

**CHANGING FUNCTIONS OF CHANDIGARH AND
THEIR
PLANNING IMPLICATIONS**

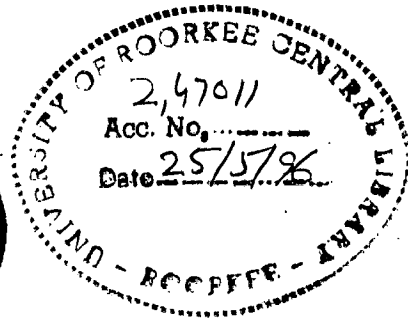
A DISSERTATION

*Submitted in partial fulfilment of the
requirements for the award of the degree
of*

MASTER OF URBAN AND RURAL PLANNING

By

MAJOR PARVINDER SINGH



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JANUARY, 1995

CANDIDATE'S DECLARATION

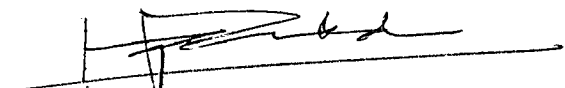
I hereby certify that the work which is being presented in the dissertation entitled **CHANGING FUNCTIONS OF CHANDIGARH AND THEIR PLANNING IMPLICATIONS** in the partial fulfilment of the requirements for the award of the degree of **MASTER OF URBAN AND RURAL PLANNING** submitted in the Department of Architecture and Planning, University of Roorkee, Roorkee is an authentic record of my own work carried out during the period from July 1994 to January 1995 under the supervision of **PROF. NAJAMUDDIN**, Department of Architecture and 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.

Place: Roorkee
Date : 30 January 1995


(**PARVINDER SINGH**)
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This is to certify that the above statement made by the candidate is correct to the best of my knowledge.


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A C K N O W L E D G E M E N T S

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I am greatly indebted to Prof. Vishwamitter, Head of the Department, Mr. R. Sankar, Mr. Rajesh Chandra and other faculty members who have encouraged and helped me at every stage during this study.

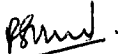
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- (c) Estate Office Chandigarh.
- (d) Office of the Divisional Town Planner, Mohali.
- (e) Panchkula Municipal Board.

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Parvinder Singh
Major

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CHAPTER 1
INTRODUCTION

INTRODUCTION

1.1 Introduction

Blessed by the presiding deity Chandi, the goddess of power, to whom the city owes its name, Chandigarh has an intrinsic beauty and charm. It was conceived amid and shaped out of confusion and crisis that followed the political partition in August 1947 of colonial India into independent nations of India and Pakistan. Begun in 1950, as a capital of post partition province of Punjab, Chandigarh owes its birth to the vision of Pandit Jawaharlal Nehru, the first prime minister of independent India, and the genius of French architect, Le Corbusier, who transformed that vision into an enchanting beauty of form compounded of the elements of sun, space and verdure.

The city is located in a picturesque setting, with the ragged skyline of the Shivalik hills as its backdrop. The urban boundaries are defined geographically by two seasonal rivulets the Patiali-Ki-Rao on the north-western side and the Sukhna Choe on the south-eastern edge. Between these two natural limits extends the chequered mesh of the grid-iron town plan.

The first conceptual master plan was evolved by the American planner, Albert Mayer, in collaboration with the Polish architect, Mathew Nowicki. When the latter was killed in an air crash, Le Corbusier took over the capital project and finalized a grid-iron

master plan for the new city, based on a rectangular module called sector.

Though city is in its infancy it has achieved so much which would seem impossible for other cities to achieve within 4 decades of its launching it has achieved almost ultimate population of five lakhs. It is still growing at a very fast rate.

Planners conceive the settlement but merely conception does not complete the whole chain of city building and development process. There are many more links. How this chain which starts with the conception of a settlement and with city growth is an interesting study in itself, because it tells us what was conceived and what came upon the ground, the differences there in and seasons thereof. These differences between, conception i.e. vision and what actually happens on ground i.e. reality do not indicate the failure of the 'Planner' but show the role that other factors play in the city building process. These variations in the assigned functions to the city by the planner and the actual ones have their own planning implications.

1.2 Identification of the Problem

Chandigarh was originally conceived, designed and built to serve as administrative, educational and cultural centre for the

state of Panjab. Due to changes in geopolitical situation and various other factors, the city has assumed a multi-functional role from the unifunctional as conceived by Corbusier. It has given rise to many problems related to plng.

Plan
Corbusier
- it is
good
but for
planning
of urban or
city
building
Wier

Originally built as the capital of Panjab, became union territory is November 1966, besides being the capital of two states of Panjab and Haryana. This has resulted in shortage of administrative accomodation. The town is fast emerging as an important centre of trade and commerce and industry. It has become a centre of knowledge and thought for a much wider area. These activities at such a large scale were never catered for in the design of Chandigarh.

Unexpected growth of population, emergence of Mohali and Panchkula towns on the outskirts of Chandigarh has put heavy stress on infrastructure. The expansion of towns and settlements in the periphery zone has taken place without any planning approach. Large no of defence projects occupying huge areas with considerable population have come up on the periphery of Chandigarh, much against the wishes of Corbusier.

How
Mohali
&
Panchkula
had
no plan
for
Chandigarh
In your
opinion
to look
of defence
project are
affecting
Chandigarh

Due to these undesirable developments the city character is changing from unifunctional to multi functional. In addition to administrative function which was assigned to it, the city is performing the functions of industrial, commercial and regional

Plan
Comment

centre. Chandigarh was never planned to perform these functions. Emergence of these large no of contradictions on the city horizon poses new challenges to the city planners in evolving appropriate plans and minimize these contradictions.

1.3 Aim and Objectives

Aim :- Aim of this dissertation is to study the changing functions of Chandigarh during the last four decades and identify their implication in planning.

Objectives :

With the aim in view the following objectives have been identified.

- (a) To study the Master Plan and the concept of the new capital town.
- (b) To know the progress of development at present.
- (c) To assess the changing functions and the role of the town in the present context.
- (d) To identify the planning implications of the changing functions.
- (e) To give broad recommendations for improvement.

1.4 Scope and Limitations :

The scope of this study will cover the city of Chandigarh in details and important aspects of the towns included in Chandigarh Urban Complex. Limited study of all the urban settlements in the periphery zone will also be carried out to assess their impact on the functions of Chandigarh.

Limitations :

A study of this magnitude requires a team of surveyors and staff for collection of basic data and requires sufficient time. The study started with a basic handicap on this account apart from many other limitations. Some of the major limitations faced are given below.

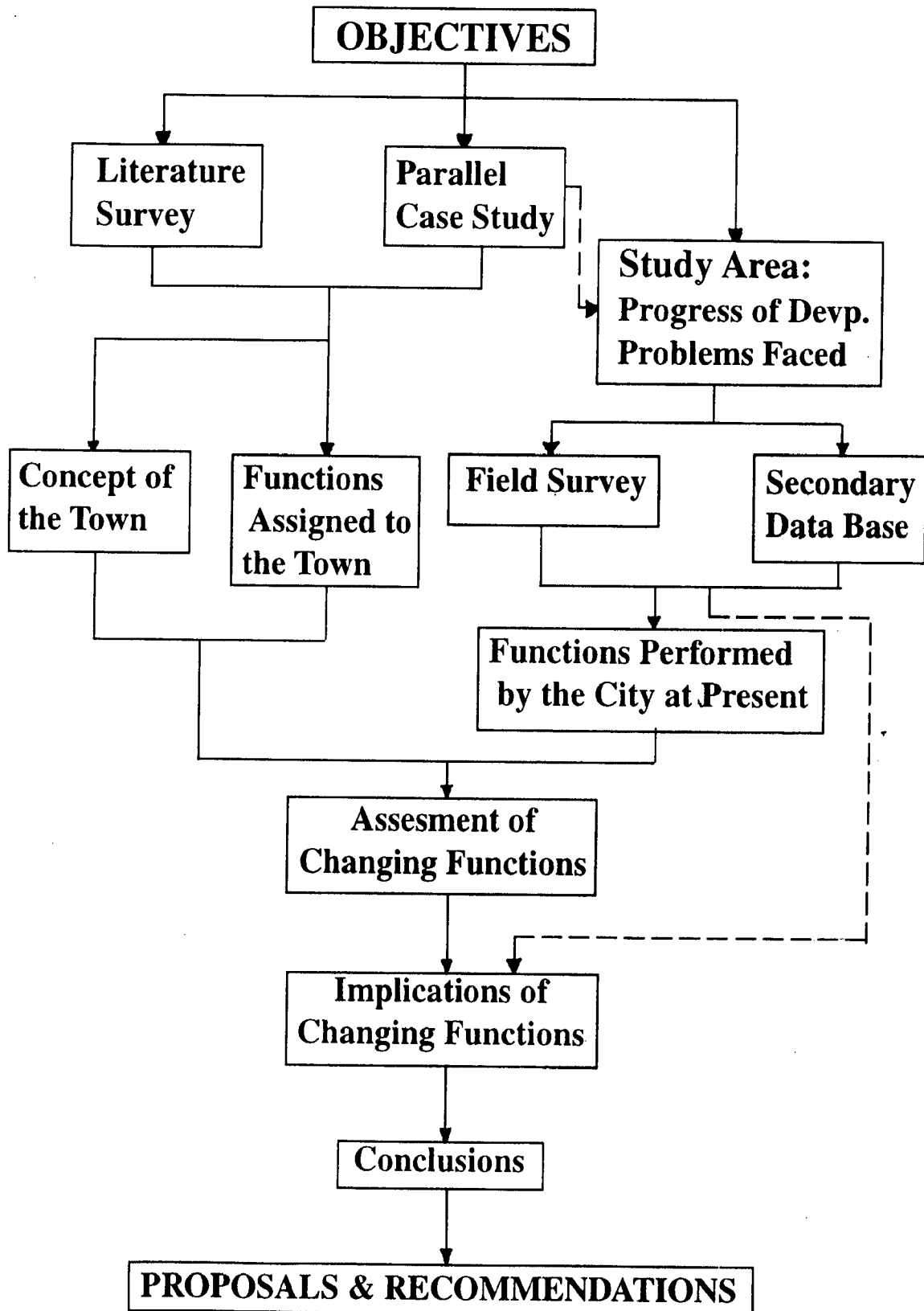
1. Study primarily based on secondary data and information obtained from records of different departments.
2. Due to limitation in carrying out detailed survey and collecting data from primary sources at individual level, the study has been based on personal observation and information along with some data collected during course of informal discussion within the town and peripheral area.
- 3 Lack of infrastructure and paucity of time to collect information from primary sources by detailed survey.

1.5 Methodology :

Methodology adopted to fulfill the objectives as identified earlier cover the following stages :

1. Study of the concept of the new capital town by Mayer, Nowicki and Le Corbusier.
2. Study of the final master plan of Chandigarh and identification of the functions assigned by corbusier to the new town.
3. Study of the progress of development of the town and the areas in the periphery zone.
4. Literature survey and the parallel study carried out earlier for another similar town to draw out relevance to this study.
5. Identification of the changing functions of the town from the above study.
6. Analysis of the plng implications caused by the changing functions and give some broad recommendations.

