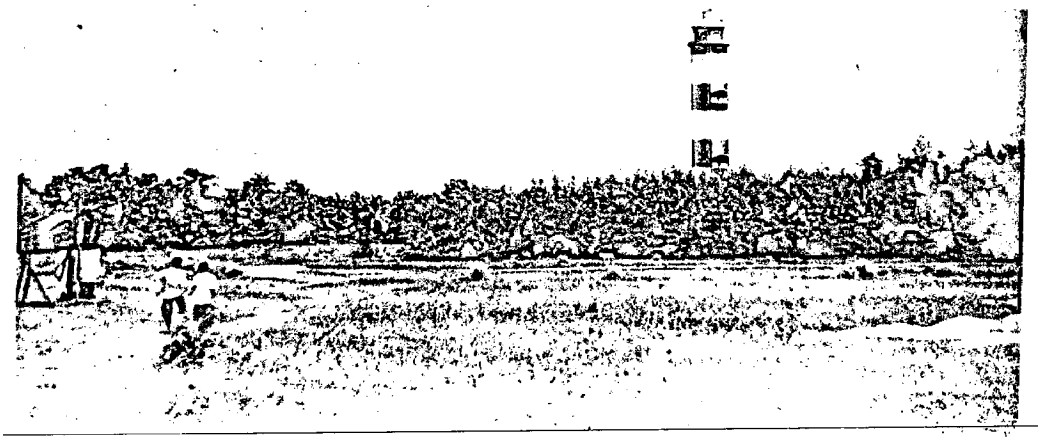
Njarackal



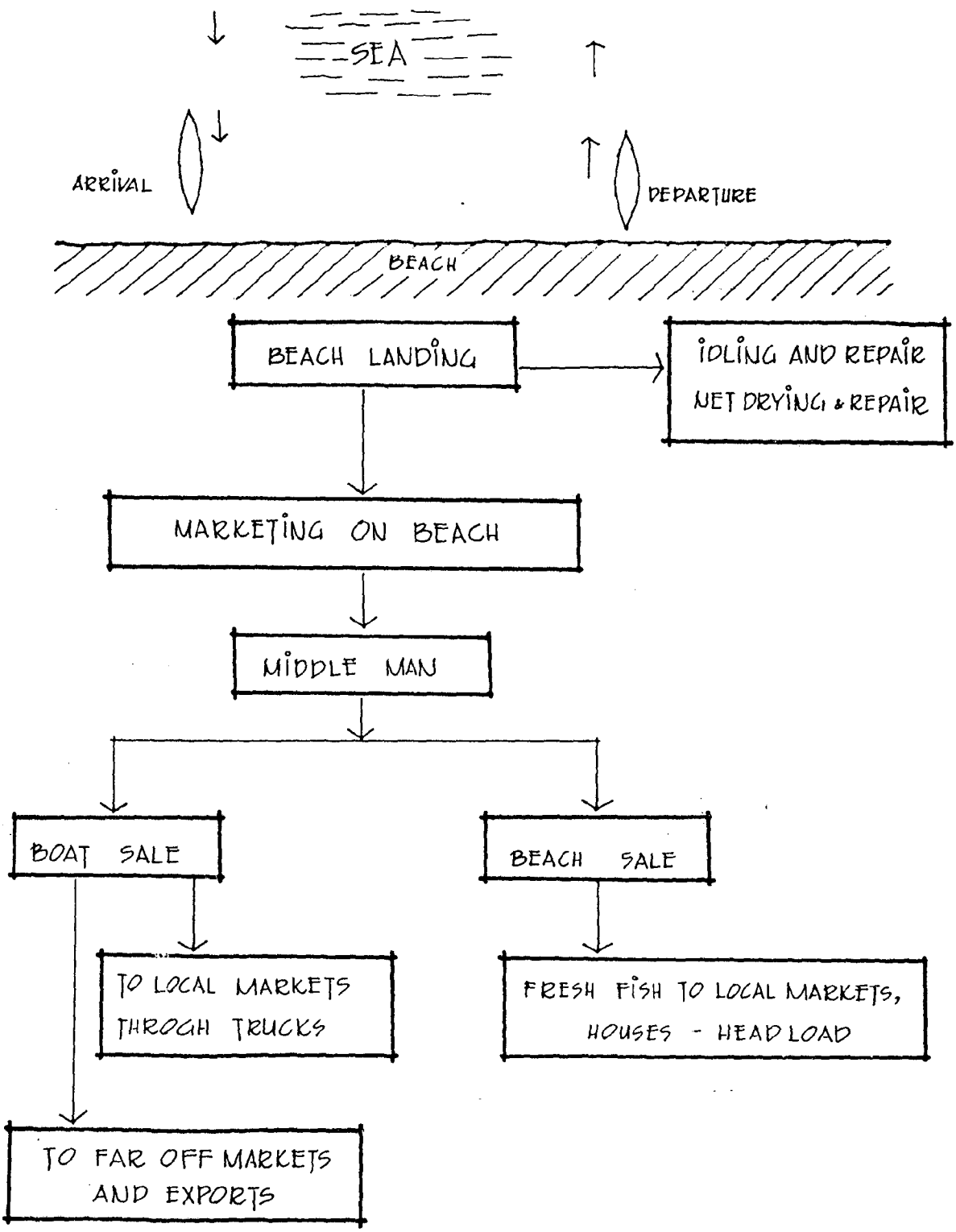
Nayarambalam



IDLING OF COUNTRY CRAFTS

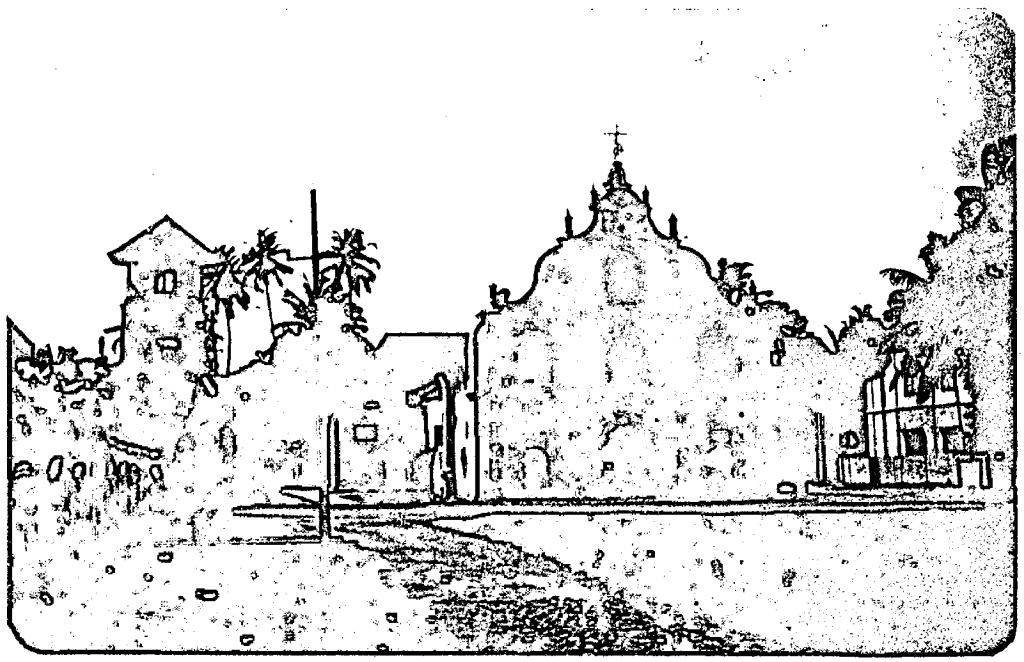


LIGHT HOUSE AT VYPIN



ACTIVITIES RELATED TO FISHING IN INFORMAL SECTOR | FIG. 4.3.2

A TEPLE IN VYPIN ISLAND CONSTRUCTED ACCORDING TO TRADITIONAL STYLE



AN ANCIENT CHURCH IN VYPIN ISLAND

4.3.3 Trade and Commerce

Retail and whole sale activity and commercial establishments, including export-import concern are concentrated in Fort Cochin-Mattancherry area which are the centre of trade in spices in particular. Employment in trade and commerce in the island are in retail trade or in agricultural produce collection centres.

Although in any urban region the importance of commercial activity is likely to be high, it is of paticular significance to Cochin city. Cochin port earned substantial foreign exchange through the exports of traditional items like tea, spices, rubber, cashew kernels,coir and marine products.The prosperity of the city and islands are extricably linked to the growth and development of Cochin port. The establishment of an International Container Transit Terminal for the port is considered to be very important to give a boost to the external trade.

4.3.4 Tourism and Recreation

The natural beauty of Cochin and islands as well as its histrorical and cultural heritage are attracting domestic and foreign tourists in increasing numbers. At present thirty thousand foreign tourists and two and a half lakh domestic tourists visits Cochin annually.An analysis of present tourist arrivals into Cochin indicates that roughly 30% of them arrive by air, 50% by rail and another 10% by ships.Most of these tourists visits these islands too. The Bolghatty palace tourist resort in the Mulavakad island is a major tourist attraction, with the picturesque location of the 18th century palace in extensively landscaped grounds within an area of 15 acres surrounded by the backwaters and providing other recreational facilities like a golf course, speed boats in the adjacent backwaters etc. The coir factory run by a cooperative

society in the Gundu islands, one of the smallest islands in the backwaters with an area of 5 acres also is visited by many tourists.The rest of the islands as well as the other parts of the backwaters, with its idyllic surroundings offers immense tourism potential, which has not been tapped. Even the conducted tours by the KTDC (Kerala Tourism Development Corporation) around the backwaters covers less than one fourth of the backwaters. Tourism packages promotional materials, trained tourist guides etc are inadequate in this area.

V

ANALYSIS

CHAPTER V

ANALYSIS

5.1 SETTLEMENT PATTERN

5.1.1 Demographic Studies

The islands are of varying sizes and population. The islands and its populations as well as densities are as follows :

Table 5.1.1.

Population - Island - wise

Name of Island	Population	Area (Hectares)	Gross Density (persons per Hectare)
VYPIN	1,66,199	6808	24.4
VALLARPADOM	7,550	141	53.5
MULAVUKAD	14,772	56	57.7
THANTHONNI	287	18.3	15.7
Total	1,88,808	7223.3	26.13

Source -Census data -1991

Vallarpadom and Mulavukad are the most thickly populated islands. As per U.N.O. reports, VYPIN is the most densely populated (1,66,196) rural village in the world.

The entire population of these islands come to be 1,88,808 and that of the central city is 9.1 Lakhs. The islands like the rest of Kerala state have a unique settlement structure. It consists of more or less uniformly distributed detached dwelling units all along the coast in both the rural as well as urban areas.

5.1.2 Population Growth Trend

The average decadal percentage increase in population in Goshree islands during 1971-1981 was 12.94. During the period, the decadal percentage increase for the whole district Ernakulam was 17.18 and that of the whole state was 19.00

The 1991 census shows a declining population growth rate in Goshree islands which is a remarkable and welcoming trend. The decadal growth rate was reduced to 7.66 from 12.94 during 1981-1991. During this period growth rate for the District Ernakulam was reduced to 10.38 from 17.18 and that of the state to 14.2 from 19.24.

There are three components of population growth viz. fertility,mortality and migration. of these, the mortality rate has almost stabilized around 7 per 1,000 persons and hence its impact on population growth is negligible. However, migration appears to have had an impact in the reduction in growth rate in view of the large scale out migration to the west Asian countries for employment.The quantum of migration is not known at present. Apart from the impact of family planning measures, the age at marriage is increasing in the recent times affecting the fertility rates. Acute unemployment has also contributed to a higher age at marriage, Which also has an impact on reduction in growth rate.

Table 5.1.2

Projected Population

	Population in the year			Projected Population in the year 2011		
	1971	1981	1991	Arithmetic method	Geometric Method	Average
ELAMKUNNAPUZHA	36,358	43,911	47,878	55,812	56,919	56,366
NJARACKAL	19,221	21,672	22,978	25,590	25,831	25,710
NAYARAMBALAM	20,183	21,726	23,166	6,046	26,339	26,192
EDAVANAKAD	16,597	18,707	19,631	21,479	21,618	21,549
KUZHIPPILLY	18,492	20,896	11,446	16,254	16,752	16,503
PALLIPPURAM	24,429	27,066	41,100	46374	47,124	46,749
MULAVUKAD	19,379	21,397	22,609	23,889	25,243	24,566
GOSHREE ISLAND	154659	175375	188808	215,444	218,840	217,142

SOURCE: CENSUS REPORT

TABLE 5.1.2 b

AREA, POPULATION, PANCHAYAT-WISE

Name of Panchayat	Area (hectares)	Population	Gross density (people/Hect.)
Pallippuram	1666	41,100	24.7
Kuzhippilly	773	11,446	14.8
Edavanakad	1124	19,631	17.5
Nayarambalam	1219	23,166	19.0
Njarackal	860	22,978	26.7
Elamkunnapuzha	1166	47,878	41.0
Mulavukad	1927	22,609	11.7
Total	8,735	1,88,808	21.6

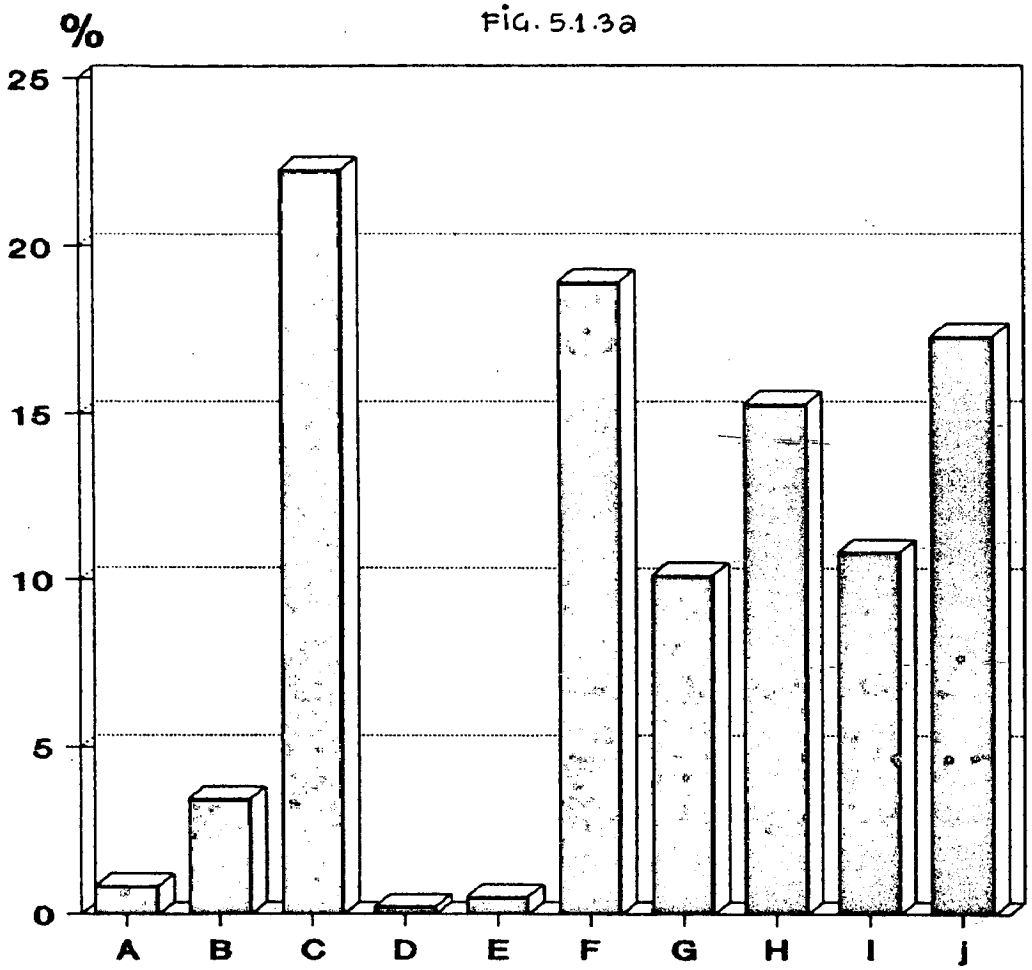
5.1.3 Break up of workers

About 50% of male population and 12.5% of the female population are engaged in any of the activities in primary secondary or teritiary sector. Fishing and agriculture augments the primary sector of these areas. Teritiary sector is also well developed in all the islands. The improtant economic activities in these Islands are as follows