METHODOLOGICAL SEQUENCE



CHAPTER 2
LITERATURE REVIEW

LITERATURE REVIEW

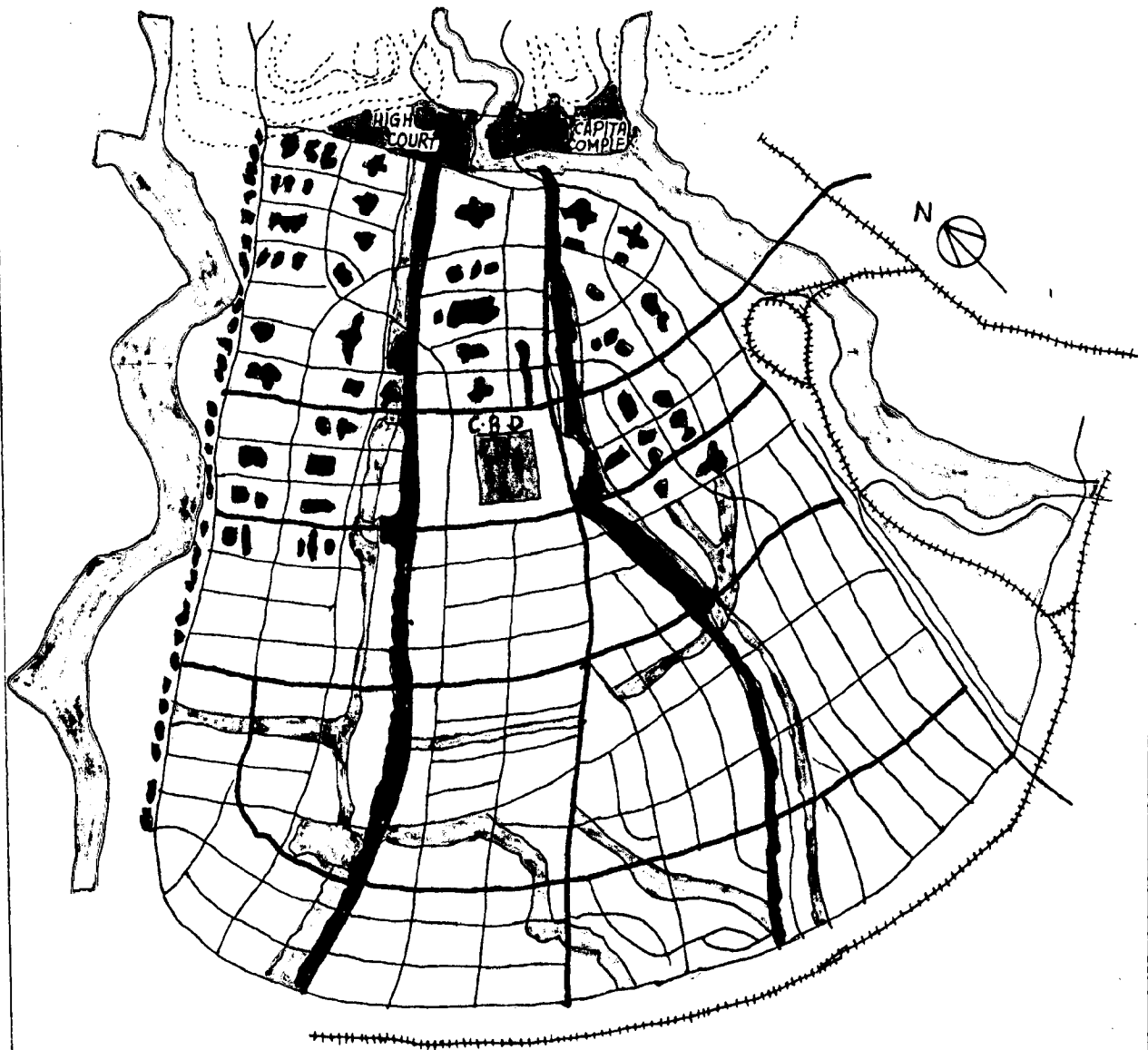
2.1 Albert Mayer's Concept and Plan for Chandigarh

The first master plan of Chandigarh was prepared by Albert Mayer, a partner in the New York firm of Mayer, Whittlesey and Glass and an ex-Lieutenant Colonel in India during World War II.

The basic unit of Chandigarh plan, the super-block of neighbourhood unit, was designed by Mayer as particularly suitable for India, where much of the population still clings to the village tradition. Mayer tried to give both inhabitants and visitors the elements of serenity and of excitement and of homeliness as well as splendour.

Albert Mayer produced the master plan for Chandigarh which assumes a fan shaped outline, spreading gently to fill the site between the two river-beds. The capital complex is located beyond the upper edge of the city within a fork in one of the rivers while the city centre occupies an area near the centre. A curving network of main roads surrounds the residential super-blocks, each of which contains a central area of park land. Two larger parks are stretching through the city and to the east is an area set aside for industry. The first phase of development of the city was to take place in the northern portion of the site, with possible expansion towards the south.

ALBERT MAYER'S CONCEPT OF CHANDIGARH



LEGEND







-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  PUBLIC SEMI PUBLIC
-  PARKS
-  WATER BODY

FIG 2.1

The plan for Chandigarh was to be prepared in detail for a population of 1,50,000 with indications of future expansions show in roads and land use.

As described by Mayer the commanding location of capital complex "would permit views of it from the city from whatever perspective and would associate it most closely with the splendid backdrop of the ridges". The capital area stands aloof from the main body of the city as a sort of symbolic head. Although the river would normally contain water only during the two month monsoon season, it was proposed to contain the rivers in the series of shallow dams which, it was hoped, would provide for some degree of water level throughout the year. In this way, the river could serve, in Mayer's words as "a sort of glittering necklace encircling the group".

The neighbourhood unit developed in the plan consisted of super-blocks accommodating about 1150 families. Each super-block would contain housing, a local shopping bazaar, primary and middle schools and park land. The central block which would house only 800 families, would contain the high schools for the district plus augmented shopping facilities. In addition there would be such community facilities as a Health Centre, Theater and Meeting Hall. This area would function, in Mayer's words "very much the same as the market square of the medieval European Town".

The size of the super-block unit was to be approximately 3000 x 1500 feet, the maximum super-block forming an area of about one hundred acres.

In general, the philosophy behind the Mayer plan was based on a human ideal. The dominant concern was the quality of domestic life within the city which would be decently habitable for all unrelated parts. In our plan, there should be a continuous park system, tying all parts of the city with the hills, the great park, the public forum and the capital area. The holiday function can depend very largely on a mass pedestrian movement, just as the everyday function depends on mass transportation.

Nowicki also produced a sketch design for Chandigarh of his own which he named "the leaf plan". The overall skelton framework of the plan is based on the organic form of a leaf. The stem of the leaf was interpreted as a commercial axis cutting through the centre of the city, from which could branch a vein-like system of traffic arteries. In Nowicki plan also, the capital complex remained at the top with the university located to the West. Nowicki indicated the polarities of the centre of thought (the University) and the centre of production (industry) by placing them at opposite corners of the city.

There is every effort to combine the strong axiality and unbroken focus established in the central core with a system of constantly shifting areas at either side. The super-blocks produced by this pattern are irregular but identical and the overall plan, although rigidly symmetrical is non-geometric.

2.2 Le Corbusier's Concept

The city was conceived by Corbusier in its essential form as a square containing a cross axis, with the capital complex culminating the north-eastern axis towards the mountains. This simple diagram derives from one of the oldest formal urban plans and this is also the gesture by which all Indian towns were laid out according to the rituals codified in the Manasara & Silpa Shastras. Once cardinal points were established, the two main streets were laid but in what was termed the cosmic cross and the so-called magic square, representing the four quarters of the universe. The centre of the town at the intersection of the cross was the recognized meeting place for the Council of Elders who regulated local affairs, and the centre according to Manasara, was the auspicious place for an assembly hall or for a temple of Brahma which had four entrances.

At Chandigarh, the crossing of the two main streets, one of which leads into the city from the province and the other which forms a monumental avenue of approach to the capital complex,

marks the location of the civic centre containing the local administration and also the Central Business District.

The emphasis on a monumental axial composition makes the second plan different noticeably from the initial scheme. In the Corbusier plan for Chandigarh, the capital area was planned to stand against the mountains. There was an effort to provide a single monumental approach linking the body of the city to its symbolic head and related along a single axis, the two main public areas of the city, the capital complex and the civic centre. The ceremonial approach to the capital complex was designed as a wide tree-lined boulevard bounded on one side by parkland and on the other by multistoreyed buildings-important banks, government offices and large hotels. While the other main street leading from the station was designed to alter its character when it crossed the capital boulevard. On the east side, extending towards the station and the industrial area, it was intended as a street of commercial depots and headquarters of business firms. To the west, it would become the centre of higher education and recreation, and was to contain in an area of parkland, the theatre, civic museums and sports stadiums. Terminating at this axial streets would be the University.

At the junction of the two main streets, the city centre would contain the large stores and office buildings in a complex of squares and piazzas, restricted to pedestrians and the sector

would contain a system of arcading and planned parking areas.

The whole town was conceived as an organism as it is found frequently throughout Le Corbusier's urban theories. In explaining his analogy, he stated "A plan arranges organs in order, thus creating an organism or organisms. The organs possess distinctive qualities, specific differences. What are they? Lungs, Heart, stomach. The same question arises in architecture.... I am talking of organisms like Industrial Centres. I am claiming sun, space and green surroundings for everybody and a striving to provide you with an efficient system of circulation, Biology. The great new word in architecture".

Essential to the plan of the city is the system of traffic separation, based on a scheme of organization which was established before 20 years at the demand of the UNESCO to try constitute an eventually acceptable proposition of urbanism for general world application. Le Corbusier termed this circulation organization "les Sept Voies" (the seven V's). This system of circulation establishes a break-down of traffic into a series of seven categories containing every level of circulation from arterial roads to apartment house corridors.

Applying his favoured biological interpretation to the road system, Le Corbusier said "The 7V's act in the town plan as the blood stream, the lymph system and the respiratory system act in

Biology. In Biology, these systems are quite rational, they are different from each other, there is no confusion between them, yet they are in harmony..... The 7 V's system has become an organized hierarchy of roads which can bring modern traffic circulation under control".

In describing the Chandigarh scheme as a whole, Jane Drew once wrote :

"The master plan is of poetic significance. It is almost biological in its form. Its commanding head, the capital group, its heart the city commercial centre, its hand the industrial area, its brain and intellectual centre in the park land where are the museums, university, library etc. It has its stomach in its city service centre in the central market, its veins and nerves in the roads, the water, electricity. The whole is surrounded by open country but it has its internal lungs too, its green breathing space and its structure of roads, the bony system to which the flesh of the building volume of the city is related. This long simile of a town as an organism can even further be extended to the fact that allowance has been made for growth".

At philosophical level, Mayer placed greater emphasis on the socioeconomic factors of the city, its potential for future growth, the peculiarities of Indian traffic, the social customs of the people, and other related issues. Le Corbusier, on the other

hand, remained concerned with the physical attributes of the city and the monumentality of the building designs. Mayer recommended the inclusion of industry in the city to simulate its population growth, Corbusier felt that the inclusion of industry in Chandigarh was incompatible with its administrative character. Although both planners professed to create the city in the Indian idiom, perhaps Mayer was more sincere about it. This in itself would not have mattered but the fact that "there were vast masses of people who were not included in the project estimates". The balme for this must rest as much on the native planners as on the overambitious administrators.

2.3 City as Thought by the Planner

According to Le Corbusier, Chandigarh is a city offering all amenities of life to the poorest of the poor of its citizens to lead a dignified life. Chandigarh is a government city with a precise goal and consequently a precise type of inhabitants.

On this presumptions, the city is not to be a big city (metropolis), it must not loose its definition. He further stated that industrial city is not the same as an administrative city, one must not mix the two. The future of Chandigarh is opened to all the cultural factors in different kinds of manifestations (schools, universities, centre for imparting audio-visual training etc. etc. in one word, all kinds of knowledge). The city must have

means to express and to disperse the thought (editions, books, magazines and eventually printing of books, magazines etc.), means to express and disperse the arts (in time and space - history and geography). All the kinds of reproductions of art - witnesses (editions, visual means - photograph, diagrams etc.) at different scales must be available within the town itself. Diverse manifestations of exhibitions, shows, theatre, festivals, creations of highest modernity etc. such as manifestations, reclaiming the organizations and use of travelling possibilities of hostelery etc. should be met within the functions of the city.

For the culture of the body, there can be created an organism having a disposition of any possibilities of meetings for competitions or tournaments.

CHAPTER 3
CASE STUDY:
BHUBANESWAR

CASE STUDY : BHUBANESWAR

3.1 Introduction

Immediately after the independence of the country, Bhubaneswar emerged as the new state capital of Orissa. The initial master plan of Bhubaneswar was the exercise of Prof. O-H. Koenigs berger. The city is one of the three planned state capitals during post independence period. Bhubaneswar has shown spectacular growth in the last four decades. Besides being administrative centre the city is fast emerging as a centre of trade and commerce and industry. Location of two universities and good health facilities have added to the importance of Bhubaneswar.

This case study is based on the study conducted by different groups and their published work. This includes Environment Assessment report by Ghosh Bose Associates and Thesis report by M. Prida. The study highlights the changing role of Bhubaneswar over a period of time with development.

3.2 Criteria for Selection of Case Study

Bhubaneswar resembles Chandigarh in many respects despite being located in economically poor region. There are many similarities which are responsible for its selection as a case

study. The reasons for selection are.

1. Both Bhubaneswar and Chandigarh are planned state capitals of post independence period.
2. Their size, population and rate of growth of population are similar.
3. Land use in both the cases is identical.
4. Growth of trade, commerce and industry and overall development also resemble.
5. Availability of relevant data for the study.

3.3 Philosophy and Plng. Principles

Philosophy of Dr. Koiengsberger behind Bhubaneswar plan was to grow the town in linear direction, towards north and all the neighbourhoods should develop around a single main artery. He suggested growth on north side because of availability of large quantity of land with high bearing capacity. He suggested provision of green belt to check tendency of unlimited expansion.

He planned for mono nuclei town, of which the secretariat is the focus. Two major work center have been proposed, one in the old work center and another in the new. Location of industry in extreme north east corner near railway line justified considering south west wind. The road pattern consists of 7 types of traffic systems.

Dr. Koiengsberger advocated a decentralised town divided into several neighbourhoods of 4500 to 5000 population. Primary school is taken as a focus of this neighbourhood unit. The basic principle of plng the neighbourhood was.

1. Every child should live within one third a mile from a primary school.
2. Every house wife should live within a half mile from a small market to find shops, dispensary, and other necessary services.

Location

Bhubaneswar is located on 20 degrees and 15 minutes latitude and 85 degrees and 50 minutes longitude. It is located on N.H.5 between Madras and Calcutta in the state of Orissa.

3.4 Population Trends

The city has shown a very fast growth of population, largely because of migration from out side. The population trend is shown as below.

BHUBANESWAR POPULATION

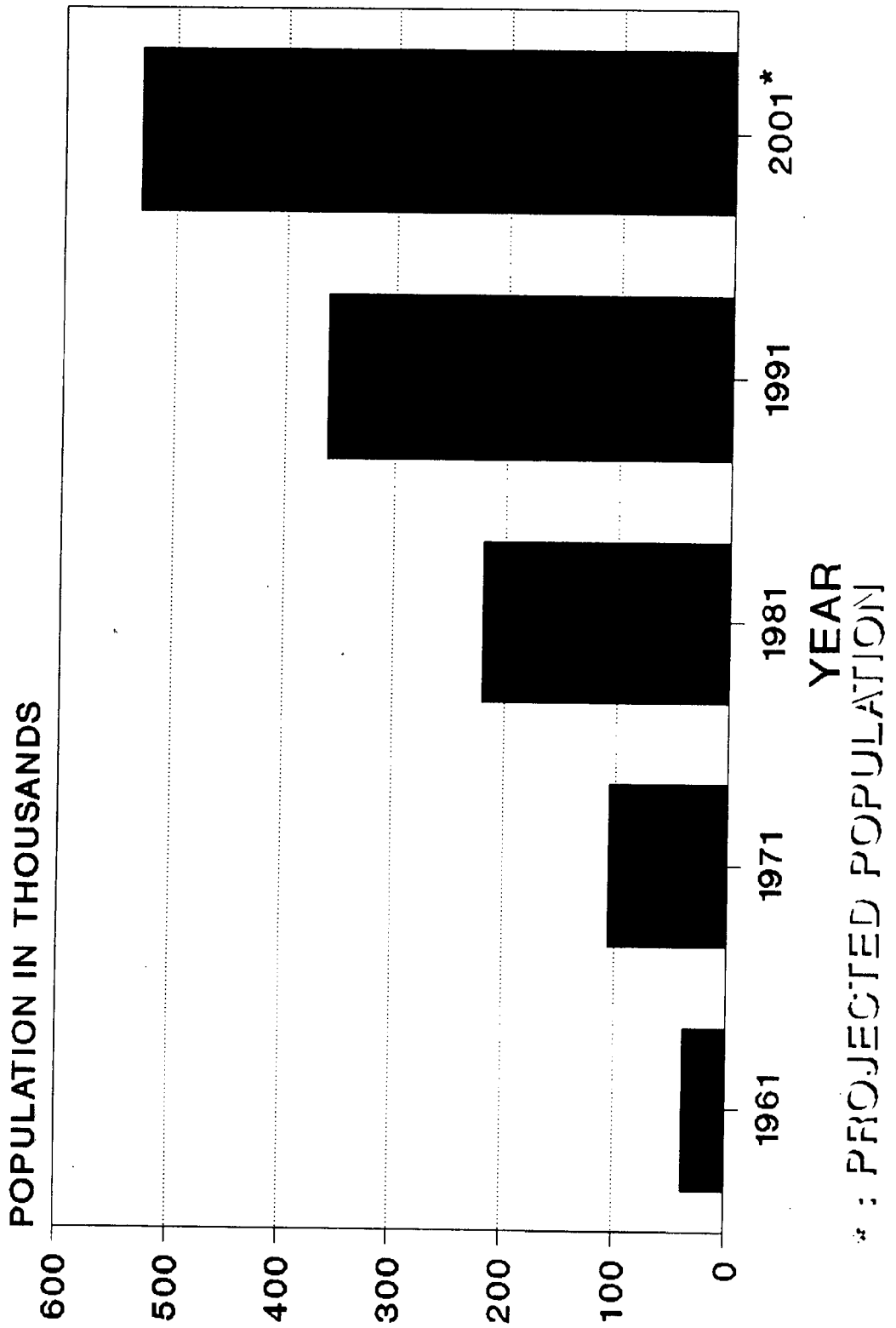


FIG 3.1

Table - 3.1

DETAILS OF POPULATION IN BHUBANESWAR

Year	Population	% Variation	Sex Ratio (No of women/1000 men)
1961	38,211		648
1971	1,05,491	+ 176	724
1981	2,19,419	+ 107	757
1991	3.61,000	+ 64	775
2001	5,31,000	+ 47	785

* Projected population

3.5 Land Use

The city has total area of 65 5g km. Out of this area by 1988 total developed area was 9633 acres. The different types of land use is as follows.

LAND USE

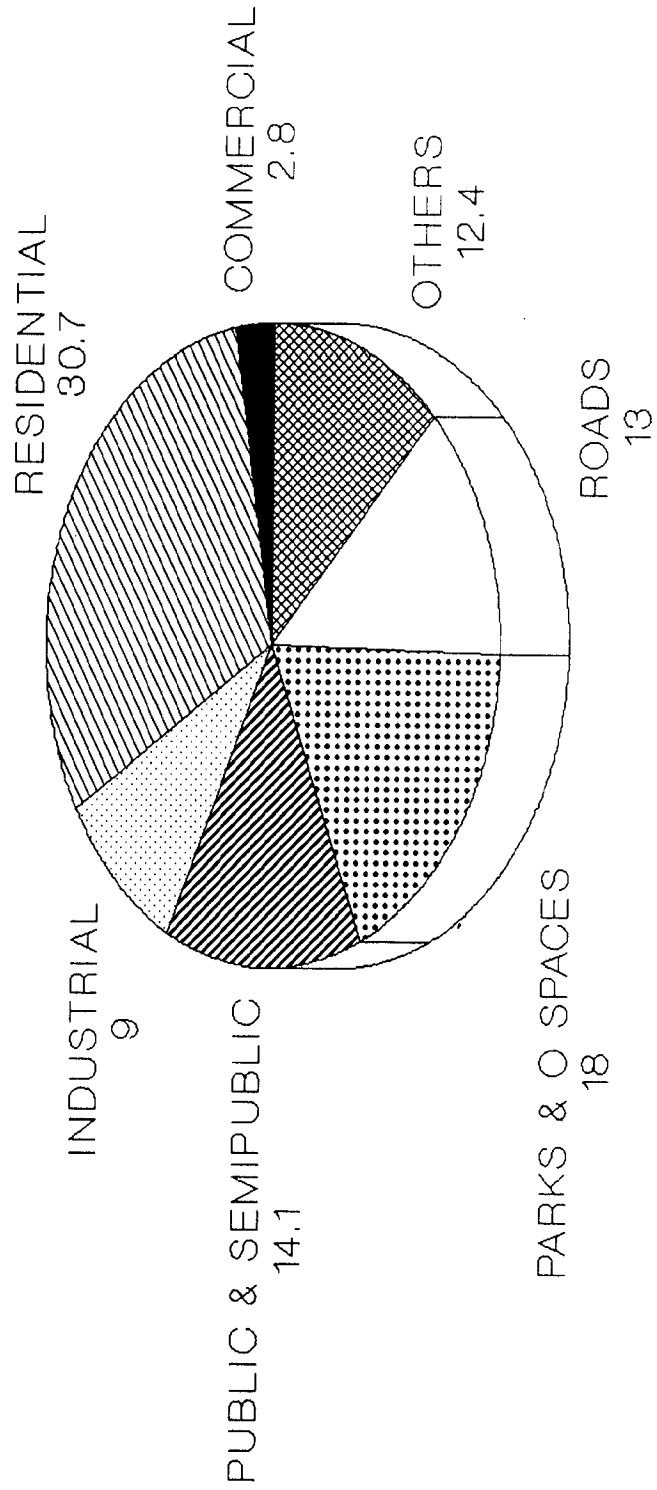


FIG 3-2

CHANGING FUNCTIONS OF CHANDIGARH

A CASE STUDY OF BHUBANESWAR

LEGEND

- RESIDENTIAL AREA
- COMMERCIAL AREA
- INDUSTRIAL
- ADMINISTRATIVE
- ROADS
- RAILWAYS
- PARKS AND OPEN SPACES
- GOVT. & SEMI GOVT.
- AGRICULTURAL LAND
- GREEN BELT W/F
- VACANT
- RIVER CH/ALLAH
- MASTER PLAN BOUNDARY
- MUNICIPAL BOUNDARY



LAND-USE

Major Parvinder Singh
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M.U.R.P. THESIS
YEAR 1983-84

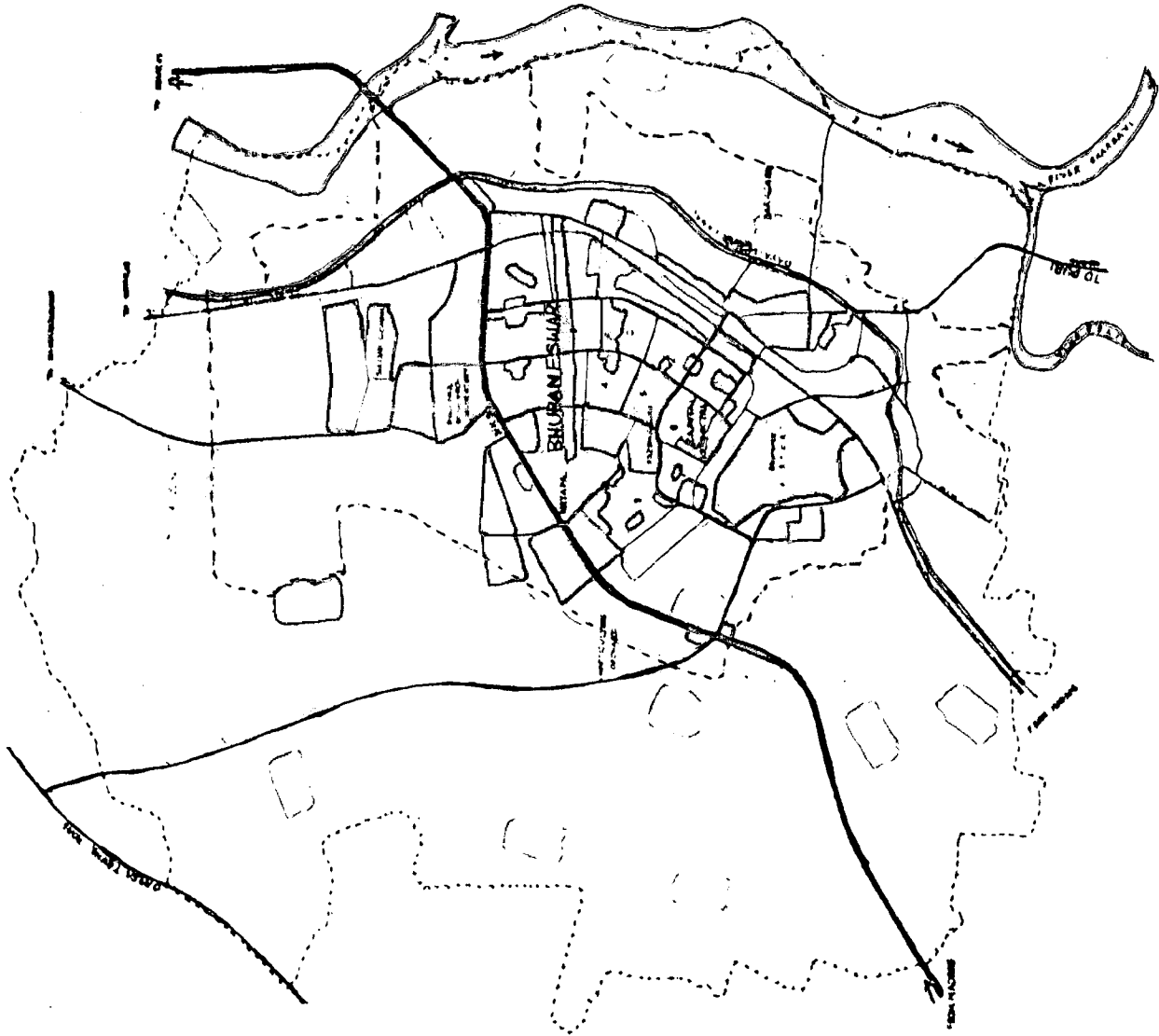


FIG 3-3

Table - 3.2

LAND USE IN BHUBANESWAR

No	Type of Use Acres	Area in of total	Percentage
1	Residential	2939	30.7
2	Commercial	278	2.8
3	Industrial	875	9.0
4	Public and Semi Public	1360	14.1
5	Parks and open spaces	1732	18.0
6	Roads	1254	13
7	Others	1195	12.4
Total		9633	100

3.6 Industry

Mancheswar Industrial Estate has been set up to house industries. Industrial area occupies nine percent of the total developed area, which is quite considerable. Although industry is required for sound economic base of a city, its problems are many fold. The environment of the city is threatened and the industry

is the major cause of sub-standard housing and traffic congestion. Poor workers can ill afford good houses and are forced to live in substandard houses. The trend of industrial growth is shown below.