Name of island	Main economic activity
1. Vypin	Agriculture,fishing, pisciculture
2. Vallarpadom	coir making
3. Mulavukad	Boatyans
4. Thanthonni	Agriculture

CATEGORIES OF MAIN WORKERS
GOSHREE ISLANDS

Fig. 5.1.3a

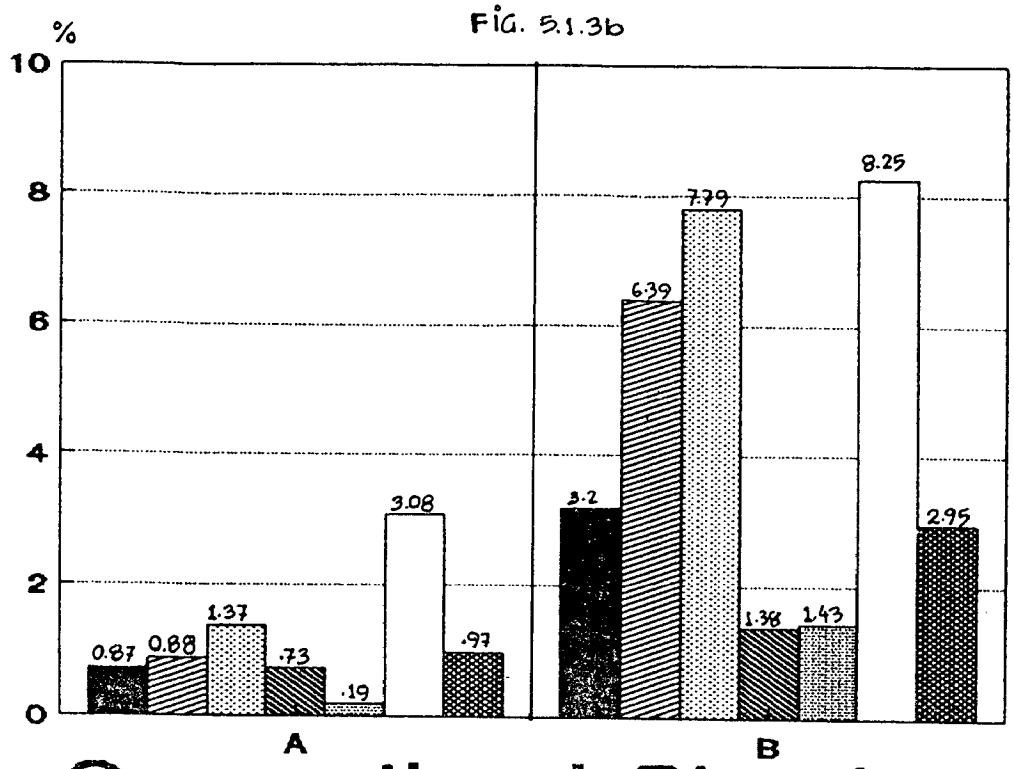


source : census report 1991

A	- Cultivators	0.87%
B	- Agrl. labourers	3.47%
C	- Fishing	22.2%
D	- Mining, quarrying	0.25%
E	- Man. processing	0.55%
F	- -do- other than hse. hold	18.9%
G	- Construction	10.1%
H	- Trade, commerce	15.3%
I	- Trnspt.,storage & commn.	10.8%
J	- Other services	17.3%

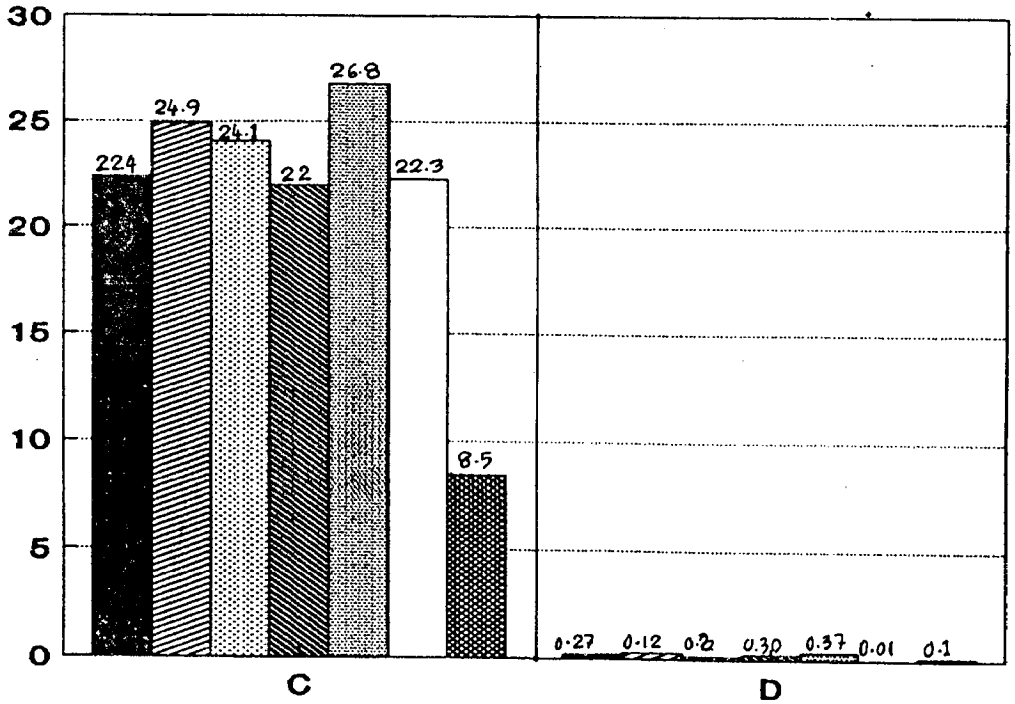
Occupational structure
Cultivators (A) & Agrl. labour (B)
(percentage wise)

FIG. 5.1.3b



Occupational Structure
Fishing (C) & Mining Quarrying
(percentage wise)

FIG. 5.1.3c

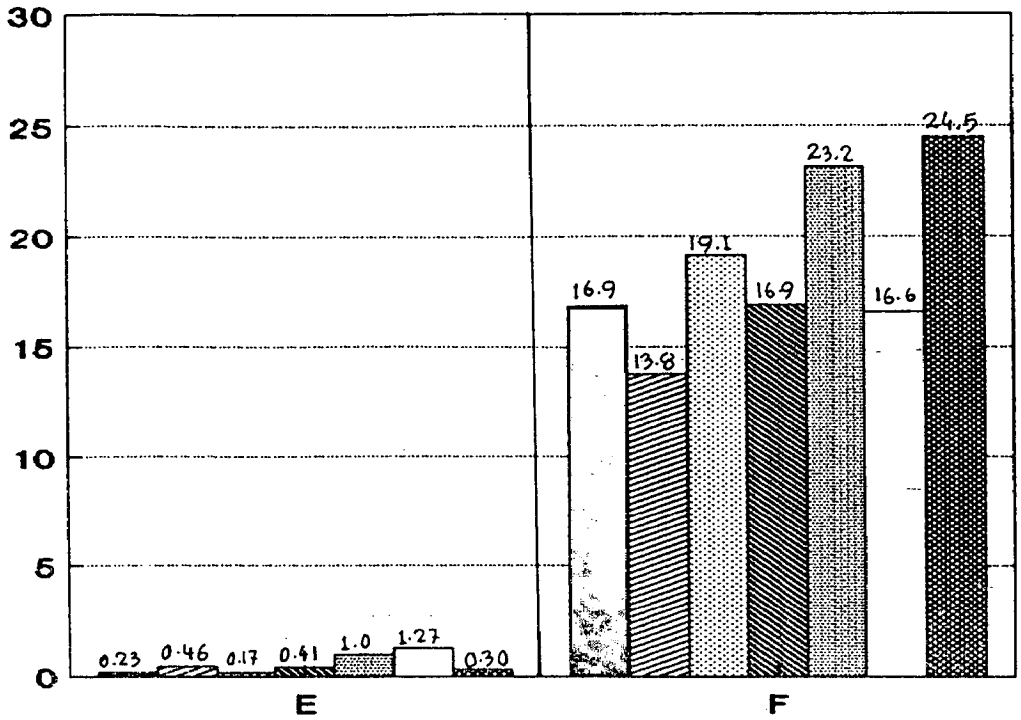


source :cenaus rept. 1991

Occupational structure

House hold ind.(E) & Other than hse. hold int. (F)

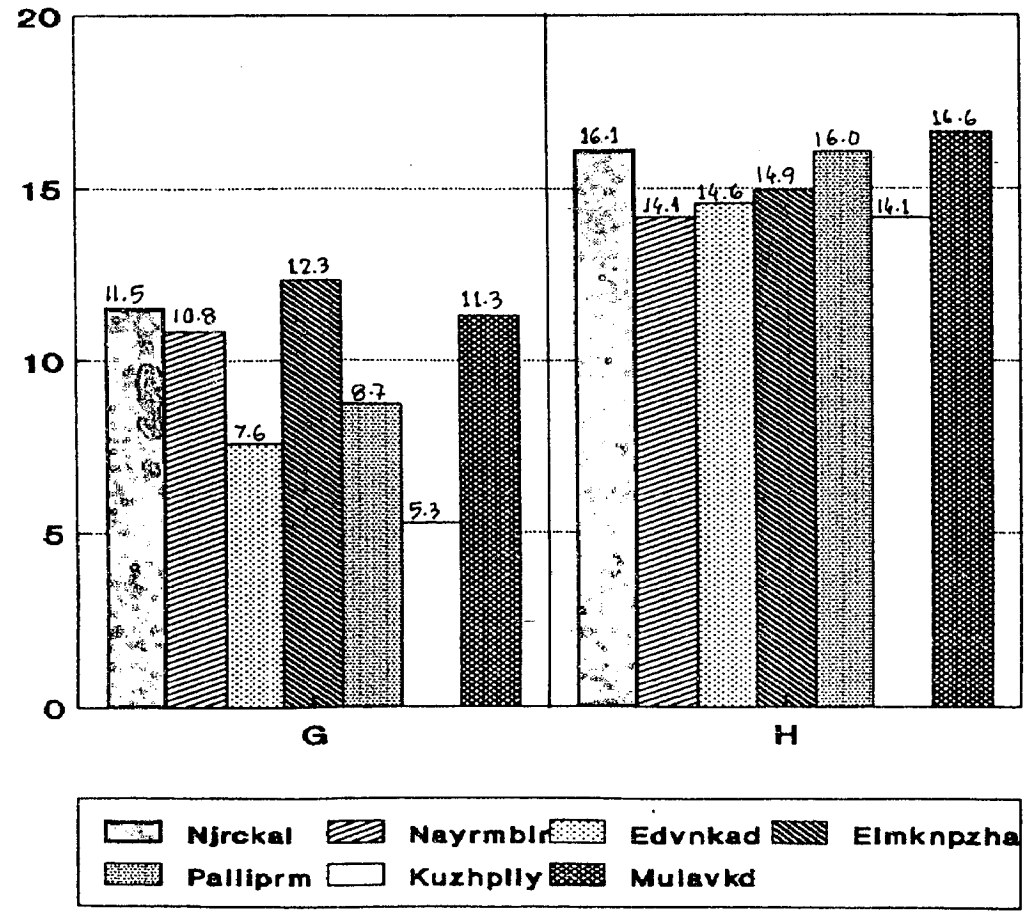
Fig 5.1.3d



Occupational Structure

Construction (G) & Trade - commerce (H)

Fig. 5.1.3e

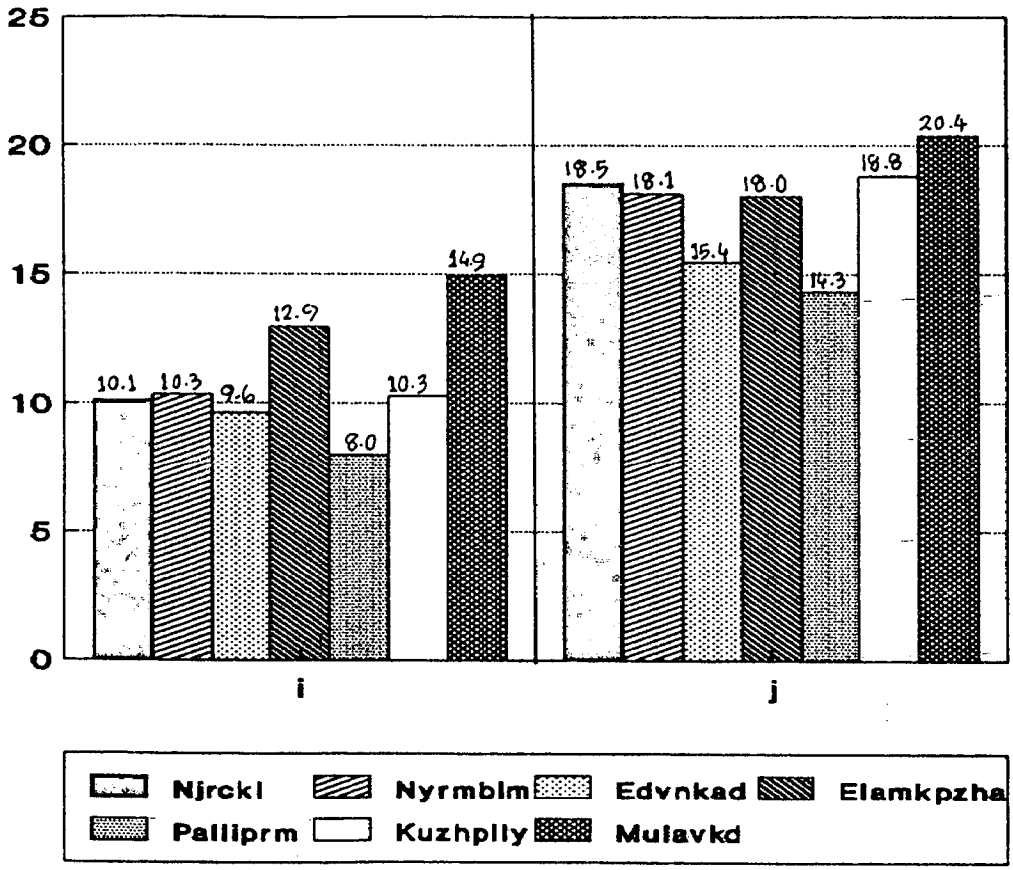


source : census report 1991

Occupational Structure

Trnspt. storage , commn.(I) & Other services (J)

Fig 5.1.3f



source : census rept. 1991

The detailed brake up of workers for Goshree islands as a whole and panchayat wise is shown in Fig. 5.1.3 a to 5.1.3b. Majority of the people are engaged in fishing, in all panchayats except Mulavukad.

The importance of fisheries in the islands economy, springs from three focal points which are

1 as a rich source of protein food

2. as a means of earning valuable foreign exchange and

3. as a field of vast employment potential.

5.2 INFRASTRUCTURE

5.2.1 Water Supply

Protected water supply is available in all the islands.The source of water supply for the islands is river periyar. There are 5 intake in the periyar from which water is supplied to the six zones of the greater Cochin region. There are 2 head works and treatment plants, one at Always (Capacity 48 million lts/day) and another at Chowara (capacity 22.5 million lts/day).

Water from the Alwaye treatment plant goes to the pumping station at kalamassery and from there it is collected in a ground level tank at Pachalam from where it is pumped to the islands.

Community taps are the major source of water for the inhabitants in all the islands. Industrial water connections are absent in the Islands. Even though adequate number of street hydrants (one street tap for 250 persons) are provided to cater to the needs of the present population, the supply is inadequate. The

level of water supply is less than 20 lpcd. Distribution of water to the islands through old AC pipes also is a health hazard.

The kerala water authority (KWA) which formed by reorganizing the public Health Engineering department is the principal agency which administers and executes water supply schemes in the area.

5.2.2 Sanitation

(a) Drainage

Being in the low land region with a mean elevation less than 4 meter above sea level easy natural drainage is not possible in the islands. During the monsoons many homesteads get waterlogged. The absence of a proper drainage network and blocking of natural flow caused by unauthorized land filling for house constructions are found to be the main causes for this situation. In certain areas, there is even a back flow from the water bodies into the drainage system during high tide period.

(b) Sewerage waste disposals

The sewerage systems in the central city is functioning only in 3 sq.km and serves only 600 households. None of the islands are covered in the severage system. The predominant sewerage disposal especially in the high density areas like Mulavukad is by individual septic tanks from the homesteads. In other islands even individual latrines are not available and the inhabitants use open fields for the purpose. As long as the population remains low, the environment will not be harmed much, but in islands with high population, it proves to be a health hazard. Pit latrines had been provided in some of the panchayats, but it had not been very popular.