Table - 3.3
TYPE OF INDUSTRIES, THEIR EMPLOYMENT AND INVESTMENT

Sl. No.	Type of Industry	Factories					Small Scale Units				
		Units		Employment		Investment (Laks) 1985	Units		Employment		Investment (Laks) 1985
		1975	1985	1975	1985		1975	1985	1975	1985	
1.	Chemical	-	1	-	200	151	9	13	163	221	110
2.	Elec- tronics	2	4	240	450	354	15	23	417	656	240
3.	Engi- neering	3	4	370	505	542	18	29	338	533	245
4.	Metal Product	2	3	234	394	293	13	21	346	591	187
5.	Plastic and Rubber	-	3	-	-	-	7	11	96	161	112
6.	Refrac- tory and Ceramics	-	1	-	150	69	5	8	183	292	109
7.	Others	4	7	326	593	311	32	44	779	1049	458
Total		11	20	1170	2292	1720	99	149	2322	3503	1461

3.7 Trade and Commerce

Commercial facilities were provided in the following hierarchy i.e. Central Business District (C.B.D), District commercial centres and Neighbourhood shopping. C.B.D. is located on the North of N.H.5 The district centres in Unit I and II, Siripur, Shaheed Nagar Market area and industrial housing area. Total 475 acres of land is provided for commercial activities.

Due to the fast development of Bhubaneswar the commercial activity is also picking up. Banking insurance and money market constitute the important part of trade and commerce sector. Growth of these institutions is shown as below.

Table - 3.4
COMMERCIAL ESTABLISHMENTS AND THEIR EMPLOYMENT

Category	1976		1982		1988	
	Units	Employment	Units	Employment	Units	Employment
Shop and commercial Establishments-	2860	4518	3584	5376	4526	7242
Banks	21	231	36	372	56	526
Total	2881	4749	3620	5748	4582	7768

COMMERCIAL ESTABLISHMENT & EMPLOYMENT

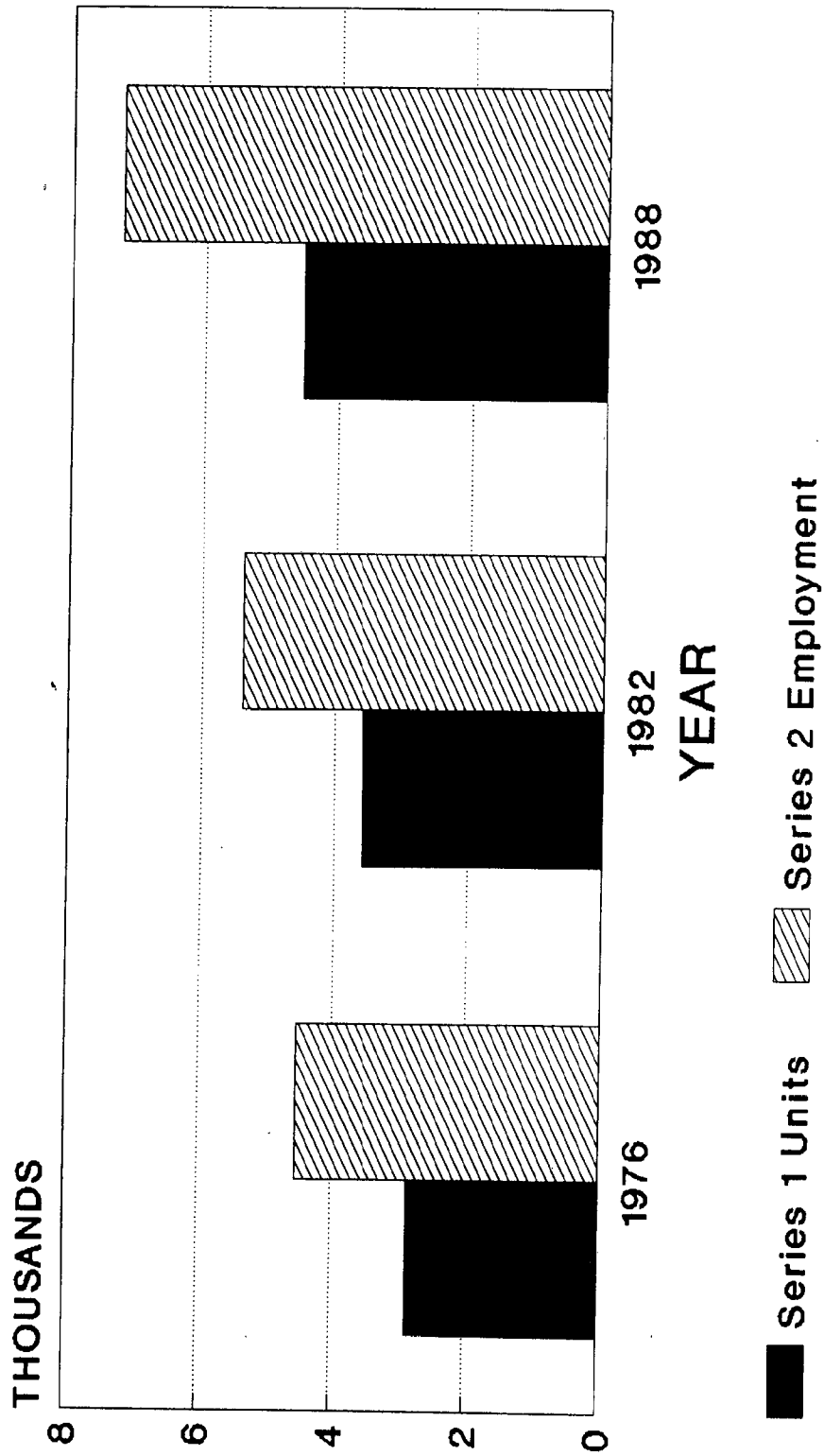


FIG 34

3.8 Education and Health

Bhubaneswar is an important centre of knowledge and learning. It functions as the cultural heart of the hinterland. Facilities for advanced studies are available in the two universities located in the city.

Good medical facilities are also available in the city. This includes Ayurvedic and Homeopathic treatment facilities. Besides this Ayurvedic research institute is also located in the city. Details of educational and health institutions of the city are as follows:

Educational Institutions (As on December 88)

Universities for general studies (Utkal University)	1
Agricultural University	1
Institute of physics (for P.G. studies)	1
Regional College of Education	1
Homeo medical College	1
No. of colleges for general studies	4
High Schools	42
Total No of students	33,000

Table - 3.5

MEDICAL (AS ON DECEMBER 88)

Medical Institutions	Year		
	1977	1982	1987
No of Hospitals	2	3	4
Dispensaries	11	15	21
No of Registered doctors	74	100	120
No of patients/Doctor	1424	1195	1035
No of Beds in Hospitals	219	271	328
No of beds/1000 population	1.2	1.01	1.03

3.9 Transpotation

Transportation system of Bhubaneswar is divided in following branches :

1. Road Transport
2. Railways
3. Airways
4. Waterways

Total road length in the city is 220 Kms out of which 137 Kms. are metalled roads. Roads pattern is based on 7V system which is as follows.

Sl. No.	Type of Road	R.O.W.
1.	National Highway	300'
2.	State Highway	250'
3.	Peripheral Road	200'
4.	Arterial Road	180'
5.	Major Unit Road	150'
6.	Major Housing Street	100'
7.	Minor Housing Street	40'

There were 10600 small and big registered vehicles in the city in March 88. Besides this Bhubaneswar is well connected by road with other cities.

Bhubaneswar is located on Madras Howrah broadgauge line. There are 7 passenger and 8 express trains plying through the city. Daily 30-40 goods trains also pass through the city. In 1988, in the month of March 75,058 passengers travelled by train from Bhubaneswar.

Bhubaneswar is connected by air with other parts of the country like Calcutta, Delhi etc. There is ferry service also operating between Bhubaneswar and Lingapur in Daya River.

3.10 Findings of the Study

By going through the various development activities the following problems are revealed.

1. Population of Bhubanewsar is growing at a very fast rate which is attributed to high influx of migration. Shortage of residential accommodation and infrastructure has given rise to substandard living conditions.
2. Trade and commerce is expanding rapidly. Lot of unplanned commercial development has taken place leading to traffic and environmental hazards.
3. Industrial activity is also picking up. It is bound to cause pollution and traffic congestion and other associated problems.
4. If the present trend of population growth continues, the existing health and educational faculties have to be increased.
5. With the increasing population the No of vehicles are also growing very fast leading to traffic congestion.
6. Large amount of money is required for providing infrastructure and development of land to cope up with fast growing population.

3.11 Recommendations of the Study

Based on the findings of the study the following suggestions are made

1. Provide the job opportunities in the urban areas around Bhubaneswar to arrest migration to the city.
2. Provision of more investment in the capital city to increase the capacity of infrastructure in direct proportion to growth of population.
3. Removal of unplanned commercial units and squatters and accommodate them in the planned commercial areas.
4. Encourage non polluting industries run by electricity. Enforce setting up of industries only in the industrial area of Mancheswar.
5. Provision of more health and education facilities.
6. Introduction of efficient public transport system to reduce the plying of large No of private vehicles.
7. Prevent unplanned development and allow development to take place as per the provisions of the master plan.

3.12 Conclusions

The findings and recommendations of the study help in drawing general conclusions for any city which is of similar nature. Despite being capital of a very poor state Bhubaneswar is developing very fast. Hence the study is relevant for any similar town irrespective of its location.

CHAPTER 4
MASTER PLAN
FOR CHANDIGARH

MASTER PLAN FOR CHANDIGARH

The first plan for Chandigarh was prepared by Albert Mayer, an American Planner and his partner Polish Architect, Mathew Nowicki in 1950. Le Corbusier was assigned the responsibility when Mathew Nowicki died suddenly in an air crash and Mayer declined to undertake the responsibility single-handed. In 1951, a new plan was evolved by Le Corbusier in collaboration with Pierre Jeanneret, Maxwell Fry, Jane Drew and a team of Indian Town Planners and Architects.

A capital project organisation was set up with powers vested under the Chandigarh Development and Regulation Act of 1952 regarding building developments, land-use, sale of developed plots, preservation of trees, regulation of outdoor advertisement, periphery control and other related aspects. The construction started in 1952 and the city was inaugurated by the late president Dr. Rajender Prasad on October 7, 1953.

The master plan of Chandigarh is the crystallisation of many ideas that Corbusier evolved in the life-long research in Town Planning. The whole layout of the city is like futuristic poem, a hymn to technology, to speed and movement, to a man-made world of vast dimensions, flooded with light and opening limitless vistas.

The layout of the city follows the well known grid-iron pattern. The basic concept underlying the plan is that of neighbourhood unit of residential sectors each of which will be practically selfsufficient in the day to day requirements such as shopping centres, recreation grounds etc. The sectors are

rectangular in shape bounded on all sides by fast motor roads. The important aspects of the master plan are described below.

4.1 Population

The capital is designed for a population of 1.5 lakhs in the first phase to be completed by 1966 and 3.5 lakhs in the second phase and the ultimate population of five lakhs. The population has been designed to be so distributed in the various residential sectors with minimum population of 5000 persons and maximum of 15000 persons giving the gross density to the city as 50-55 persons per acre. In general, three groupings of income as a classification of neighbourhood units were followed, producing density pattern ranging from 25 persons per acre in the upper class districts, to 50 persons per acre in middle class sectors and 75 persons per acre in the lower class areas.