WATER, WATER EVERY WHERE, BUT NOT A DROP TO DRINK

HOUSE WIFES USING HAND PUMP FOR TAKING WATER FROM COMMUNITY TAP

No facilities are available in the islands for the collection Of garbage. It is normally burnt within the homestead itself.

5.2.3 Electricity

Hydroelectric projects provides power in the state of kerala. Power supply is available in all islands. The transmission is through overhead lines. From the 220 KV substation at Kalamassery, electricity is transmitted to 66 KV substation at Mattancherry (capacity 16. M. V. A.) and Njarakkal (capacity 8 M.V.A.) and from there to 11 KV feeders, Since 66 KV feeding points are only 4 in number for the entire city, 11 K V feeders from these substations extend for long distances to feed load centres resulting in transmission losses of nearly 20%.

Based on the projections by Kerala State Electricity Board, the power availability of the state by 2000 A.D. would be only 11848 million units against the requirement of 17543 million units resulting in a shortage of 32.5% Hence measures for augmentation of power generation and improvements in the transmission and distribution systems are of major importance to overcome the crisis.

5.2.4 Road Transport

Pucca metalled roads are not present in the islands except Vypin .The road network in vypin is narrow. Improvement of the existing narrow roads posesses the problem as the area is almost completely built up. Frequent bus services to the main land are available in Vypin and are operated by the private sector.

Bus service operates within Vypin island also, from its southern tip to the northern tip. In all the other islands motor vehicles are absent, though cycles are common (Fig. 5.2.4).

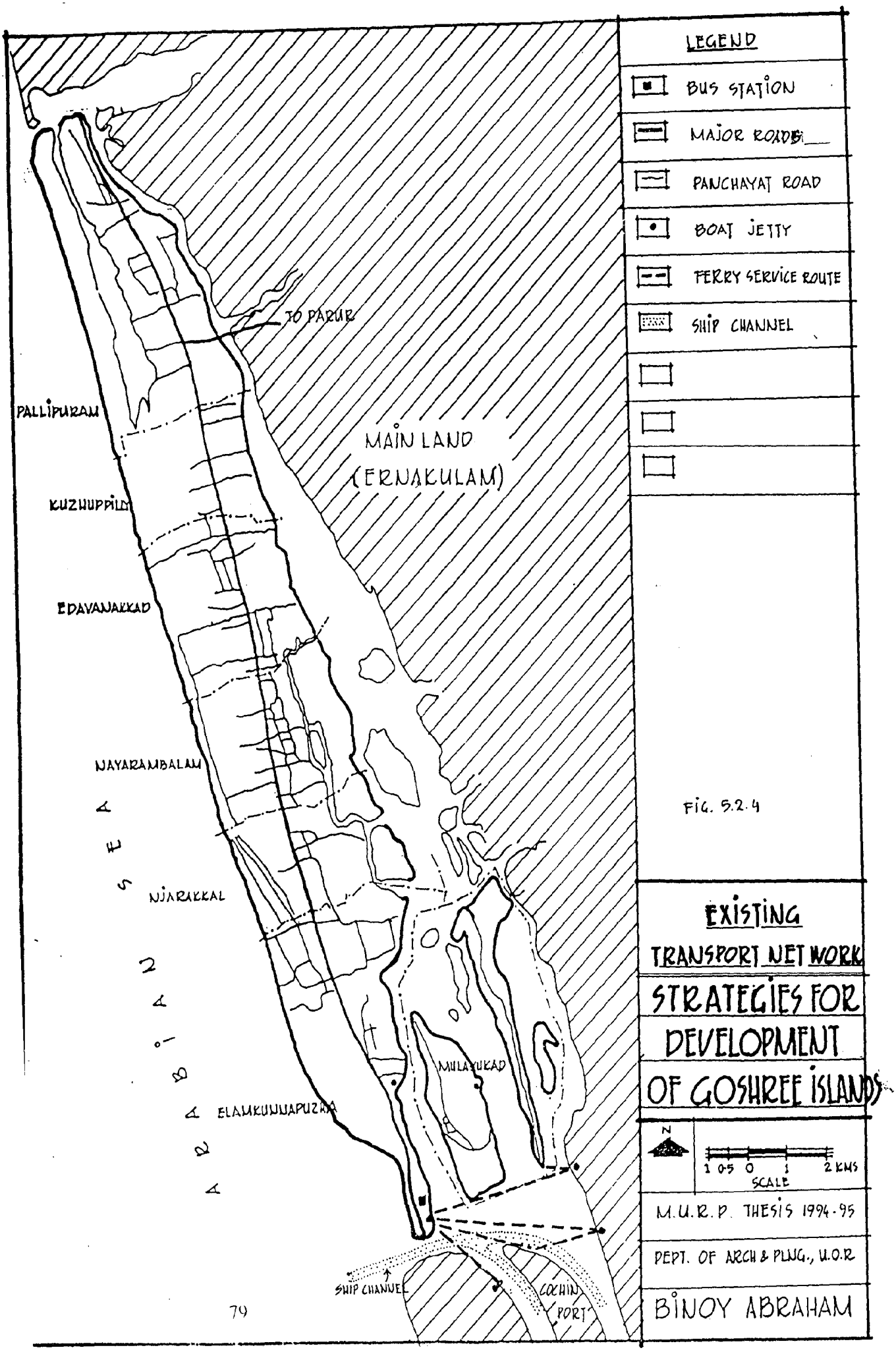
5.2.5 WaterTransport

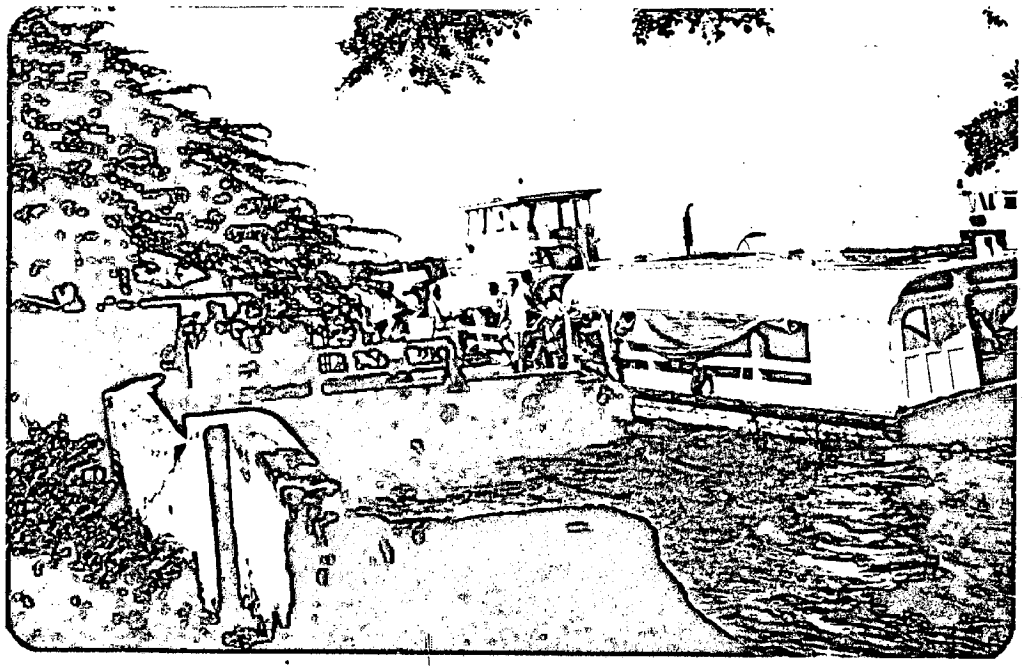
It has been estimated that there are about 7500 households in the islands who are dependent solely on water transport for their daily needs. Apart from commuting for work, this island population is dependent on water transport for movement of produce to and from the city markets. This is important since these islands are predominantly residential settlement with the primary economic activities of fishing and cultivation with a few clusters engaged in manufacturing of coir and brick making.

In addition to about 40,000 passengers, 1800 tonnes of cargo also are transported daily through the waterways in the region. It is significant that out of this cargo other than industrial raw materials are carried mainly by country crafts. Among passenger routes, the major water route is the Ernakulam Vypin route which carries about 25,000 passengers to and from the mainland daily. Ferry services are also available to Mulavukad, Vallarpadam. This, in addition to being slow is also very infrequent, though a relatively cheap mode of transport. In many islands, operation of motor boats become impossible in summers due to siltation.

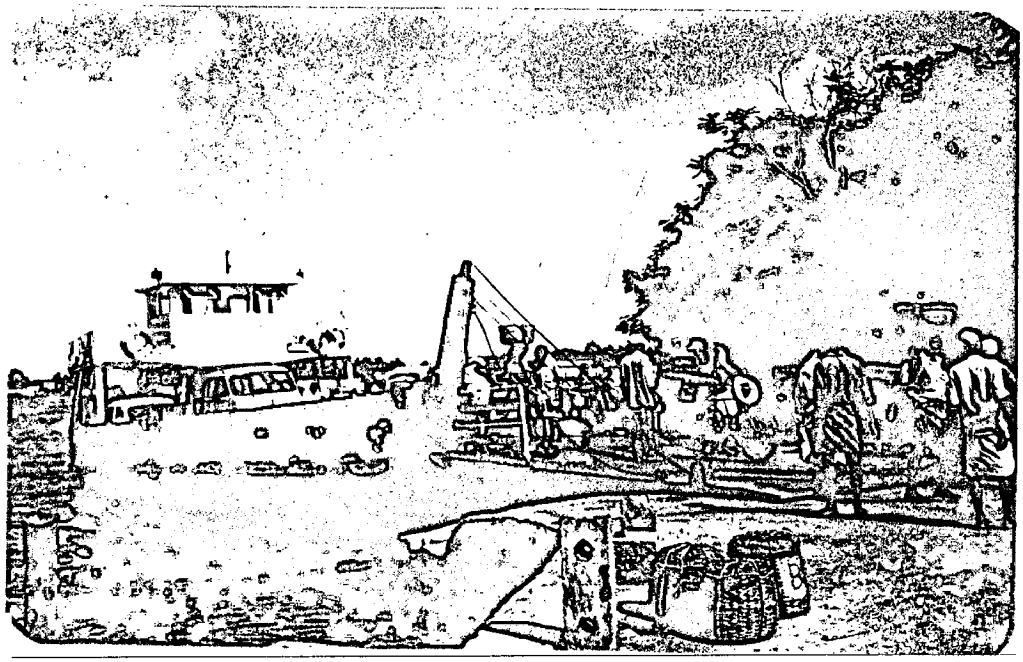
The following agencies are involved in the transportation of passengers and goods in the region. In addition to operating their fleets, these agencies also maintain their own terminal facilities.

1. The State Water Transport Department
2. The Water Wing of the kerala State Road Transport Corporation
3. The Kerala Inland Navigation Corporation (KINCO)
4. The Corporation of Cochin
5. Private agencies


LEGEND
BUS STATION
MAJOR ROADS
PANCHAYAT ROAD
BOAT JETTY
FERRY SERVICE ROUTE
SHIP CHANNEL
TO PARUR
PALLIPURAM
KUZHUPPILLY
EDAVANAKKAD
NAYARAMBALAM
NJARAKKAL
MULAVUKAD
ELAMKUNNAPUZHA
MAIN LAND
(ERNAKULAM)
ARABIAN SEA
SHIP CHANNEL
COCHIN PORT
FIG. 5.2.4
EXISTING
TRANSPORT NETWORK
STRATEGIES FOR
DEVELOPMENT
OF GOSHREE ISLANDS
N
1 0.5 0 1 2 KMS
SCALE
M.U.R.P. THESIS 1994-95
DEPT. OF ARCH & PLNG., U.O.R
BINOY ABRAHAM



ARRIVAL OF A BOAT FROM MAINLAND



A JANKHAR WITH VEHICALES AND PASSENGERS FROM MAINLAND

During peak hours an average of 250 to 270 people travel on boats which have a passenger capacity of about 85 persons, making it dangerously over crowded.It is evident that the fleet strength is grossly insufficient even to bear the present day traffic.

The different modes of transport are not properly integrated in these islands. Many of the landing places are not properly connected by roads. Absence of terminal/interchange facilities is a main problem of water transport facilities of the area.

5.3 COMMUNITY FACILITIES

5.3.1 Shopping:

There are adequate number of medium size shops to supply the daily needs in all islands except Thanthonni. These shopes are situated all along the main road Vypin - Munambam and concentrated at main junctions of each panchayat.

Government retail ration shops to distribute rice, wheat, kerosene oil and sugar are available in all wards of each panchayat. Whole sale shops are not available in these islands and for these purposes islanders are depending on Cochin market.

The weekly market of the area helps the people to buy and sell the local produces. The day for weekly market is different from panchayat to panchayat. This market is the place where the village produce is sold to others. The things sold are the produces like fish, tapioca and other vegetables and things which are not produced there.

The important commodities imported to these islands includes rice, sugar and oil. The important items which are exported are fish, coir and coconut.

5.3.2 Schools

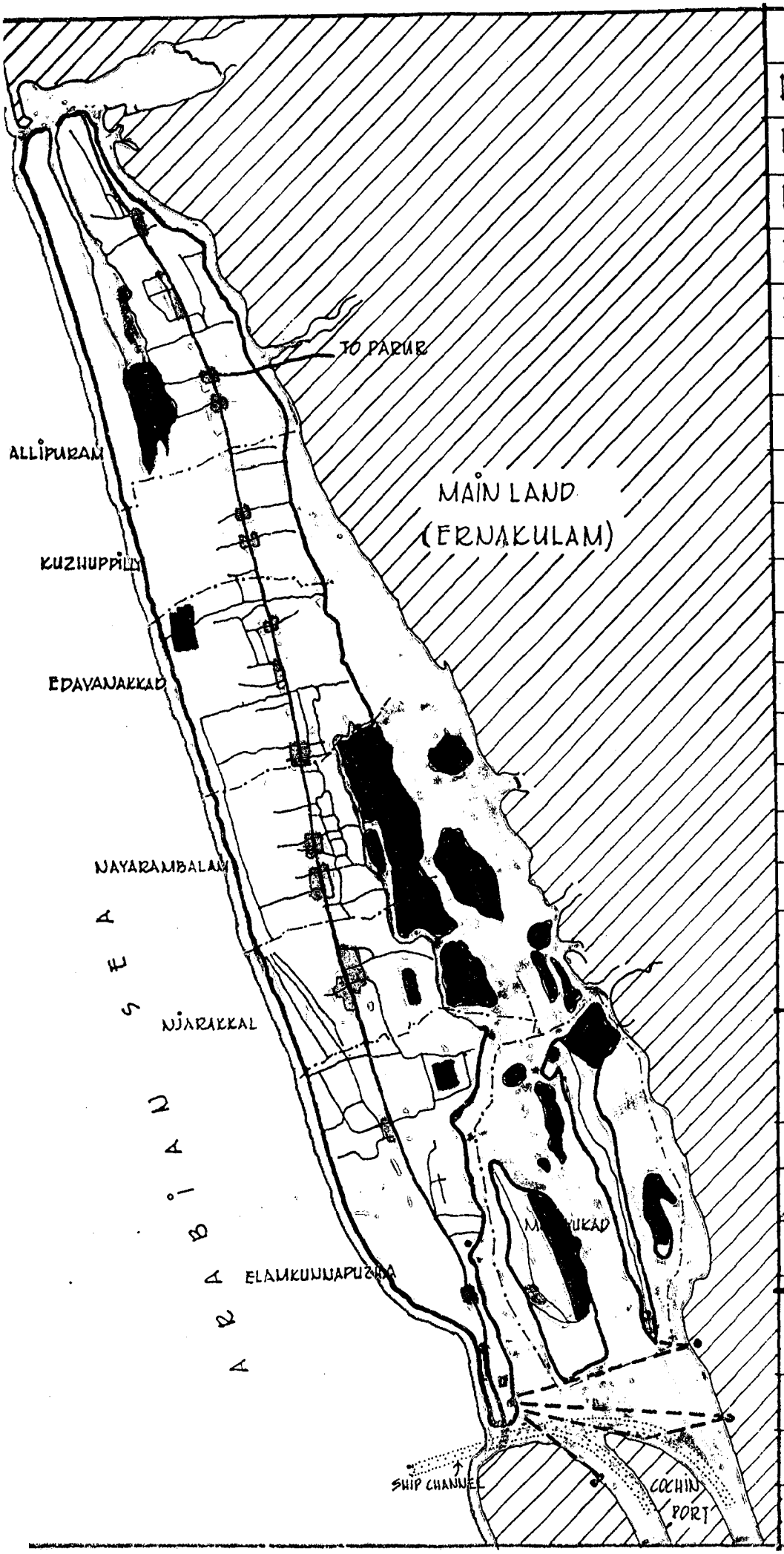
Adequate number of schools are available in all the islands owned by private management or government. Perhaps this may be the main factor which helped to attain hundred percent literacy in these islands. Even through the school education facilities are available- college level educational facilities are not available in the islands. For college level education. the islands are depending on the colleges of the main land.