4.2 Land-Use

Le Corbusier has proposed to contract the basic of modern urban life by developing the town as a living organism with its various limbs interconnected to each other and yet performing their distinctive functions. The land-use in the city may be broadly divided into six categories :

1. Administrative area i.e. Capital Complex.
 2. City Centre i.e. Chief Commercial area.
 3. Industrial area.
 4. Residential area.
 5. Educational area.
 6. Green belt, parks and play grounds.
- Of the 29 sectors of first phase into which the city is

divided, all except five are primarily residential sectors. The other five sectors are reserved for certain exclusive purposes. Of these sectors, one is for administrative purposes, sector six is for Governor's House, State Guest House and Golf Course, sectors 12 and 14 are for educational and medical institutions and sector 17 is for the main commercial activity and as a civic centre. But even in these nonresidential sectors, there is limited provision for the residences of some of the persons working in the main establishments, located therein. Thus, for instance, sector 14 also accommodates most of the staff of the Panjab University. Most of the sectors which are intended mainly for residential purposes, also contain the local marketing and shopping centres, schools, local parks, recreational centres and so on.

An area of about 610 acres has been reserved for parks and park-ways which run across the city from one end to another. Also an area of 3000 acres immediately surrounding the city has been left undeveloped. This is to function as a green belt and as parks outside the developed area of the city.

4.3 Housing

In Chandigarh houses can be divided under three major heads according to their ownership. They are :

1. Government houses provided to government employees and industrial workers.
2. University houses, allotted to employees of Panjab University and

3. Privately owned houses, occupied by owners themselves and or rented.

In each head, the houses fall into several types, depending on the size of the plot. While the largest plot is of the size of 6000 square yards, the smallest plot is 250 square yards. There are also a few government houses on such small plots as 67.5 square yards even.

The government houses have been classified into several types, each intended for separate income groups. The primary basis of the classification is the size of the plot, though it includes the provision of other facilities within the houses as well. The plot size of the different categories of government houses ranges from a minimum of 5000 square yards and more and there are in all, 13 major categories of houses.

4.4 Transportation

Le Corbusier followed a unique system of the road planning known as 'Les Sept Voies' or 7 v's. The main roads run from north to south and east to west. The town has separate roads reserved for fast moving traffic which are aligned around the sectors and pick up passengers on points so well defined on the periphery of each sector that no passenger has to walk more than a quarter of an hour to catch the bus. The system of roads was designed specifically to reduce tension and road hazards which are the most deadly occurrences of the modern age, the age of the automobile and of speed. Since no house opens on a fast traffic road, residential quarters enjoy the quiet and peaceful living.

With the seven types of roads a man could cross the continent, arrive in town and in fact reach the door of dwelling. Eighth type of road was added later as a cycle track. The roads are classified as follows :

- V 1 A connecting highway, helps cross continent and arrive in the town. These connect one city with the other.
- V 2 An urban highway, enables one to go to essential public services e.g. v 2 capital, v 2 station, v 2 university and v 2 city centre.
- V 3 General city street network surrounding each sector and penetrating each individual sector with openings in only four places, two on the vertical and two on the horizontal. It helps to cross at full speed without interruption, the territory of the town. This is reserved for mechanical circulation. They have no footpaths, no door from a house or other building will open to them.
- V 4 These are the shopping streets of the sectors and help social movements of the habitants of the sectors.
- V 5 The roads penetrate into sectors and lead to a group of houses.
- V 6 Roads leading to individual houses and help to reach the doors of dwellings.
- V 7 These are pedestrian paths.

V 8 To saggrigate the slow moving traffic from the faster one,seperate cycle tracks have been created and are called v 8 tracks.

4.5 Industrial Area

A 580 acres area was set aside for industry, of which 336 acres were to be developed during the first phase of the city, located to the east of the near the rail road terminus permitting easy transfer of raw material and finished goods without the need of transport through the city. In the event of city expanding southward, Le Corbusier suggested the location of an additional industrial area in the south part of the city where a second rail-road station could then be established. It was also proposed to seperate the industrial area from the residential portions of the city with a buffer area of trees, fruit belts, 500 feet wide considered desirable for the purposes as a pqtential source of raw material for some of the industries. Industries are only to be non-obnoxious type. Architectural controls were established regarding site coverage and material of construction It was assumed that employes of the industrial firms in Chandigarh would find residences within the city and eventually sectors 28 and 29 were set aside for industrial housing.

4.6 Commercial Area

Chandigarh commercial district of about 125 acres area is quiet similar to Connaught Place, New Delhi, as far as housing of establishment is concerned. These are housed in a three storey building block, shaded by 12 feet varandah, lined with doric

columns. The buildings are shop-cum-offices with two upper floors adopted for office use. This commercial area is located in sector 17, which has been developed as a city centre.

The main business district was designed to repeat the cross axial motif, established in the Capital Complex and in the Master Plan. Four wide pedestrian ways were designed to lead into a central chowk or square on which are fronting principal buildings of the area, The Town Hall, the Central Library, the Regional Headquarters of Post and Telegraph, the Chambers and Commerce and other large commercial establishments such as regional offices of Banks and Insurance companies. The vehicular traffic could enter along a loop road leading to parking areas at the other edge of the complex.

A sub city centre has been planned in the eastern half of sector 34. Half of sector 43 has been left for whole sale market. Shopping street in sector 22, next to the city centre has been developed to accommodate restaurants and shops. Besides this all residential sectors have been provided local shopping centres along v 4 roads.

4.7 Parks Open Spaces and Land-scaping

The parks and gardens which form the lungs of the city, have been laid out by Le Corbusier who consulted Mr. M. S. Randhawa on tree and plant varieties, out of its total area, 2000 acres are to be developed as parks. Almost 50 percent land has been set aside for these vital green spaces in terms of Rajendra Park in sector one, on west of the capital complex 'Leisure Valley' and

continuous green spaces running through the sectors, meeting the mountains which are the breath and the life of the city.

Running through the city from north to south is the undulating valley of Leisure. This is a natural valley, 15-20 feet below the general level of plateau, formed by water erosion of a one time river bed. Recreation facilities are provided and delightful shaded parks laid out in the valley.

As a part of the Master Plan, a scheme was devised for systematic landscaping in order to establish appropriate patterns of greenery through the city. Urban elements requiring distinct landscape treatment were given three classifications, the roads, the urban spaces where landscaping would work closely with architectural elements such as the capital complex and commercial areas and the free spaces for the parks.

4.8 Peripheral Control

In addition to controls established for development within the borders of the city, 'The Panjab New Capital (Periphery) Control Act 1952', gave the planners of Chandigarh, the power to regulate development within a five mile limit beyond the city which was extended to 10 miles in 1962. The main provisions of the Act for controlling and regulating the periphery of the city are as under :

1. A plan showing the area declared to be controlled area along with nature of restrictions applicable in the area is to be prepared and published under section 4.
2. Subject to provisions and restrictions provided

in the Controlled Area Plan, every person would require prior approval of the Deputy Commissioner under section five for the following :

- (a) To erect or re-erect building.
- (b) TO Make or extend any excavations.
- (c) To layout any means of access to a road.

The Act aimed at achieving the following objectives :

1. To eliminate chances of any haphazard and unplanned development in the periphery.
2. To freeze the land use in the peripheral area (which was at that time primarily agricultural) and to retain the basic character.
3. To stop conversion of land-use into uses other than agriculture or subservient to agriculture.
4. To clearly demarcate the functions of the Capital City and its periphery for evolving harmonious relationship between the two.
5. To provide legal framework for achieving the above objective.

CHAPTER 5
FUNCTIONS ASSIGNED
BY LE CORBUSIER

FUNCTIONS ASSIGNED BY LE CORBUSIER

5.1 Functions Defined by C.I.A.M. (Charter of Athens)

The four functions of the town are very well defined by C.I.A.M. (Charter of Athens). The significance of this charter lies in giving the first place to the dwellings, the environment of living, the family under the rule of '24 Solar Hours'.

The second place is given to 'Work' which is daily act of human obligation. The third is the culture of the body on one hand and an 'Intellectual Leisure' on the other

When all these goals have been received in their definitive containers, it is possible to give to each of them a respective rightful place and at this moment, can come the problem of realizing the contacts, that 'Circulation'. With this line of conduct, the urbanism of Chandigarh emerged. The decision concerning the dwelling was an arbitrary one, 'the charter of 13 categories'.

5.2 Functions by Le Corbusier

Concerning the working, Chandigarh being an administrative city, two centres have appeared, one of government, the capital complex buildings and parks and its precise situation in the landscape. The second is the Town Hall, placed in the city centre.

According to Corbusier, the other working are the University, the college and schools etc. The land for industry in the east of the city near the railway station have been provided.

So we can say that the functions of Chandigarh, according to Le Corbusier in their order of predominance, leaving aside the living are

1. Administrative
2. Educational and Cultural
3. Trade and Commerce
4. Industrial

5.3 Administrative Functions

Two centres of administrative functions have been planned, one of state government, the capital complex buildings and the second is the Town Hall, where town administrative functions are to be performed.

5.3.1 Capital Complex

The capital complex located at the head of the city, is a focal point of the city, both visually and symbolically. Secretariat, Assembly Chamber, High Court the Open Hand Monument etc. are standing on a sector of area of about 220 acres against the mountains at the upper edge of the city. In the centre, the state functions of administrative nature are to be performed. The massive 10 storey building of the secretariat is one of the most dignified buildings, designed by Corbusier himself. It is rectangular in shape, 775 feet long, 128 feet high with rugged facade in perfect harmony with the nearby hills. It has working accommodation for more than 3000 persons. Then comes the box like building of the Assembly Chamber with a funnel shaped structure on the top, giving it, the symbolic appearance of a ship. It silently imposes a responsibility on those chosen representatives

PLATE 5.1



Open Hand Monument in the Capital Complex

PLATE 5.2



Secretariat Building

of the people who assemble in it to steer the destiny of the state.

Then comes the monumental building of the High Court-the temple of justice with the three pilons of the great entrance created with a cement-rendering and are painted-one green, one white and one red. The whole design of the capital complex is commenced with a visual consciousness of the site.

5.3.2 The Centre of District Administration

Sector 17 is divided like all other sectors by the v 4 shopping street. The area, south of this division was developed as a centre of district administration while the northern section, an area of about 125 acres, serves as a major commercial and civic functions of the city. All the offices related to town or district administration, Town Hall, police station, District Court etc. are located in this sector. In this sector, the commercial district occupies the central portion of the block, while outer edges are reserved for development as an area of office buildings, those on v2 capital to be occupied by government agencies. So the total area for administrative function is approx. 350 acres, 220 acres of the capital complex and 130 acres in the city centre.

5.4 Educational and Cultural Functions

In the plan of Chandigarh, sector 12 and 14 were left as educational avenues and it was thought that this part of the town would function as the centre of important intellectual and cultural activities. In the year 1954, the senate of the Panjab

Univercity decided to move to Chandigarh and purchad full land in one sector (sector No 14) which together with some additional land to the west, gave an area of 306 acres for University use. Before this, the Panjab university teaching departments were located temporarily at Amritsar, Jalandhar, Ludhiana, Hoshiarpur and Delhi and the offices were located at Solan, a hill station 50 miles from Chandigarh on Kalka-Simla road, whereas the seat of Panjab Govt. was located at Simla.

The master plan for the Panjab University was prepared by J.K. Choudhry, Consulting Architect to the Panjab Govt. The construction of the University campus started in 1955. The University sector was designed as a self-contained community including teaching departments, student dormitories, shopping facilities and housing of seven types for University employees according to their rank and income.

The area of the city in which the University is located also contains two other large institutions. North of the Univercity in sector 12 is a Post Graduate Medical Education and Research Institute, developed as a governmental medical research centre and a centre of advanced treatment facilities, a school of medicine and a housing enclave for medical personel is also provided there. In upper part of sector 12 is the College of Engineering and a College of Architecture. The Panjab University serves as a place of instruction for post graduate students and as an examining body for a number of under-graduate colleges, spread over in Panjab and Chandigarh, of which two, one for men

and one for women, were included in the initial plan of Chandigarh. The adjoining sector, sector 10 is largely given to park area but contains a Women's Handicrafts Institute designed by Aditya Prakash and an Audio-Visual Training Institute by Le Corbusier. The program, which Le Corbusier intended the building ultimately to serve, was the training of the technicians for his museum of knowledge to be built in the capital complex. At present, however, the school is apparently functioning as conventional art school. A large park in sector 10 is provided in the master plan for Chandigarh and is termed by Le Corbusier as 'Valley of Liesure'. It has been developed as the primary cultural area of the city and houses an outdoor theatre and a museum and Art Gallary, designed by Le Corbusier. A Polytechnic Institute has been developed in eastern side in sector 26. Like the University the Polytechnic also has a self-contained community, housing all its employees in a single compound.

These educational and cultural institutions of Chandigarh were hoped to create some varied and simulating natural atmosphere.

5.5 Trade and Commerce

Due to the central location of the town in the state, Chandigarh was thought to become busy trading centre for whole-sale market of timber, grains, vegetables and fruits. Keeping this in view, a wholesale market was provided in sector 26. Central Business District has been provided in sector 17 and 125 acres of land has been provided for major commercial and civic functions of the city. It houses main shopping and commercial

areas, head offices of banks located in Bank Square, head exchange office and head post office besides other offices and Inter-State Bus Terminus.

Along Madhya Marg, Himalaya Marg and Dakshin Marg commercial areas have been provided which perform city level functions. A wholesale market in sector 43 and the eastern half of sector 34 is reserved for commercial area to serve as sub-city centre. Principal shops and restaurants were planned in sector 22 to meet the city needs.

In addition to sector 17, bazar street of sector 22, local shopping in each sector has been provided along v4 roads. Shop-cum-offices has been planned to accomodate offices of commercial establishments on top of the shops. The commercial facilities in Chandigarh are basically provided to fulfil the requirments of the inhabitants of the city.

5.6 Industrial Functions

Le Corbusier accorded least priority to industries in his master plan. He thought that the administrative city is not the same as the indusrrial city. But certain type of industries are required to meet the basic needs of the city residents e.g. service industries. A city is incomplete without industries.

The industrial area of the city 580 acres, was planned for industries. This area is located in the eastern side of the city and is seperated from the residential area by a buffer green belt. Plot sizes were laid out to accomodate both medium and

small scale units. Only non-abnoxious and electricity operated units could be installed there.

The industrial area is located close to rail-road terminus presenting easy transfer of raw material and finished goods without the need of transport entering the city. The industrial workers were provided accomodation in sectors 28 and 29.

Industrial area was planned to fulfil the service needs of the residents and to exploit the raw material available locally and to produce the finished products which need not be exported to other places but can be consumed within the city. These industries included food processing, textiles, timber, paper and paper products and autoparts.

CHAPTER 6
CHANDIGARH AT PRESENT

CHANDIGARH AT PRESENT

During the short span of four decades of its existence Chandigarh has the distinction of achieving substantial degree of growth and development. It has already crossed the targetted population of five lakhs. Since the start of the capital project, Chandigarh and its environs have shown a rapid growth of urbanisation and industrialization. In this chapter we will see the extent to which the development has taken place since the creation of the new town.

6.1 Demographic Features

Chandigarh which was a small village in 1951, qualified for a town in 1961 census when it achieved a population of 89321. Since then it has shown tremendous population growth as shown below.

Table 6.1

POPULATION GROWTH OF CHANDIGARH				
Year	Population	Percentage Variation	Sex Ratio Females/1000 Males	Literacy Rate
1961	89,321	—	N.A.	N.A.
1971	2,57,251	+188	756	N.A.
1981	4,22,849	+64.4	775	66.15
1991	5,75,829	+36.2	810	79.87

Source :- Census report Chandigarh, 1991.

During 1961-71 the city recorded unprecedented population growth rate of 188%, highest among class one towns of india. High growth of population is due to migration. Initially male members

CHANDIGARH POPULATION

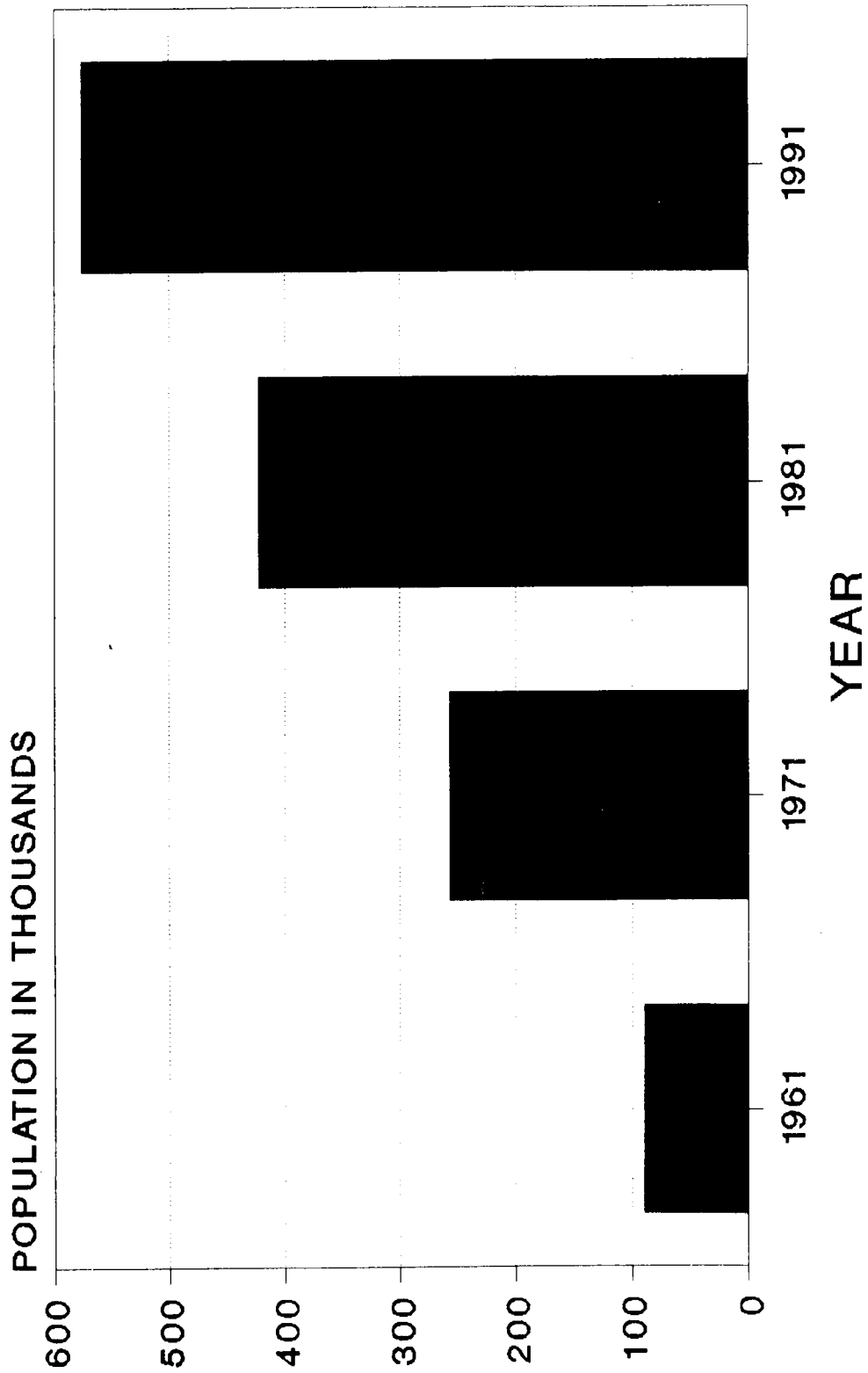


FIG 61



of the family migrated to work as construction workers. This attributed to low female to male ratio. Later when the families settled down in the city, the sex ratio improved.

First phase sectors (1-30) are low density sectors whereas second phase sectors (31-47) are high density residential sectors. Corbusier proposed the following three stages of development in Chandigarh :

Stage 1, S1 - Development of first phase.

Stage 2, S2 - Development of second phase.

Stage 3, S3 - Augment the density of phase one by raising the height of the buildings to 2.5 stories (three dwelling units).

After redenstification phase one was expected to accomodate 2.5 lakh people in place of 1.5 lakhs. But as things stand now first phase has already crossed the population of 2.5 lakhs. In fact, in 1981 itself it had a population of 2,75,118 whereas the height of all the buildings is not yet raised to 2.5 stories.

There are four villages left within developed sectors which have not been acquired and planned. These villages are Badheri and Slapur in sector 41, Attawa in sector 43, and Burail in sector 45. These four villages have a combined population of 27,025 (1991), which is not included in city population. Burail alone has a population of 16000. The population of these villages is increasing at a rate faster than the city because no development controls are enforced there and they have a very high population density. In 1981 Burail recorded a population growth rate of 108.05% as compared to 64.4% of that of Chandigarh.

OCCUPATION STRUCTURE (CHANDIGARH : 1971 - 91)

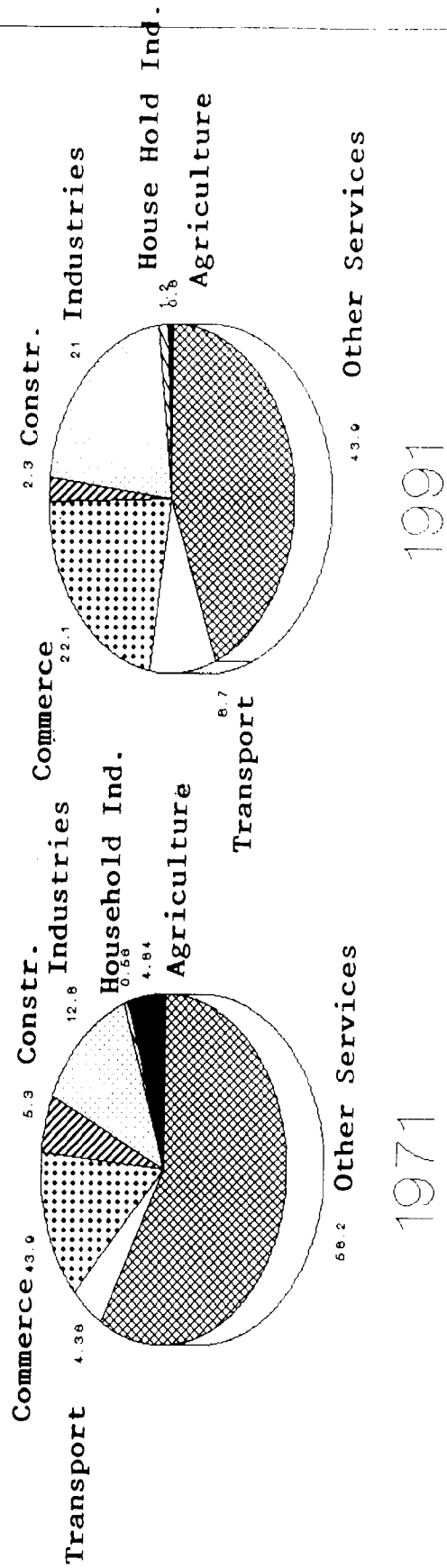


FIG 6-2

6.3 Occupation Structure

Occupation structure of Chandigarh is shown in the table below :

Table 6.2
OCCUPATION STRUCTURE OF CHANDIGARH

Sr. No.	Occupation Category	No of Workers	%age	No of Workers	%age	No of Workers	%Age
1.	Agriculture	4149	4.84	2416	1.66	1612	0.8
2.	Household Industry	447	0.56	801	0.57	2418	1.2
3.	Industries	11030	12.8	25675	17.5	42323	21
4.	Construction	4535	5.3	10182	6.95	4645	2.3
5.	Trade and Commerce	11923	13.9	25998	17.8	44540	22.1
6.	Transport and Communication	3976	4.36	9700	6.62	17534	8.7
7.	Other Services	49795	58.2	71573	48.9	201540	43.9
	Total	85645	100	146345	100	201540	100

Source :- Statistical Hand Book of, Chandigarh, 1992.

Employment in industry, trade and commerce and transport sector is growing. This is due to the increase in the level of these activities and indicate the changing trends in the occupation structure. Due to the nature of the city tertiary sector has the largest share of employment. But it is declining due to the increase of employment in other sectors.