5.3.3 Open spaces

There are no organised open spaces existing in the study area except the vacant land of the residential plots. There are no recreational facilities or playgrounds in the area. The beaches on the sea shore and the surrounding spaces of temples and churches serve the purpose.

5.3.4 Medical Facilities

Medical facilities such as maternity and child welfare centre, maternity house, primary health centre dispensaries etc are available in the island, but a good hospital with inpatient treatment is not available in the island. For these the islanders depends on the hospitals of the mainland. Patients who are in need of urgent medical attention are finding difficult to reach the hospital in time because they have to depend on the ferry service for commutation.



LEGEND

- BUS STATION
- MAJOR ROADS
- PANCHAYAT ROAD
- BOAT JETTY
- FERRY SERVICE ROUTE
- SHIP CHANNEL
- RESIDENTIAL
- COMMERCIAL
- INSTITUTIONS
- AGRL./OPEN SPACE
- BACK WATER

FIG. 5.4

EXISTING LAND USE

STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS

N

1 0.5 0 1 2 KMS
SCALE

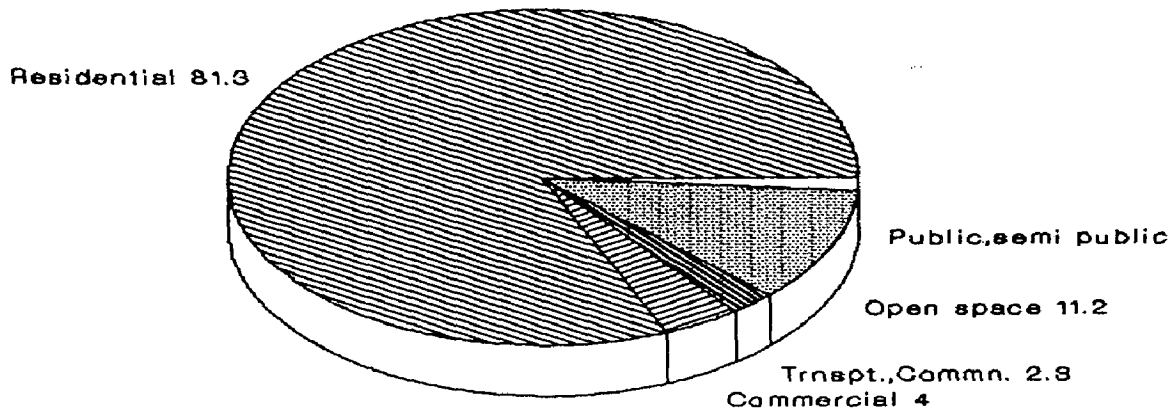
M.U.R.P. THESIS 1994-95

DEPT. OF ARCH & PLNG., U.O.R

BINOY ABRAHAM

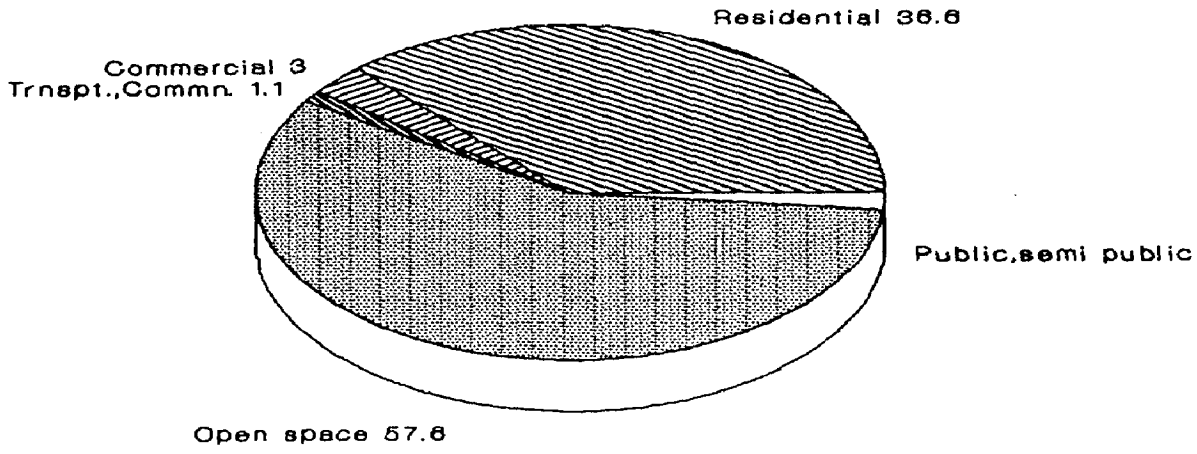
LAND USE BREAK UP
Pallipuram

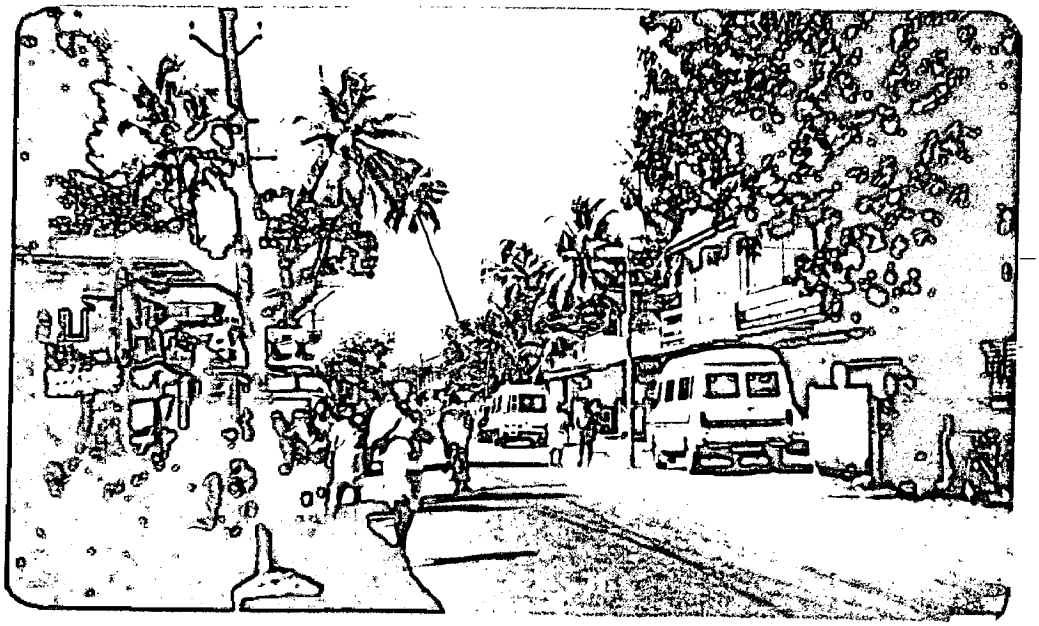
Fig. 5.4a



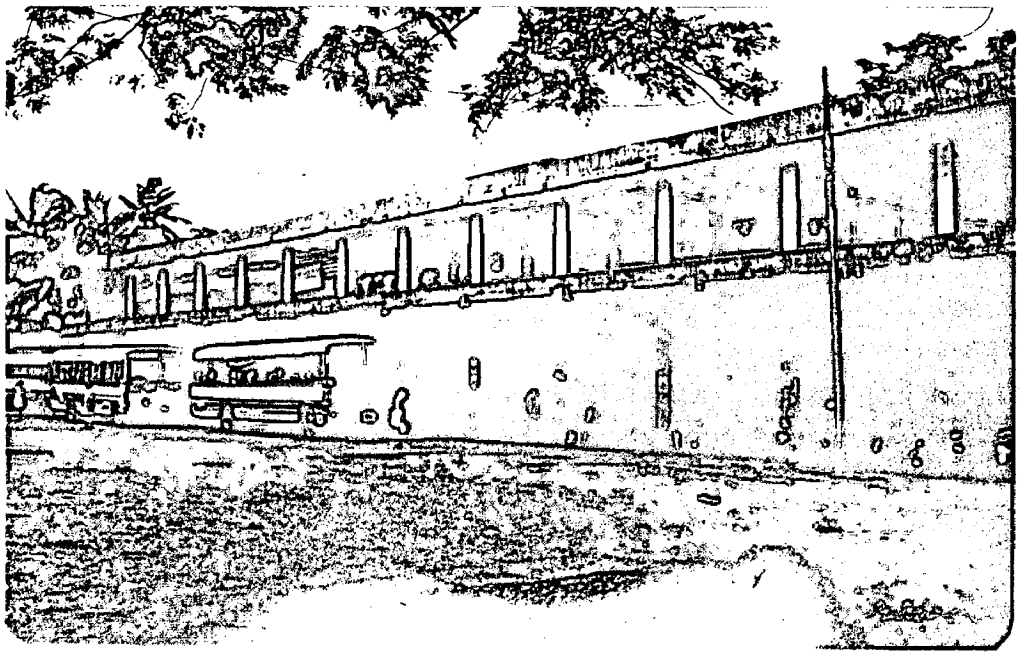
LAND USE BREAK UP
Kuzhippilly

Fig 5.4b





VEHICLES PARKED ALONG ROAD SIDE IN VYPIN ISLAND

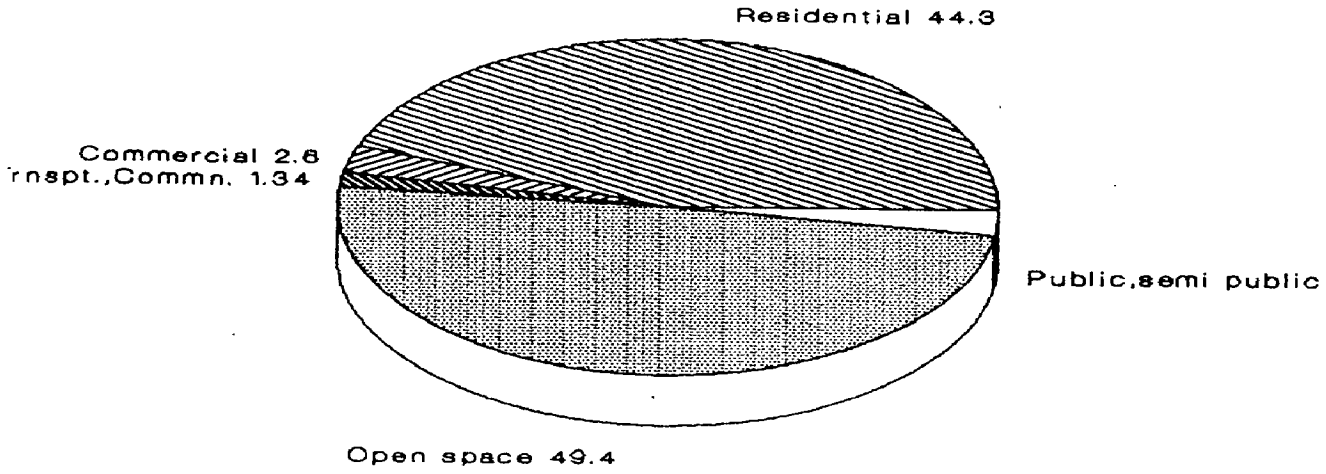


BUS STAND IN VYPIN ISLAND

LAND USE BREAK UP

Edavanakad

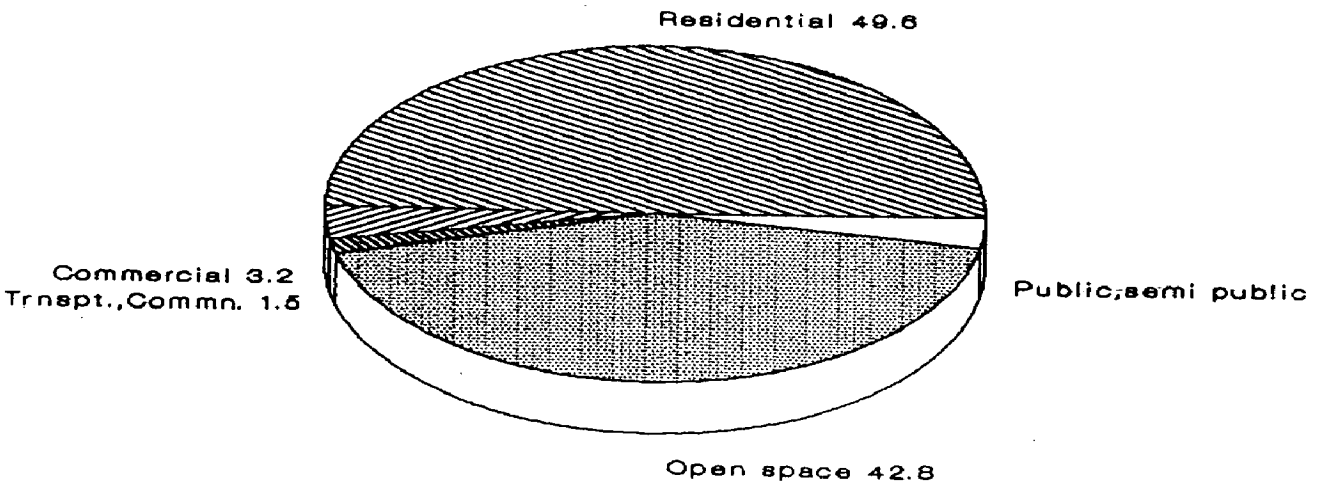
Fig. 5.4e



LAND USE BREAK UP

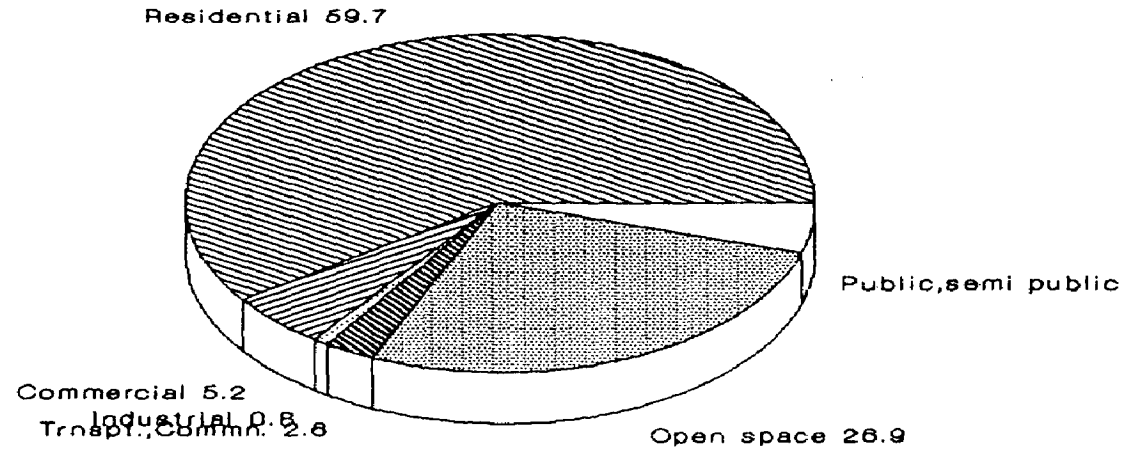
Nayarambalam

Fig. 5.4d



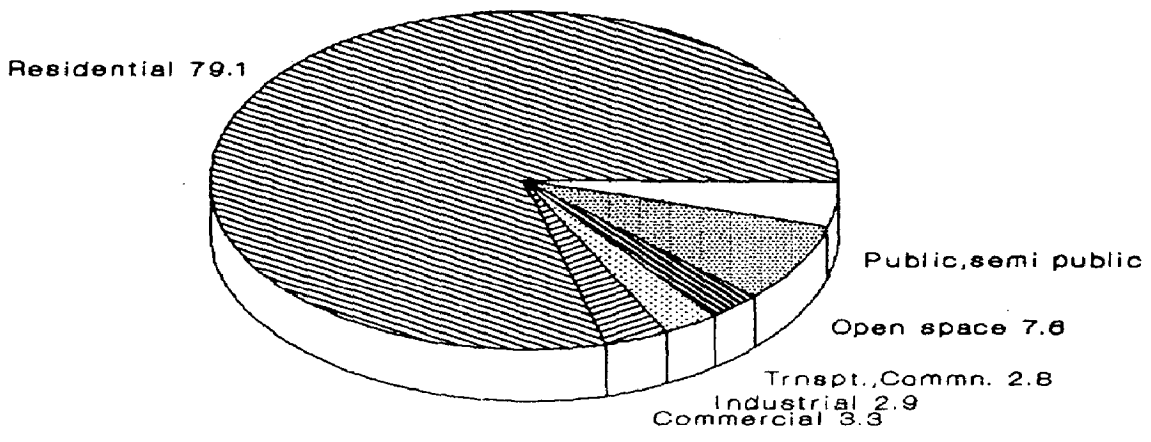
LAND USE BREAK UP
Njarackal

FIG. 5.4e



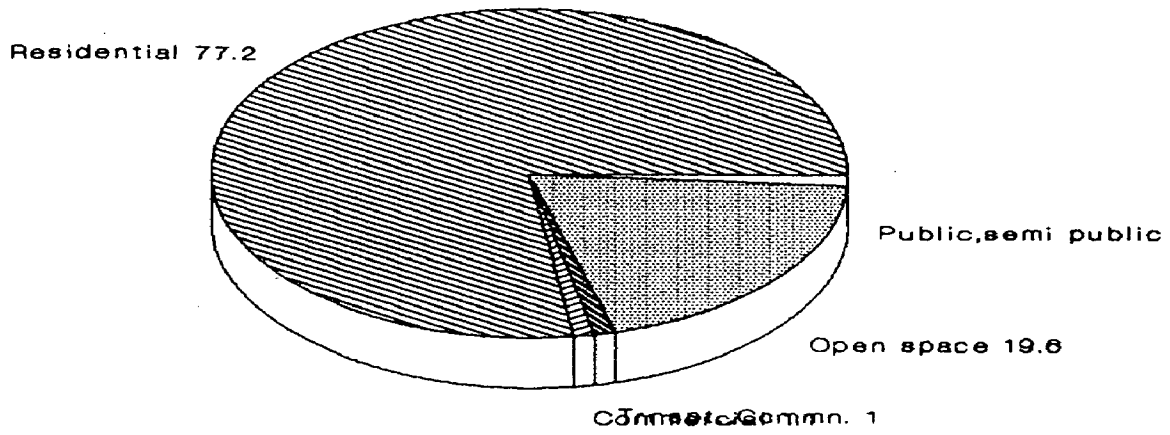
LAND USE BREAK UP
Elamkunnapuzha

FIG. 5.4f



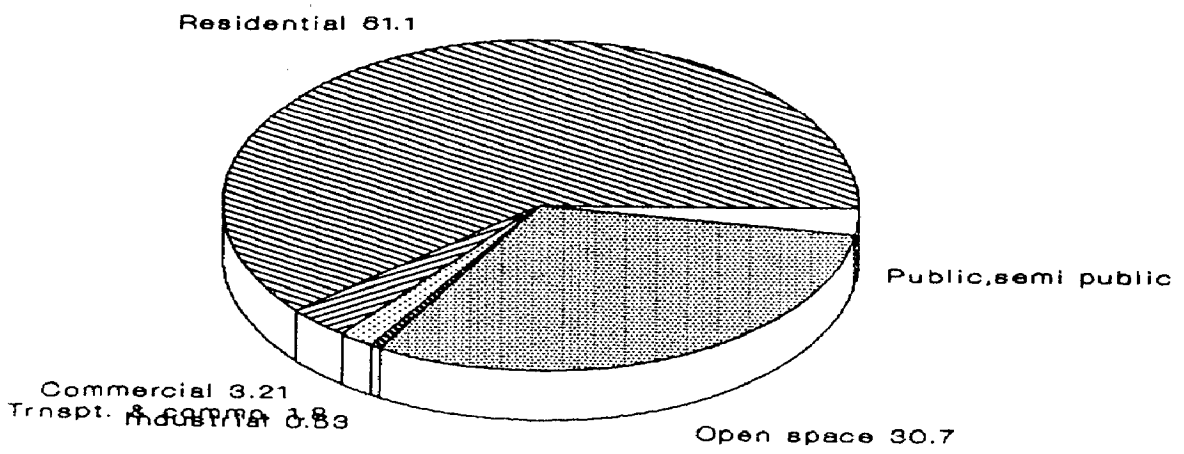
LAND USE BREAK UP
Mulavukadu

FIG. 5.4g



LAND USE BREAK UP
Goshree Island

FIG. 5.4h



5.4 LAND USE BREAK UP

The total area of Goshree Island is 8,73 sq hectares and it accommodates 1,88,808 persons at a density of 21.6 persons per hectare (2161 persons per sq km)

The existing land use for the various panchayat and Goshree island as a whole is shown in Fig. 5.4a to 5.4h.

5.4.1 Residential

Most of the area is under residential use. Out of the total area of 8,735 hectares, about 4095 hectares (61%) of land is used for residential use. The total population of 1,88,808 persons are accommodated in 35,610 houses, overall density is 2161 person per sq. km and net residential density is 4611 persons per sq. km.

5.4.2 Commercial

The total area under commercial use is 197.2 hectares (32%). These commercial activities are located all along the central road of Vypin with more concentration on each panchayat main road junctions.

5.4.3 Industrial

The total area which is put under industrial use is only 35 hectare (0.53) The segregation of the island from main land makes it difficult for import of raw materials or export of finished goods from industries. This may be the main reason for more industries being not located in the islands.

5.4.4. Transport & Communication

The total area which used for transport and communications is 114.5 hectares

(1.8%). This includes the main road of Vypin island running from extreme south to extreme north, the secondary roads from this to the sea shore on west and back waters on east, the tertiary roads which connects the different secondary roads and the areas utilised for bus stand and boat jetty.

5.4.5 Public & Semi Public

The area utilised for this purpose is 157.3 hectares (2.6%). This includes the area occupied by various administrative buildings. institutional and religious buildings.

5.5 CONSTRAINTS FOR DEVELOPMENT

The study and analysis so far made helps to list down the set of problems facing the present and future development of Goshree Islands (Fig. 5.5).

1. Communication

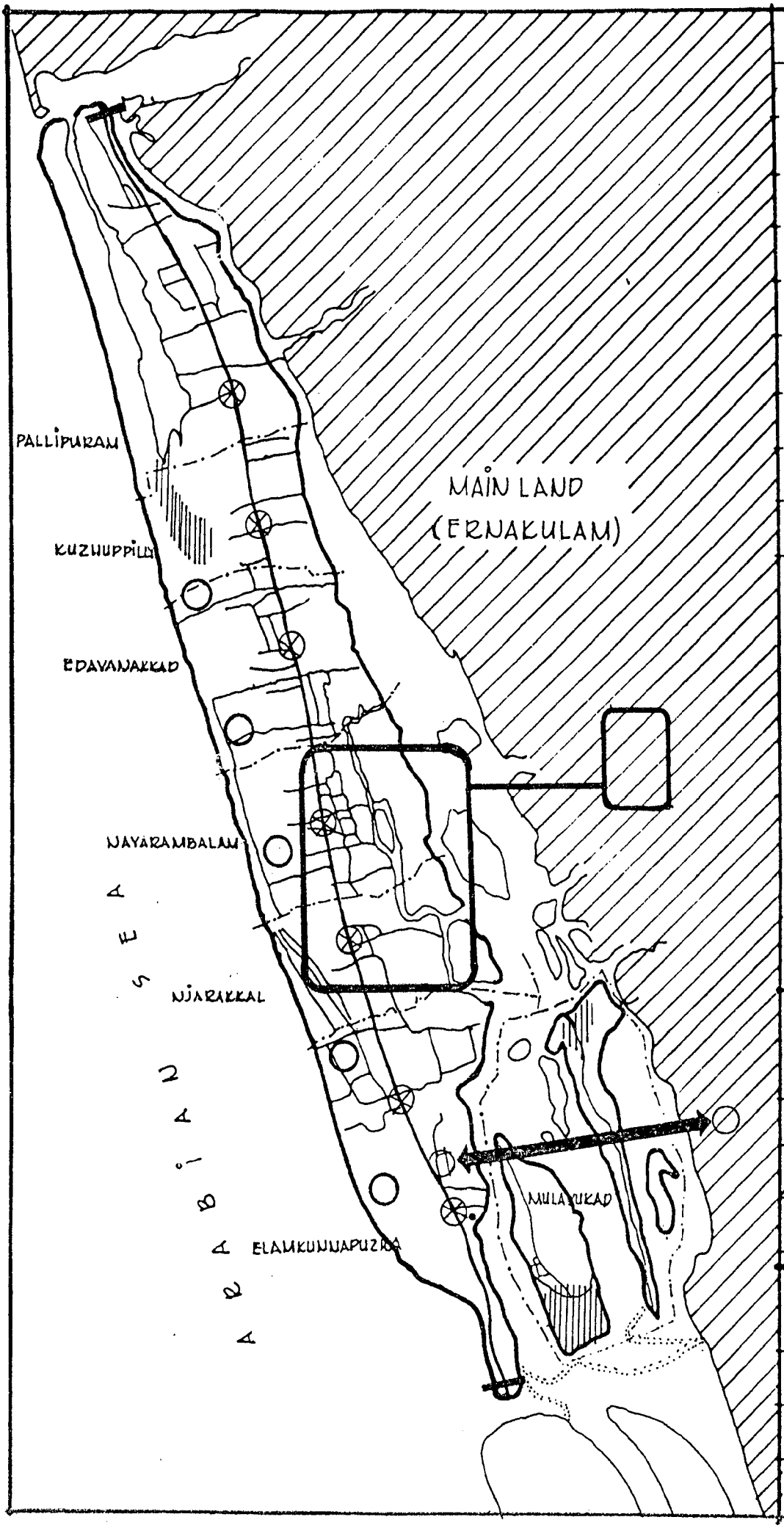
Absence of communication link between Goshree Islands and mainland, inefficient road net work, Bottlenecks, lack of parking facilities, irregular ferry services.

2. Inefficient Public Utilities

Such as water supply, sewage disposal, storm water drainage, refuse collection and disposal.

3. A Land Shortage

Competetion for land resulting from increase in population (The population is expected to increase by 30,000 without considering the migration from main land that may occure soon after the construction of the bridges). There is an urgent



LEGEND

COMMUNICATION

- BOTTLE NECKS
- CUL-DE-SAC SITUATION
- IRREGULAR FERRY SERVICE
- LACK OF COMMN. LINK

INEFFICIENT P.UTILITIES

- WATER SUPPLY
- SEWAGE DISPOSAL
- STORM WATER DRAINAGE

LAND SHORTAGE

- TO ACCOMMADATE PROJ. POP

HOUSING

- INADEQUATE IN
- QULITATIVE AND
- QUANTITATIVE

COMMUNITY SERVICES

- INADEQUATE - HEALTH, RECREATION, SERVICES

SOCIAL STRUCTUE

- UNDER DEVELOPED H.RESOU

PHYSICAL CONSTRAINTS

- SWAMPY LAND
- BACK WATER, LOW BEARIN
- CAPACITY OF SOIL, EROSION

LOCATIONAL FACTORS

- WORK CENTERS ARE ON MAIN
- INADEQUATE EXPLOITATION OF TOURISM POTENTIAL
- INADEQUATE UTILIZATION OF RESOUR

FIG 5.5

DEVELOPMENT CONSTRAINT

STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLA

N

1 0.5 0 1 2 KMS

SCALE

M.U.R.P. THESIS 1994-95

DEPT. OF ARCH & PLNG., U.O.R