6.3 Land-Use

Land-use in the city as observed in March 1990 in terms of the percentage of the total developed area is shown in the table

below:

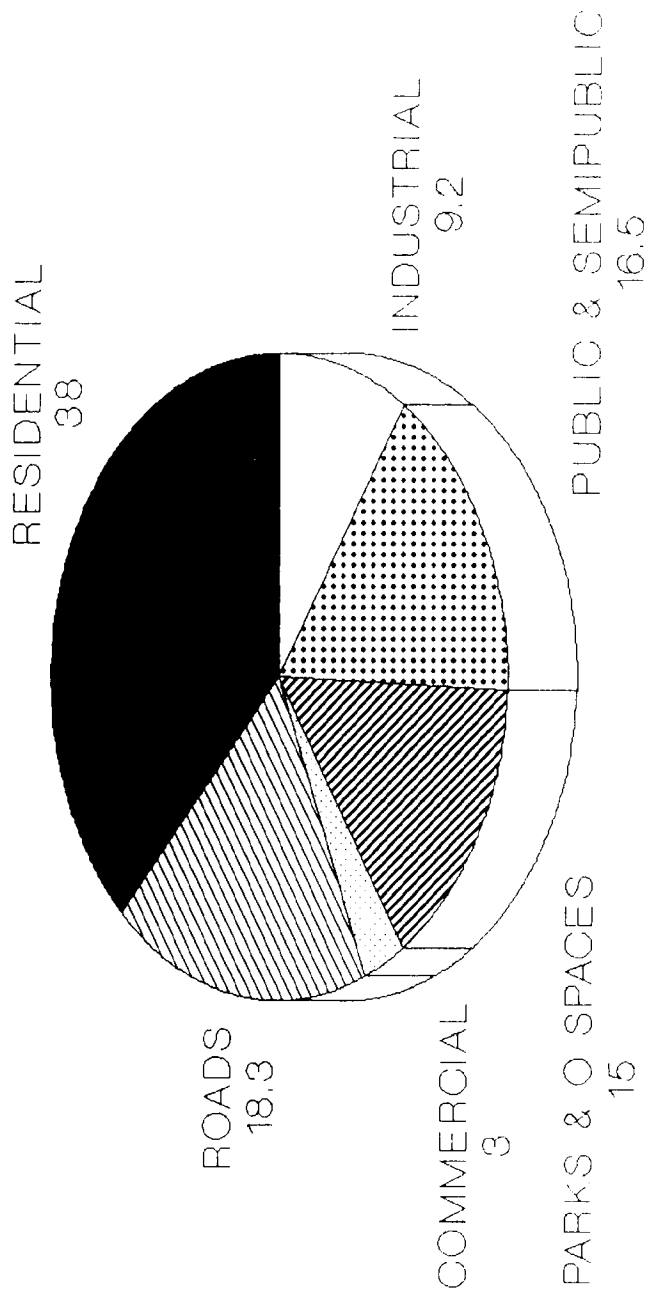
Table 6.3
LAND USE IN CHANDIGARH

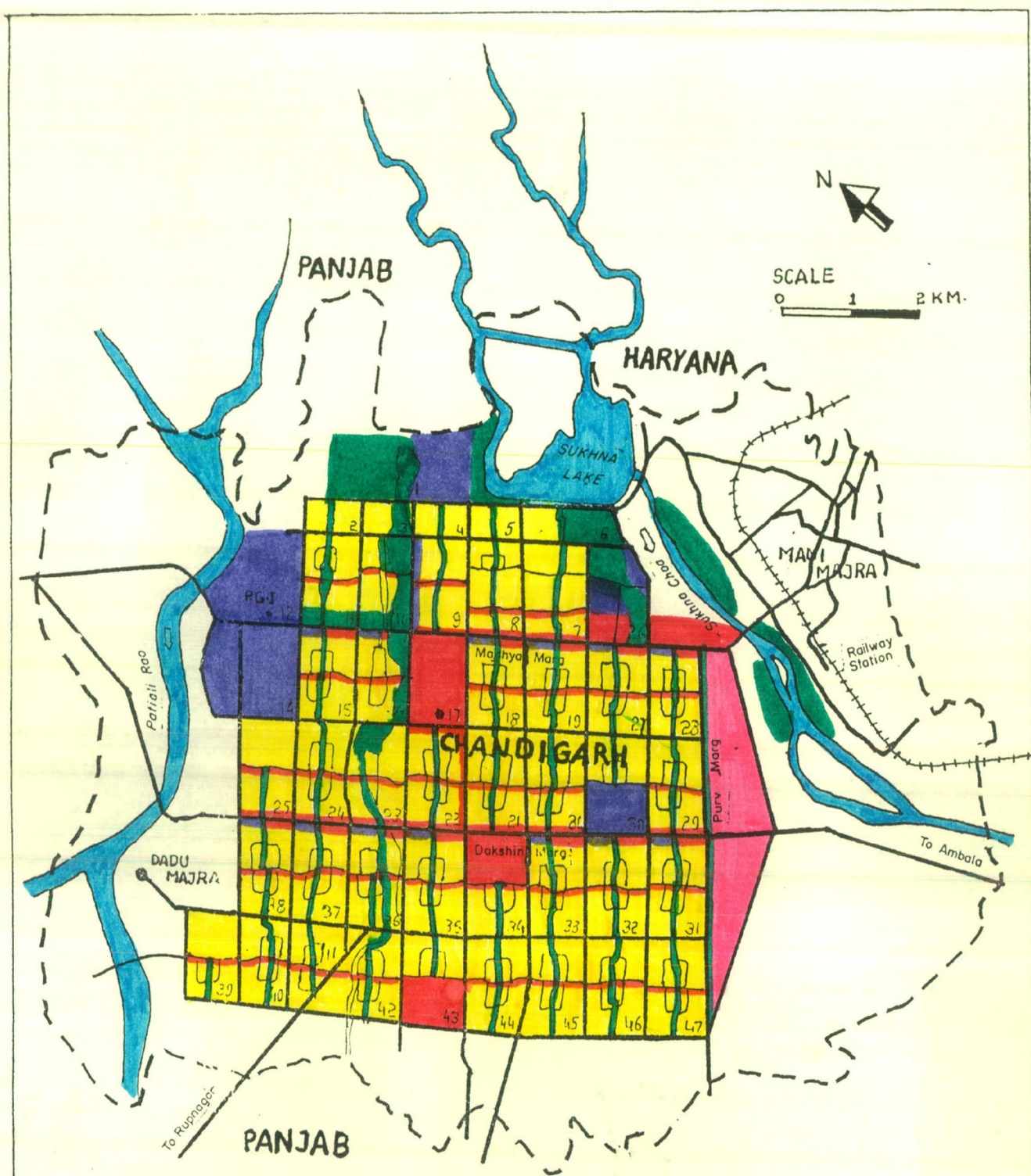
Sr. No.	Land Use	By End of First Phase	By End of IIInd Phase	Average of State Capitals	Ludhiana
1.	Residential	21.0	38.0	45.0	52.7
2.	Commercial	4.0	3.0	3.7	2.15
3.	Industrial	6.0	9.2	5.1	12.2
4.	Public and Semipublic	21.8	16.5	17.7	9.02
5.	Parks and Open Spaces	26.7	15.0	4.4	3.75
6.	Roads and	20.5	18.3	15.5	20.7
7.	Others	-	-	8.1	-

Source :- Statistical Handbook of Chandigarh, 1992.





Area under residential use increased considerably after the completion of second phase as the second phase sectors are largely residential. Large increase in industrial area is because the industrial activity is picking up very fast. Since the second phase sectors (31 to 47) are high density residential sectors, smaller areas are left for public and semipublic use, open spaces and roads. This contributes to the overall decrease in the areas under these uses. However as compared to the other state capitals Chandigarh is better placed.

LAND USE (CHANDIGARH)











LEGEND

-  U.T. BOUNDARY
-  ROADS
-  RAILWAY LINE
-  WATER BODY

LAND-USE

-  RESIDENTIAL
-  COMMERCIAL
-  INDUSTRIAL
-  PUBLIC & SEMI-PUBLIC
-  COMMERCIAL CUM CULTURAL
-  PARKS & OPEN SPACES

6.4 Development of Residential Plots

The city began its eventful career within a short span of time. The first phase of development completed in 1966. The work on the second phase started after the completion of second phase and has already been completed. The huge rush of people to Chandigarh is the indicative of the fact that the city has attained a widespread recognition. The development of the city has taken place at a very fast rate. This is evident from the allotment and construction of the plots as shown in the table. This position is as on March 1990.

Table 6.4

ALLOTTMENT AND CONSTRUCTION OF VARIOUS TYPES OF PLOTS

Sr. No.	Type of Constr.	Plots Allotted	Constr. Completed	Under Constr.	Completed + Under Constr.	%age Column land 4
1.	Residential	27885	25654	612	26266	94
2.	Commercial	4763	2270	240	2510	52.6
3.	Industrial	1843	1389	60	1442	78.63
4.	Cultural & Educational	307	90	58	148	48.2
Total		34798	29403	970	30373	87.3

Source :- Estate Office U.T., Chandigarh.

The construction on most of the plots is either complete or they are under construction. In case of residential plots construction has taken place at a very fast rate. Details of

constr. on residential plots is given below :

Table 6.5
CONSTRUCTION ON RESIDENTIAL PLOTS
(AS ON 31 MARCH 1990)

Year	No of Plots Constructed
1970-71	15,185
1980-81	17,587
1986-87	19,081
1987-88	20,707
1988-89	24,044
1989-90	25,654

Source :- Estate Office U.T., Chandigarh.

About 3000 residential plots have been allotted and constructed by ex-servicemen in sectors 33,34,35 and 36. Plots have been provided to Air Force in sectors 31 and 47 for their personels working in the Air Force Station which is located near these sectors.

Chandigarh Housing Board has an important contribution to the construction of houses in the city. The board constructs houses and allotts them to the needy people. The details of houses constructed and allotted at different periods are given

RESIDENTIAL PLOTS (CONSTR. AS ON 31 MARCH 1990)

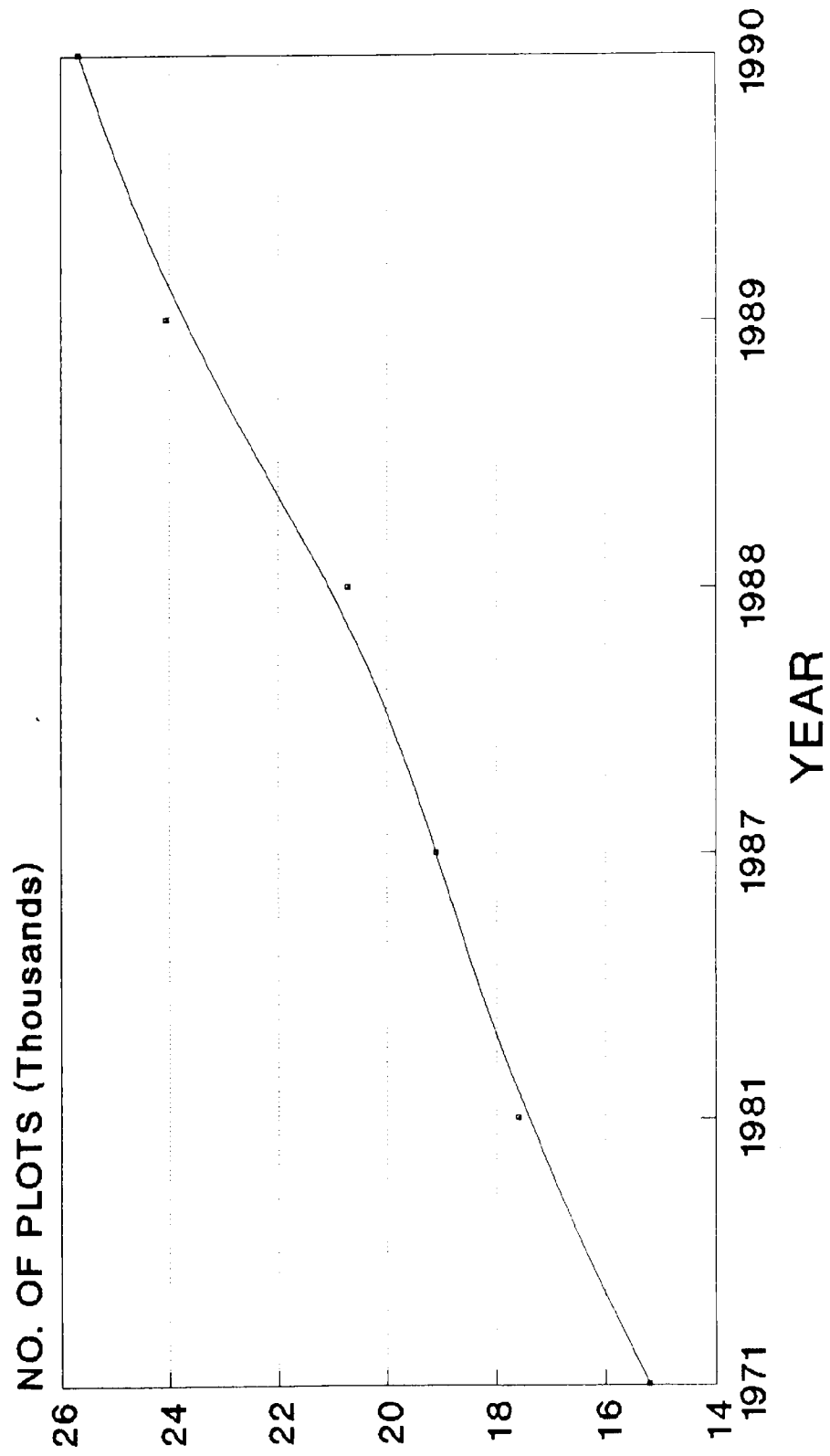


FIG 6.5

below in the table.