BINOY ABRAHAM

need to create more land for various uses.

4. Housing

Inadequate both in quantitative and qualitative aspects Improve housing environment.

5. Inadequate Community Services

Such as Health, Recreaction, Markets

6. Social Structure

Community neglect, low economic level, under-developed human resources, lack of college level educational facility.

7. Physical Constraints

Such as back water, swampy land, erroding and silting of soil creeks and low bearing capacity of the soil.

8. Locational Factors

Employment opportunities are less in Islands. Most of the work centers are located in main land. Because of the commuting hazards, socio-economic problems are created.

9. Inadequate Exploitation of Tourisum Potential

10. Inadequate Utilisation of (fish) Resources

5.6 Threshold Analysis

The Christallers central place theory perhaps is the most important theory of empirical nature which try to explain the spatial aspects of socio and economic growth. But this theory, by its complete exclusion of territory activities and important growth inducing factors like transportation etc. does not cater to the growth inducing factors.

The growth pole theory based on growth centre policy is fast gaining acceptance in the developing nations. But the growth poles transplanted in such economies, remained poles without a deeply rooted broad base, the propulsive industries located in the pole have failed to diffuse development in the hinterlands.

It is necessary to identify local potential pertaining to growth in terms of resources as well as constraints. Resources here denotes the total sum of all physical, organizational, man made as well as natural, technological as well as non technological means available for use in the process of development. Constraints similarly denote these aspects that delay the process of development as such. Threshold analysis is the technique adopted here to ascertain the local potential.

5.6.1 Identification of Thresholds

Based on the concept of spatial structure, thresholds could be broadly categorised into three main types viz.

a) physical thresholds

b) economic thresholds and

c) social thresholds

a) Physical Thresholds:

Conditions prevailing in physical space such as, physiography of land as hilly terrain, slopes, marshy lands etc. all affect the development costs of such lands and these costs are higher than the normal costs of developments, At sub regional level land suitable for development would be that land where the land is comparatively plain while predominantly hilly terrain or marshy land would incur additional costs for the laying of necessary infrastructure as roads, water supply and sewer lines, house construction etc. The potential of an area for development are thus assessed by making such areas on maps are thought to be difficult for development. Areas of such lands can be calculated and their percentage in total land area found. This would provide area wise land available for development. The percentage of land available and the percentage of culturable land available of each panchayat are considered in analysis under this category.

b) Economic thresholds

Factors of local space economy the existing conditions of which affect the development process, thus in general making the cost of development more or in other words warrant, additional resources, financial or otherwise could be said to be economic thresholds. As an example extra ordinarily low levels of living of an area would make it essential, to invest in creation of basic infrastructure thus increasing the development costs in that particular area. Take the example of an area lacking in supply of electricity. Any economic activity envisaged in this area would first make it necessary to create power supply network thus adding the requirement of finance as well as other resources as trained manpower etc.

Similarly, extreme poverty conditions of an area would, as per the well known visual circle of poverty, affect the savings capacity of the population in turn affecting, the economic capacity of the area to invest and make the capital available. Such an area obviously involve, additional resource requirements and thus can be called a threshold area. The important task then is of setting standards for judging what can be called as below average economic situation calling for additional investments. The percentage of working population to total population percentage of people engaged in fishing, road length (puck) per sq km, distance to the nearest market town etc. are analysed under this category in this study.

c) Social thresholds

The thresholds of social nature, though,similar to economic thresholds are of even more complex nature, it being so difficult to decide what could be called as a social standard. However, it should always be possible to decide what could be termed as a desirable social level of a factor relative to which occurance of a threshold could be judged and classified. Social thresholds need to be viewed along with economic thresholds and not in isolation as the two are likely to be complimentary and often over-lapping. The number of house holds per 100 persons, population between the age(0-6),% of SC,ST population, number of primary schools per 1000 population of Age 0.6 are analysed under this category.

5.6.2 Threshold Identification Technique

The technique adopted is a quite simple statistical technique that makes use of the analytic method of standard deviation for finding the standard meassure of dispersion of a particular variable with differing values in its spatial

THRESHOLD ANALYSIS

A - VALUE IN %/UNITS/NOS
B - VARIATION

SELECTED INDICATORS / GROWTH AREAS		(1) LAND SUITABLE FOR DEVELOPMENT %	(2) CULTURABLE LAND AVAILABLE %	(3) NO: OF HOUSE HOLDS PER 100 PERSONS	(4) POPULATION WITHIN THE AGE (0-6)	(5) % OF SC/ST TO TOTAL POPN.	(6) WORKING POPN.%	(7) PEOPLE ENGAGED IN FISHING. %	(8) PUCKA ROAD LENGTH KM. PER 100SQ KM AREA	(9) AS-DISTANCE TO THE NEAREST MARKET TOWN	(10) NO. OF PRIMARY SCHOOLS PER 1000 CHILDREN OF AGE (0-6)
NJARACKAL	A	71.70	28.29	18.93	10.88	15.40	27.9	22.39	1.09	16.0	2.40
	B	-2.60	-8.38	-0.06	0.1	1.41	0.01	0.84	0.28	-1.28	-054
NAYARAMBALAM	A	69.4	56.21	18.30	10.12	16.48	28.80	24.93	0.73	15.0	2.44
	B	-4.90	19.54	-0.69	-0.66	2.49	0.911	3.38	-0.08	-2.28	-050
EDAVANAKKAD	A	81.97	21.62	18.57	11.62	18.86	28.5	24.07	0.60	12.0	1.31
	B	7.67	-15.05	-0.42	0.84	4.87	0.61	2.52	-0.21	-5.28	-163
ELAMKUNNAPUZHA	A	88.14	45.46	18.73	11.15	9.54	27.3	21.98	1.11	18.0	2.81
	B	13.84	8.79	-0.26	0.37	-4.45	-0.59	0.43	0.31	0.72	-0.13
PALLIPURAM	A	73.1	26.89	19.05	11.03	8.53	28.6	26.78	1.09	20.0	2.65
	B	-1.2	-9.78	-0.06	0.25	-5.46	0.71	5.23	0.28	2.72	-0.29
KUZHIPPILLY	A	7.68	23.22	20.31	10.27	15.67	28.9	22.26	0.60	17.0	6.81
	B	2.5	-13.45	1.32	0.51	1.68	1.01	0.71	-0.21	-0.28	3.87
MULAVUKAD	A	59.0	55.0	19.03	10.42	13.45	25.20	8.46	0.46	23.0	2.5
	B	-15.3	18.33	0.04	-0.36	-0.54	-2.69	-13.09	-0.35	5.72	-0.79
MEAN	$\bar{x}$	74.3	36.67	18.99	10.78	13.99	27.89	21.55	0.81	17.28	2.94
STD. DEVIATION	SD	8.64	13.98	0.59	0.14	3.48	1.21	5.58	0.13	3.28	1.63

SEVERE THRESHOLD AREA ○ IF VARIATION $\geq$ $^{-}$(STD. DEVIATION)
MILD THRESHOLD AREA ◐ IF VARIATION BET. 0 AND $^{-}$(STD. DEV.)
AVERAGE CAPACITY AREA ○ IF VARIATION BET. 0 & $^{+ve}$(STD. DEV.)
SURPLUS CAPACITY AREA ● IF VARIATION $\geq$ $^{+ve}$(STD. DEV.)

dispersion. The stages involved are

a) For a given indicator the highest and the lowest values were noted, giving the total range of variation.

b) the arithmetic mean value $\bar{X}$ of all values were noted.

c) variation from the mean positive or negative were noted,

d) the standard deviation were found as, standard deviation

$$\sqrt{\frac{(Xi - \bar{X})^2}{n}}$$

Where,

$\bar{X}$ = arithmetic mean

Xi = noted value of the variant

n = number of values noted

The statistical definition of the standard deviation is given as the square root of the arithmetic mean of the square of the deviation from the mean. In simpler words deviation means the measure of dispersion as such standard deviation means, standard measure of dispersion.

As given in it the thresholds now can be identified in two categories viz. severe and mild. All the values that deviate from the mean, on the negative side, for a factor having positive co-relation are indicative of threshold values; while for a factor having negative co-relation with the developmental aspects as infant mortality, deviation from the mean on the positive side would be indicative of thresholds as, high rates of infant mortality are category of development. While selecting indicators, all factors having positives co-relations can be selected, or they could be mixed. Based on the variation extents two categories of thresholds, and two other categories is the absence of thresholds viz. Average and

Surplus capacities are identified. It may be noted that, this typology is relative within itself and not absolute. As such an area showing surplus capacity would indicate its capacity in relation to other areas, and not otherwise. The variation classification is ranged between two polarities of double values of standard deviation on negative and positive sides. The range which is taken as the standard is between mean and one standard deviation value, on the positive side for a positive co-relation factors and vice-versa for a negative co-relation factor. With this analytic technique the process of threshold identification and classification was carried out in the selected factors The chart no 5.5.2 describes this technique.

5.6.3 Assessment of Development Potentials

In the assessment of potentials it becomes necessary to grade the typological variants in some scale. The technique for assigning weightages to the categories in spatial patterns used in the case study is based on assigning varying points to each category and then obtaining total across of each area to give its relative position on the potential scale. Efforts is made here to explain the underlying reasoning. The two polarities fixed in the threshold identification were first considered against each other in terms of their effect on developmental process. It may be mentioned that the implications or negative effects of a severe threshold would be more in overall impact on development than the positive impacts of a surplus capacity. One is indicative of extreme inertia while the other relates to relative momentum. As such it was thought to give more negative weightage to severe thresholds category than positive weightage given to surplus capacity. Having decided the relative weightage of the polarities the task of actual assignment of points was taken up. For this it was considered to keep the

overall range in the normal perceptual limits so as to most effectively express the potentialities. As such it was thought desirable to limit the range to around 50 on each side or so. Hence, considering the number of indicator i.e. 10 the points of (-) 5 for severe threshold category, thus limiting the extreme score on the negative scale to a maximum of 50 and then points 4 for surplus capacity as per the earlier reasoning of assigning lessor positive weightage, to this category, thus limiting the positive maximums to 40 was decided. Within this range the points for other two categories, viz, mild thresholds and average category was done. Mild threshold was assigned (-) 1 point because it was thought that this category on the negative side involves much less negative impact on total development as growth can be said to be already underway in such areas. Similarly, the average capacity was assigned (+) 3 points as this category appears to be the most desirable one keeping the overall aims of developments. Based on this reasoning the point scale was devised and across of each growth area obtained as given in the Chart number 5.5.3.

VI

STRATEGIES AND PROPOSALS

CHAPTER - VI

STRATEGIES AND PROPOSALS

6.1 STRATEGIES BASED ON THRESHOLD ANALYSIS

The assessed development potential of areas would reflect. the fast developing, moderately developing and slow developing areas. The aim of such a hierarchy is to identify the momentum of growth,areas of intense inertia and in general should help in picking new locations for economic activity in the aim of decentralization and maximization and equitable distribution of resources.

a) Areas of average development potential

As per the analysis, the panchayats, Njarackal, Elamkummapuzha and Pallipuram are the areas with average development potential (Fig.6.1 a). These areas would be characterised by their potential for high growth that has not been fully realized due to physical or organizational constraints. In the development scale, these areas are to be considered as the most promising areas. As the nature of constraints of these areas would not be of outstanding nature,schemes for development in such areas, thus need to be given priority as they offer optimal returns in reasonable investments without the fear of increased concentration.

b) Areas of Low Development potential

The Kuzhipilly panchayat of Goshree islands comes under this category (Fig. 6.1 a). These areas differ from areas with average development potential in the intensity of constraints encountered by them which is more than that of average areas. These areas along with average areas, should be given priorities. The proportionate share of investment of these areas hence should be the same as of average development potential area.

c) Problem areas

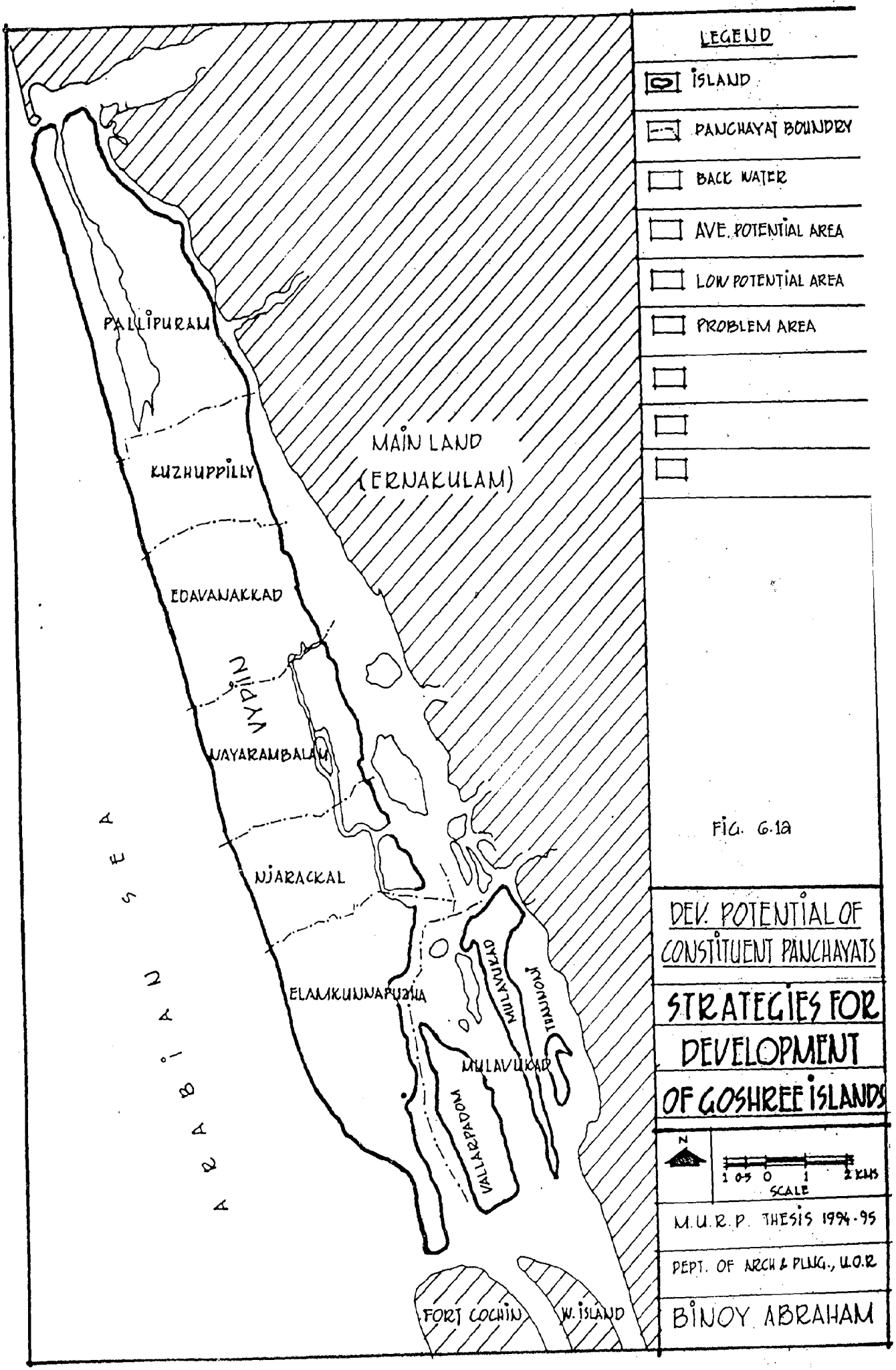
The panchayats of Edavanakad, Nayarambalam and Mulavukad comes under this category as per the threshold analysis (Fig.6.1 a). The constraints of both physical and organizational nature of extra ordinary scale would need tackling before normal process of growth could be under way. Investments made to activate such areas, due to their extreme state of inertia would be large in quantum, at the same time not much of returns could be expected from them, as it would be for creation of basic infrastructure. Investments of lesser quantum are likely to be ineffective.

The Strategy aiming at maximization and equitable distribution of resources can be listed in general as (Fig 6.1 b)

1. Maintain the existing levels of development of high potential areas, without further increase in their growth.
2. Accelerate the development process in the average and low potential areas, by providing alternatives in the location of industrial and economic activities as well as by providing necessary infrastructural facilities.
3. Concentrate on preferred problem areas, by satisfying their critical needs and create basic infrastructure that is conducive to growth such as road network urban nodes, credit facility for local trade and economic activities etc.

6.2 STRATEGIES BASED ON LINKAGE OF ISLANDS

The linkage of islands to main land by road is considered to be the most important aspect for the development of these islands. By making four bridges, the islands can be connected to the mainland. There by the islanders who are commuting daily to mainland through ferry services for their medical, educational, and employment needs can reach the mainland easily through roads.


LEGEND
ISLAND
PANCHAYAT BOUNDRY
BACK WATER
AVE. POTENTIAL AREA
LOW POTENTIAL AREA
PROBLEM AREA
PALLIPURAM
KUZHUPPILLY
EDAVANAKKAD
VYPIN
NAYARAMBALAM
NJARACKAL
ELAMKUNNAPUZHA
MULAVUKAD
VALLARPADOM
MAIN LAND
(ERNAKULAM)
FORT COCHIN
W. ISLAND
ARABIAN SEA
FIG. 6.12
DEV. POTENTIAL OF CONSTITUENT PANCHAYATS
STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS
N
1 0.5 0 1 2 KMS
SCALE
M.U.R.P. THESIS 1994-95
DEPT. OF ARCH & PLNG., U.O.R
BINOY ABRAHAM

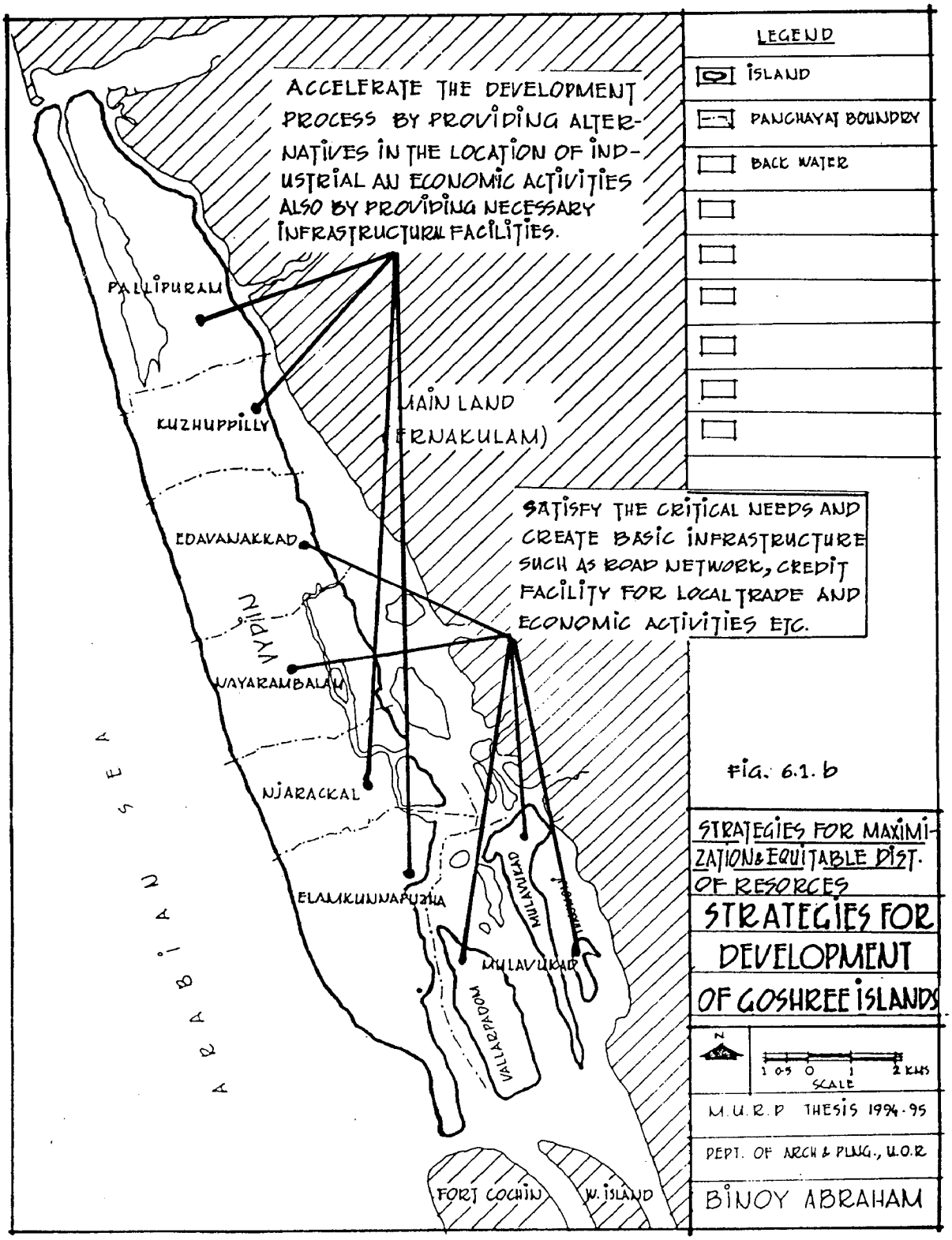


Fig. 6.1.b

STRATEGIES FOR MAXIMIZATION & EQUITABLE DIST. OF RESORCES

STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS

M.U.R.P THESIS 1994-95

DEPT. OF ARCH & PLNG., U.O.R

BINOY ABRAHAM

Moreover Vypeen being the major fishing centres which provide fish to the entire city and its hinterland, providing road access will reduce the traffic on the water route and lead to faster transportation of the fish catch from the landing centres to the other areas.

The location of bridge has a predominant role in physical as well as socio-economic development of island and also on its impact on mainland. The alternate locations of bridges under consideration now are

Strategy A: Connect north end of Elamkunnapuzha panchayat to the northern tip of Vallarpadom and cross Mulavukad island to reach NH 17 and NH 47 as envisaged in structure plan of central city of Cochin.(fig6.2a).

Strategy B : Connect Elamkunnapuzha panchayat to the CBD of Ernakulam across the islands of Vallarpadom, Mulavukad and Thanthonni (fig 6.2.b). This is the proposal put forward by GIDA. (Goshree Island Development Authority).

The cost analysis of crossing the thresholds are based on per capita cost of the population which needs an up-to-date knowledge of building costs and of the existing condition of the environment. Due to the lack of such information the application of the threshold theory remains limited in this study. However, an attempt is made to highlight the various categories of thresholds in each category and evaluate them in comparing advantages and disadvantage.

Physical Thresholds

Strategy A It would require immediate reclamation of land for extending Vallarpadom Island upto bridge.

The reclaimed land could be used for providing community facilities and public utilities.

Strategy **B** The link could be provided with out much reclamation.

Sale of reclaimed land between mainland. Thanthonni and Mulavukad will help to raise enough fund for the construction of bridges.

Technological Thresholds

Strategy **A** Existing transportation system requires redesign

Existing water transport is to be maintained.

C.B.D. of Ernakulam will be effected less because of island development.

It will be convenient for islanders to commute to the work places in mainland.

Strategy **B** Pressure on C.B.D. of Ernakulam will increase considerably.

Commercial activities may be extended upto Vypeen island.

Existing transport is to be extended to mainland.

Structural Threshold

Strategy **A** Traffic pressure on point of linkage of bridge (Northen and of End of Elamkunnapuzha panchayat) will increase considerably and could get dispersed towards south and north of Vypeen Island.

Natural development may took place towards south and north

Strategy **B** Thanthonni island could act as the extended C.B.D. of Ernakulam Mulavakad island could be developed as a tourist centre.

Advantages and Disadvantages of strategies

Advantages

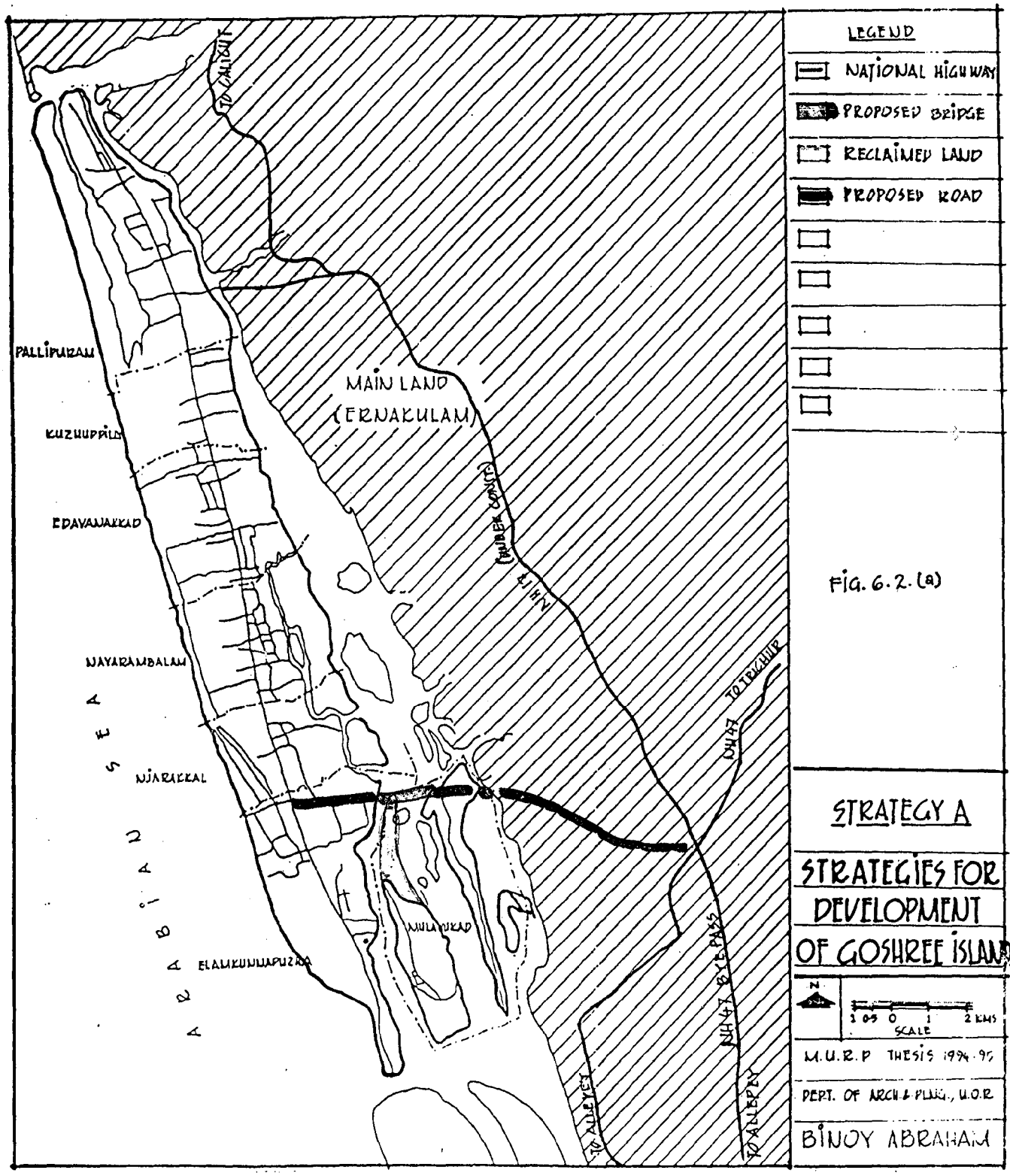


Fig. 6.2.(a)

STRATEGY A

STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS

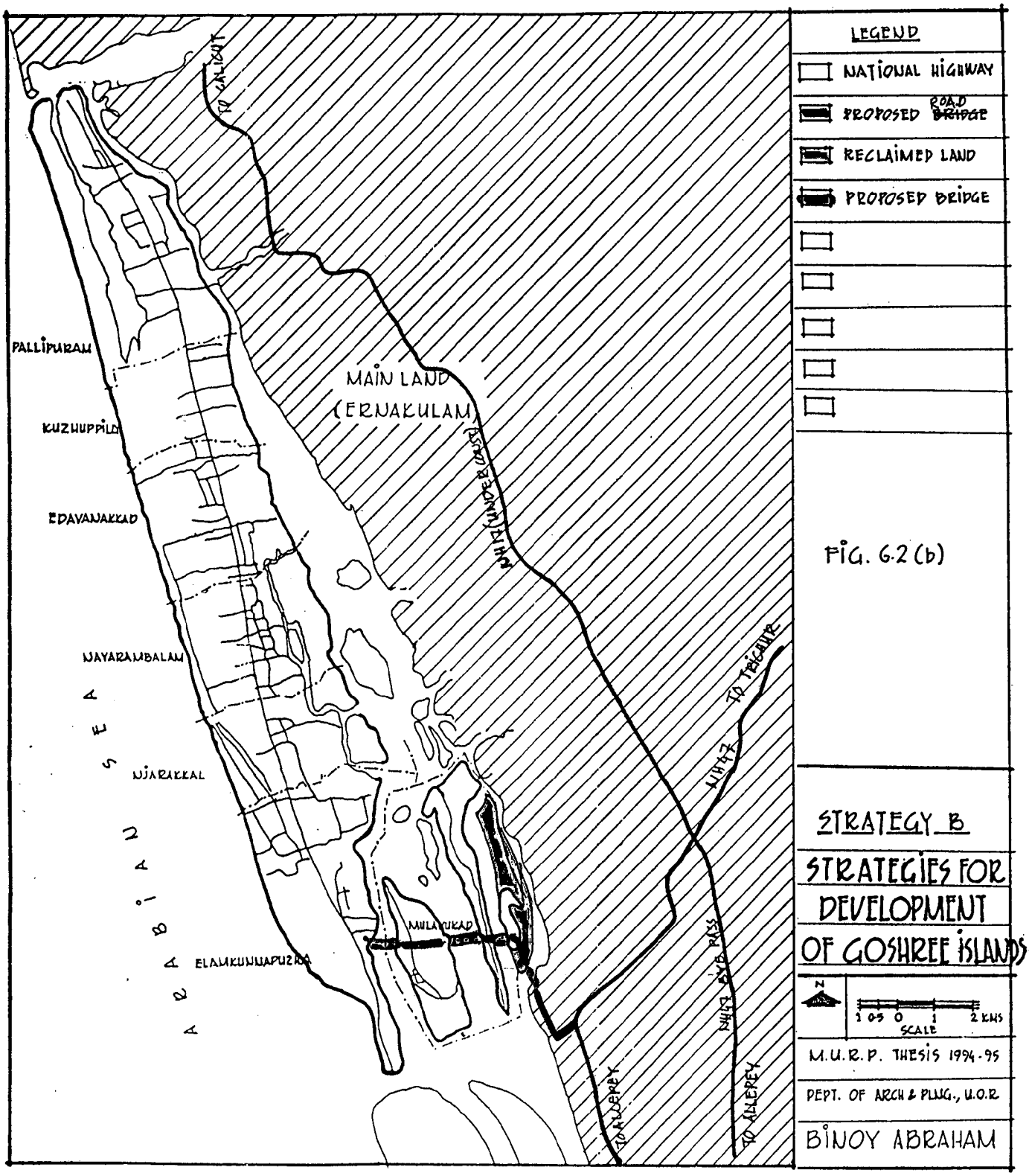
N

SCALE 0.5 0 1 2 KMS

M.U.R.P THESIS 1994-95

DEPT. OF ARCH & PLNG., U.O.R

BINOY ABRAHAM


LEGEND
NATIONAL HIGHWAY
PROPOSED ROAD BRIDGE
RECLAIMED LAND
PROPOSED BRIDGE
PALLIPURAM
KUZHUPPILY
EDAVANAKKAD
NJARAKKAL
ELAMKUNNAPUZHA
MAIN LAND (ERNAKULAM)
MULAVUKAD
TO CALICUT
TO TRICHUR
TO ALLEPEY
TO ALLEPEY
FIG. 6.2 (b)
STRATEGY B
STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS
N
1 0.5 0 1 2 KMS
SCALE
M.U.R.P. THESIS 1994-95
DEPT. OF ARCH & PLNG., U.O.R
BINOY ABRAHAM

Strategy **A** Free movement from island to different parts of mainland is possible especially for those who are employed in various industries of mainland.

C.B.D. of Ernakulam will remain unaffected by the island development Maintaining the ferry service between islands and mainland will keep the roads less congested.

Strategy **B** The bridges as per the proposal will make easy access to C.B.D. Even at odd hours of the night, it will be easy for the islanders to reach the C.B.D.

Disadvantages

Strategy **A** Islanders will have to depend on ferry service to reach the C.B.D. Ernakulam, quickly

Strategy **B** Direct linkage to C.B.D. Ernakulam will make that area more congested.

It may mar the natural beauty of the islands.

It may cause environmental problems due to the land reclamation required for bridge construction.

Possibility for natural development of Vipin island is towards north only.

The evaluation so far made reveals that communication linkage as per Strategy A is best suited for the Islands as well as the mainland.

6.3 GENERAL STRATEGIES FOR DEVELOPMENT

From the study and analysis various aspects related to the four islands namely Vypin, Vallarpadom, Mulavukad and Thanthonni of Goshree islands area, the following strategies in

physical,socio-economic and technological areas have been evolved guidelines for future development.

A) Strategies for Water Supply Improvement

* Improve the water supply scheme by providing one more fresh water pipe line from main land and storing in overhead tanks with adequate capacity, in each panchayat.
* The alignment of new pile line laid along sea bed should be so choosen that it has minimal effect on hydrology and marine ecology.

B) Strategies for Sanitation Improvement

* Improvement of drainage facility by making drainage canals near the areas which gets water logged during rainy season.
* Each panchayat should be provided with appropriate capacity sewage treatment plant and the treated water must be first used for plantation and agriculture and then only to be discharged in sea.

C) Strategies for Industrial Development

* Only non polluting industries should be permitted on the islands. Industries like tourism, computer software, fishing and agro industries or such like S.S.I units can be permitted.
* Creating opportunities at household level in can making, fisheries by products etc. through the co-operatives in order to give gainful employment to the fishermen during the lay off season.

D) Strategies for Tourism Development

* A water sports complex to be established on Vallorpadom island and the back waters adjoining to it should be used for water sports like water skiing, yatching etc.
* The strip of land in between sea and back water at Munambam has the potential for developing it as a tourist centre.

E) **Strategies for Fisheries Development**

* Provision of proper infrastructure at the country craft landing places.
* Develop organized fish drying yard and prawn peeling centres.
* Develop an efficient system for collecting fish waste and converting into manure.
* Proliferation of way side market are natural indications of new sites needed and their continued existence indicate their acceptance by the residents. Such markets shall be identified and organised space and necessary infrastructure may be developed for the operation of informal fish vendors in such locality.
* A structural change in the prevailing socio-economic condition in the sector can be achieved through organizing the toiling of traditional fishermen into co-operatives dealing with the credit service and fish marketing.
* Imparting training for preparation of value added diversified products out of low cost fish and conversion of fish waste into useful bye products.
* Evolve appropriate domestic market strategy for the value added fisheries bye products and also to cater the export market.
* Labour intensive intermediate technology is to be encouraged in fish processing and packing.

F) **Strategies for Environmental Development**

* Unauthorised filling of wet land which is used for agriculture or acquaculture should be strictly prohibited.
* The construction of structures should merge with the local surroundings and landscape of the area.

* The present practice of sea wall construction is found to be expensive and ineffective. It also affects the natural cyclic process between the sea and the land, creating unbalanced erosion. Hence sea wall construction should be discouraged. shore stabilization measures should be taken by planting indigenous dune grasses and artificial mangroves.
* Conducting training programmes for creating an awareness for improving the living and working environment.* Development and enforcement of methods to control over fishing (no of nets, net sizes etc).
* Public education programme for coastal resource management particularly prevention of over fishing and mangrove destruction.

G) Strategies for Physical Development

* Low rise high density type of development shall be the best option for coastal belt. considering the occupational requirement of fishermen and pressure on island land.
* Considering the aesthetic value of the coastal fringe high rise development should be discouraged. Building's exceeding the general height of coconut trees, disturb the beauty of the coast line.
* Construction of jetties, piers etc affect the current and pattern of sediment deposition leading to unbalanced erosion and accretion and hence have to be designed to allow better water movement after studying the current and sedimentation pattern. Construction of such structures by private individuals/agencies is to be controlled. Legislations should be made which necessitates the consent of competent authorities for construction of such structures.
* Development should be totally banned for a distance of 200 mts from the coast line and the fore shore should be left free for the interplay of waves on the land.
* Rehabilitation Scheme for fishermen should be provided outside the 200 m line for those who are living next to the sea which is prone to the attack of sea waves during monsoon.
* The dredging and reclamation activities it required should be under taken with least effect of the marine life in the area.

H) Strategies for Transportation Development

* Improve the physical linkage of settlements (fishermen) with the remaining areas of the island.
* In the proposed bridges, separate provision for pedestrian and cyclists should be made to encourage such movements with safety. The toll tariff system if any should be designed so that public transportation system is encouraged

I) Strategies for Housing Development* Providing institutional finance at a subsidised interest rate and technical support for the low cost construction techniques to improve the housing conditions.

* Improve the housing conditions and physical,environment especially that of the fishermen community.

J) Strategies for Social Status Development

* Provision of one junior college and a degree college giving priority to the islanders helps the college level education of the islanders in the island itself and there by daily movement of the students can be reduced considerably.
* Proper legislation is to be made to check the flow of migrant from mainland that may occure soon after the construction of bridges.

6.4 DEVELOPMENT PROPOSALS

1) Owing to the proximity of Thanthonni island to C.B.D. of Ernakulam, there is enough potential for developing it as a regional commercial centre and there by proposing predominantly commercial use.
2) With Bolghatty Palace as a tourist landmark at the southern end of Bolghatty island, and by virtue of it being in visual contact with all major islands to the north and south of harbour inlet, it is perceived as an ideal location for provision of tourism based industry and other similar land use.

3) Vallarpadom, located centrally between Vypeen and mainland is considered to be suitable for land-intensive social institution like professional colleges, super speciality hospital etc.

4) The land on southern tip of island could be developed and can be converted in to the International container terminal as proposed in the structure plan of Cochin region. And there by the connection of this island to the main land by railway line is unavoidable.

5) The Njarackal panchayat on Vypeen island is to be developed as Taluk head quarters to meet the taluk level needs of the people.

6) All other five panchayats should be developed as Town-sub-centres with all facilities for satisfying the population of each panchayat.

7) All developments in the islands are to be circumscribed by a motorable road. This road shall act is an outer ring road for the islands during day time. Also this will prevent the unauthroised reclamation of land from backwater.

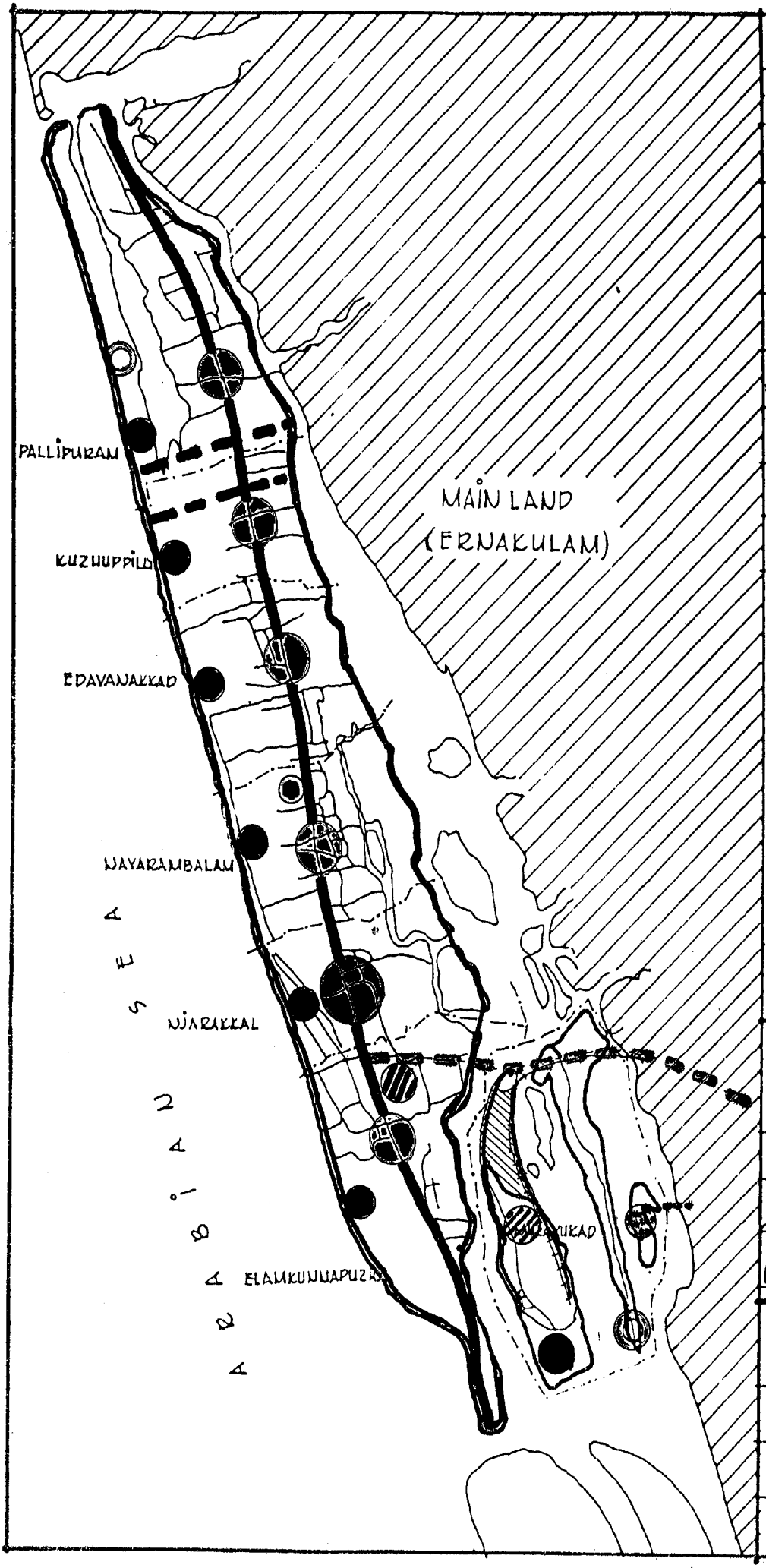
8) In Vypeen island, the Vypeen -Munambam road can be the central spine road. Transverse roads can be aligned along east west direction so that they may act as channels to prevailing wind direction which will be favourable to the mainland also.

9. The areas adjacent to the sea in all panchayats in Vypeen islands except Pallipuram can be developed as fisheries villages with an organized location of infrastructure that are required for marketing, processing and storing fishes. (Fig 6.4a)

6.5 PHASING OF DEVELOPMENT

The proposed developments can be carried out in III phases

Phase I : Develop the direct linkages from mainland to the Vypeen island through other islands. the total length of approximately 8 kms comprising of 3 bridges. This could be carried out in a period of 2 years.



LEGEND

- TOURISM INDUSTRIES
- TALUK CENTRE
- SUB CENTERS
- FISHERIES VILLAGE
- CENTRAL SPINE ROAD
- SECONDARY ROADS
- RING ROAD
- PROPOSED LINKAGE
- LAND RECLAMATION
- REGIONAL COM. CENTRE
- SUPER SP. HOSPITAL
- INTERNATIONAL CONT. TERMINAL
- RAILWAY LINE
- DEGREE COLLEGE
- MAJOR FISH MARKET

FIG. 6.4

DEV. PROPOSALS

STRATEGIES FOR DEVELOPMENT OF GOSHREE ISLANDS

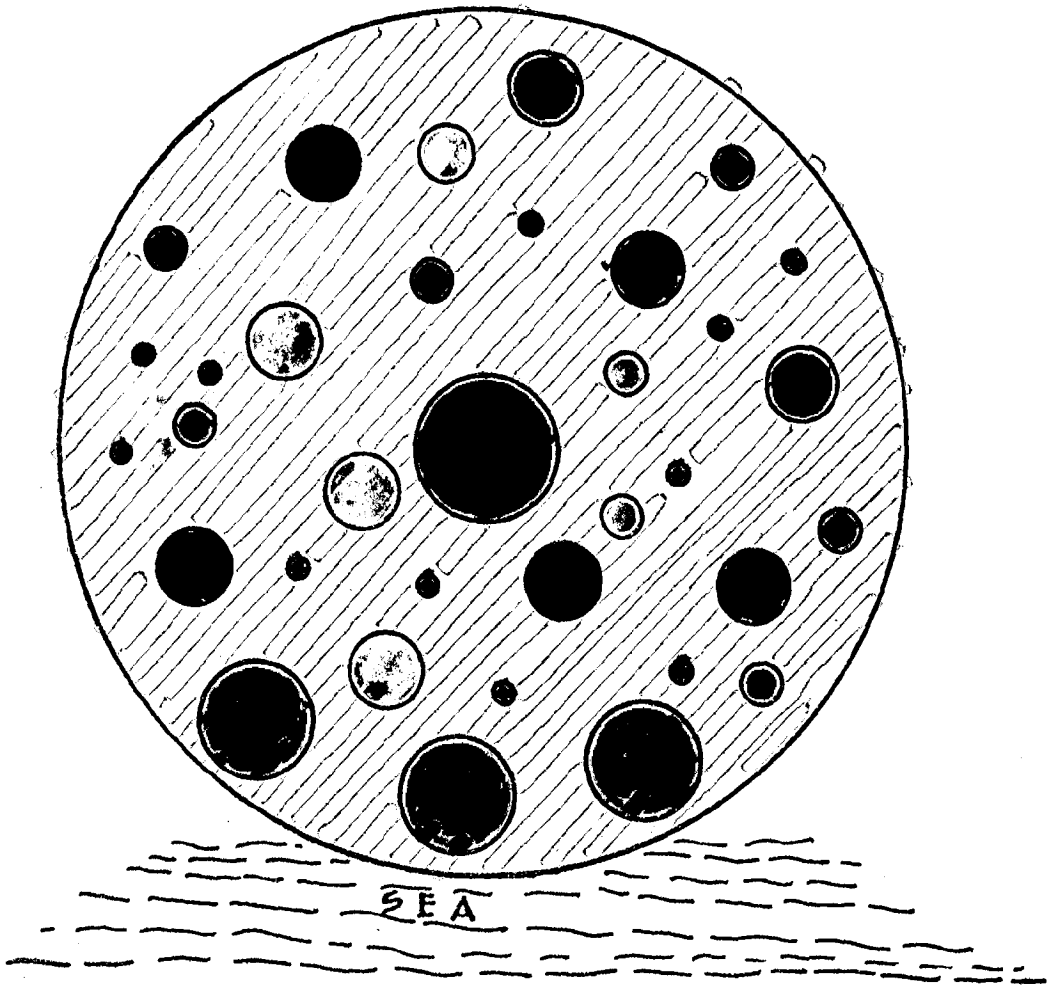
N

1 0.5 0 1 2 KMS
SCALE

M.U.R.P. THESIS 1994-95

DEPT. OF ARCH & PLNG., U.O.R

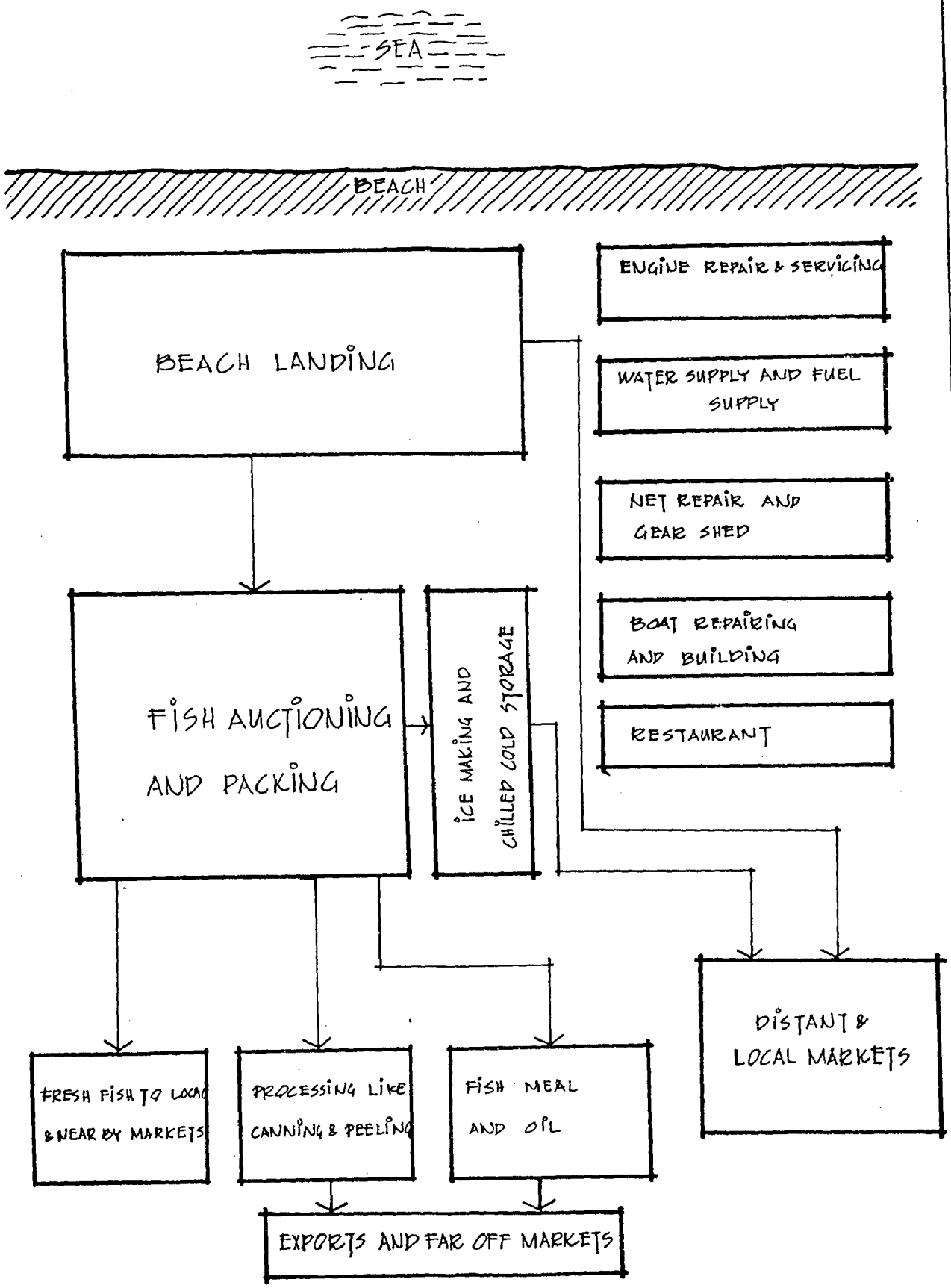
BINOY ABRAHAM



- RESIDENTIAL
- S.S.I UNITS
- RECREATION
- LANDING PLACES
- LOCAL MARKET
- INSTITUTIONS

FISHERIES VILLAGE

FIG.6.4a



INFRASTRUCTURES REQUIRED AT LANDING PLACES

FIG 6.4a

Phase II : Develop the panahayats of Mulavukad, Edavanakad and Nayarambalam panchayats (problem areas) so that its status is being raised to "Low potential Areas" At the same time develop Kuzhipilly panchayat (Low potential area) so that its will attain the higher order status of Average potential area.

This could be carried out in a period of 5 years.

Phase III Develop Pallipuram, Njarackl and Elamkunnapuzha panchayats (Average potential area) so that its status will be raised to High potential area - This could be carried out in a period of 5 years

6.6 FINANCIAL IMPLICATION

The implementation of the development of programme can be shared by public and partially by private agencies. The adequate fund for construction of bridges can be raised by commericallizing the reclamation of land.

Apart from the investments made by Govt. money can be found for development from the following sources.

Contribution from the tax revenue of the local bodies falling within the region.

Institutional financing such as loans from banks, Kerala Urban Finance Development Corporation, HUDCO, L.I.C. etc. Investment made by other agencies such as Kerala Rural Development Board, Housing Board, Kerala Tourism Development Corporation etc. can be taken us their respective contribution for development.

6.7 CONCLUSION

Physical planning without considering the economic implications will be a failure. The gap between physical plannersand economists may lead to the failure of physical plans on the economic front in their implementation. Threshold analysis is an approach to develop rationales to asses the economic implementation of physical planning. In this study an attempt has been made to co-relate the physical development of islands to the economic front.

Traditional fishing is the main economic activity in these islands. The physical planner should understand the need for social and economic related programmes related to this sector, in physical development. This will lead to increase in productivity in the overall frame of the islands. More over by exploiting the high level potential for tourism of these islands. Goshree islands can be developed as a self sustainable unit.

BIBLIOGRAPHY

1. Department of Town Planning, (1977) Development Plan for Cochin Region, Trivandrum.

2. Greater Cochin Development Authority, (1986) Structure Plan for Central City Cochin - 2001, Cochin.

3. Census Report 1991.

4. District Directory 1981.

5. K. Thomas Poulose, (1979) Experiences and Experiments in Town and Country Planning, Trivandrum.

6. K.T. Ravindran, Cochin, (1994) Architecture + Design Vol. XI No.3, May-June.

7. Leo Koppelman & Joseph De Chiara, Planning Design Criteria, Van Nostrand Rehnold Company, N.Y.

8. Jackson, Survey for Town and Country Planning, Manchestor.

9. Tosksvic, Dobrivoje, New Calcutta Salt Lake Township (A-r) Annual of Architecture and Town Planning, Vol. 6, 1954-55, Calcutta.

10. Calcutta Metropolitan Development Authority, (1976) (CMDA) Area Development Strategy for Salt Lake Township Report No.6, Director of Planning, Calcutta.

11. Kuldip C. Kambo, (1970), Structure Plan-Lagos, The Department of Development and Tropical studies, School of Architecture, London.

12. FCatpt, M.M. Kotwal, (1980), Spatial Planning and Development with Threshold Analysis-Case Study. Pune Sub Region., Deptt. of Architecture and Planning University of Roorkee, Roorkee.