Table 6.6

HOUSES CONSTRUCTED BY CHANDIGARH HOUSING BOARD

Catagory	1980-81	1986-87	1987-88	1988-89	1990-91
E.W.S.	1245	1102	600	2466	40
L.I.G.	444	132	363	250	-
M.I.G.	513	236	562	491	60
H.I.G.	200	24	180	132	61
Total	2402	1494	1725	3339	161

Source :- Chandigarh Housing Board.

Although construction of residential plots has taken place at a very fast rate, but it is still not able to cope up with the high population growth rate. About 9% of the city population lives in sub-standard accomodation. A survey conducted by Estates Office in 1992 shows that there are 19,210 Jhuggies existing in Chandigarh, spread over various places such as in sectors 25,30,34 and industrial area etc.

6.5 Industries

Not withstanding these facts, no city can live by only its beauty and provision of amenities. It was felt necessary to install industries in the city industrial area. The industrial are has been developed in two phases. In the first phase 633 acres of land was developed and 900 plots were carved out, of different sizes. Due to the increasing demand of industrial plots, first phase area is being further extended by 283 acres creating 682 more plots. In the second phase 550 acres of land

has been notified for industry. Out of which 239 acres have been planned and developed into 1120 plots of different sizes ranging from 125 square metres to three acres. Thus in all a total of 1146 acres of land has been planned under industry.

The industries which are encouraged are those that are powered by electricity and do not pollute the atmosphere with fumes from coal and diesel. The industries which have come up relate to automobile parts, scientific instruments, electrical goods, food processing and sports goods etc.

In order to provide clean and cheap accomodation to the industrial workers in Chandigarh, Govt. has constructed houses in sector 30 which is closer to the industrial area, under the Subsidised Industrial Housing Scheme. However in view of the progress made in the industrial sector in recent years, these houses are considered inadequate.

The details of the registred factories and the small scale units in Chandigarh are given in the table below :

Table 6.7
DEVELOPMENT OF INDUSTRIES (1981-93)

Sr. No.	Description	1981	84	87	90	1993
1.	No of Factories	270	385	427	462	490
2.	No of Persons Employed	9670	11732	12346	11904	12492
3.	No of S.S.U.'s	1100	1940	2413	2760	3010
4.	No of Persons Employed	11210	16345	19185	21320	42028
5.	Invested Capital (in Crores)	40.88	49.68	65.48	102.05	142.70
Total Employment		20886	28077	31531	33224	36520

Source :- Department of Industries U.T., Chandigarh.

PLATE 6.1



Industries in Chandigarh

PLATE 6.2



Green Belt Between Industrial and Residential Areas

INDUSTRIAL DEVELOPEMENT (EMPLOYMENT & INVESTMENT)

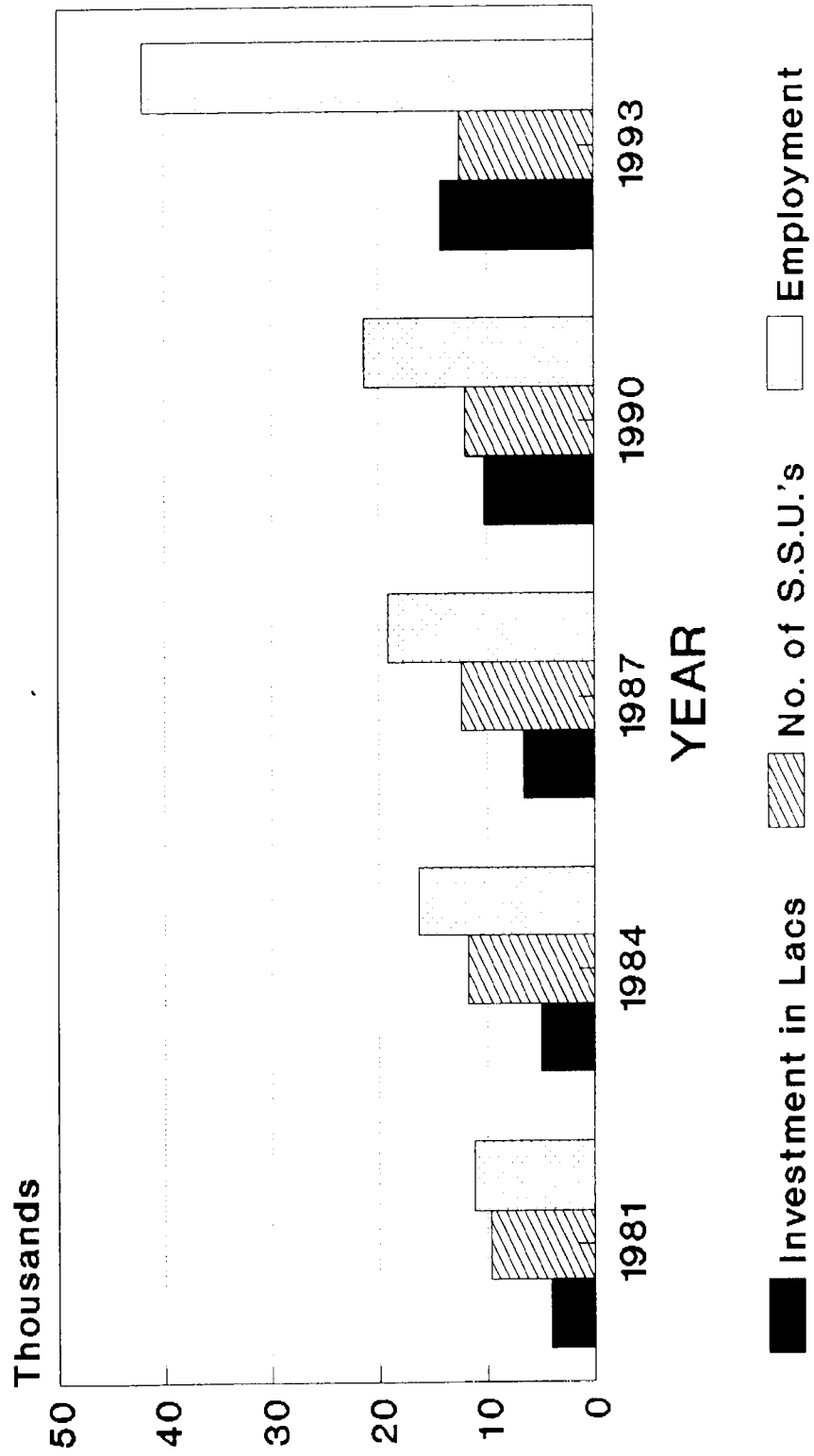


FIG 6.6

6.7 Education and Health

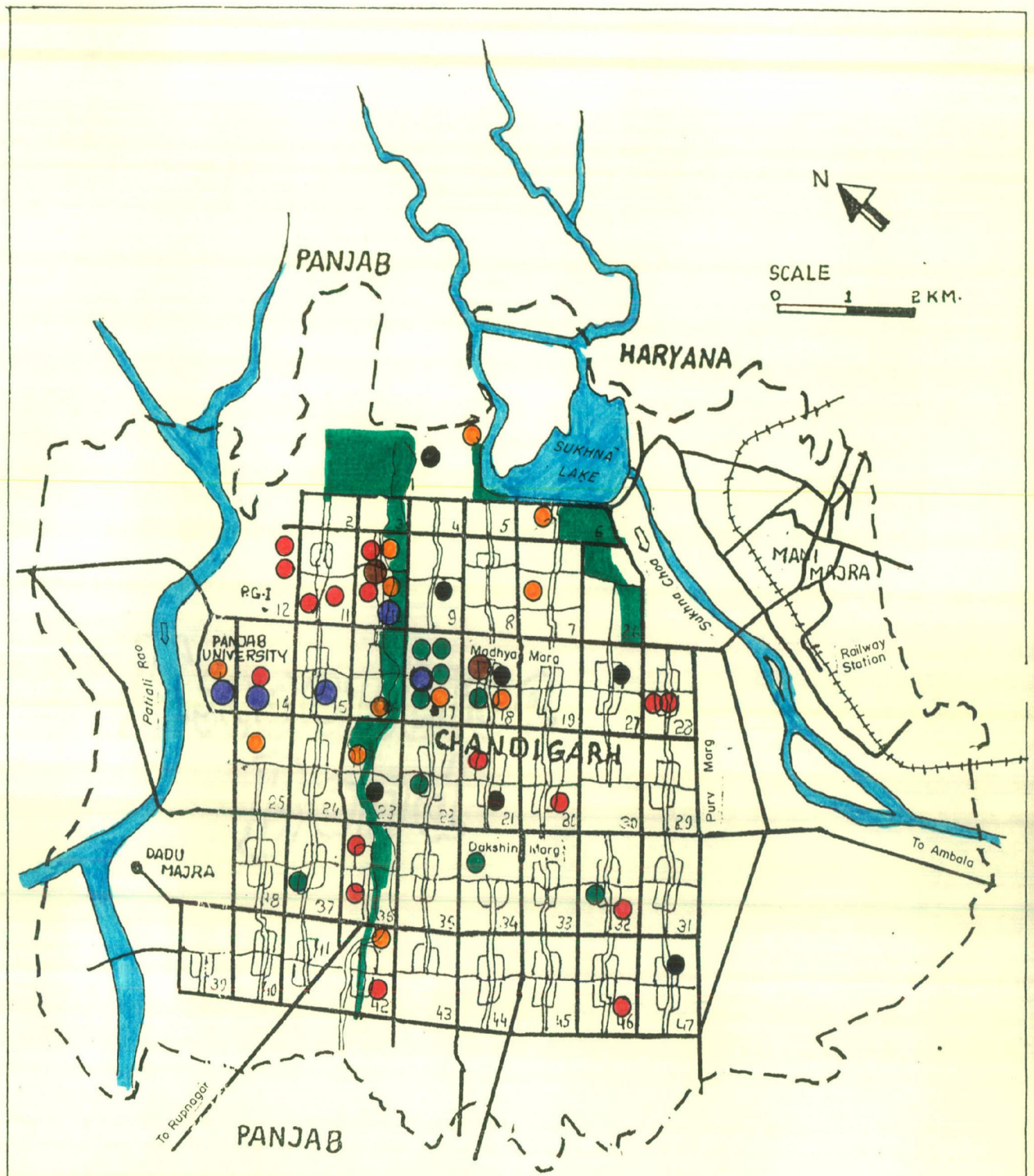
Educational facilities of Chandigarh are of unique type. Chandigarh has become one of the important educational centres of India. Besides Panjab University which provides excellent higher education and research facilities, facilities for technical education are also available. The College of Engineering, College of Architecture , Polytechnic and other colleges for general education make the city an important centre for learning. At present the following educational facilities are available in the city :

Table 6.8
EDUCATIONAL FACILITIES IN CHANDIGARH

Sr. No.	Type of Institutions	Institutions		Students	
		Boys	Girls	Boys	Girls
1.	University	1	-	2750	2482
2.	Institutions of National Importance (P.G.I.)	1	-	391	140
3.	Colleges for Professional and Technical Education	4	1	1313	606
4.	Colleges for General Education	5	5	10440	9480
5.	Higher Secondary Schools	12	4	11365	9422
6.	High Schools	53	6	26663	25601
7.	Middle/Primary Schools	76	-	13534	11431
8.	Schools for Vocational & Technical Education (I.T.I.)	2	2	1377	1010

Source :- Education Department U.T. Chandigarh.

Being a fully planned city, providing a healthy living environment to its inhabitants, Chandigarh is free from the danger of any widespread disease. But still strict enforcement of



LEGEND

- U.T. BOUNDRY
- ROADS
- RAILWAY LINE
- WATER BODY
-

FACILITIES IN CHANDIGARH

- COLLEGE
- CINEMA HALL
- SPORTS CENTRE
- COMMUNITY CENTRE
- MUSEUM
- LIBRARY
- RECREATIONAL AREA

FIG 6.7

health laws and sufficient provisions of medical facilities have been made in the city.

Almost all sectors have been provided with dispensaries. There are 176 registered doctors in the city and large number of private clinics and nursing homes are functioning in the city, providing medical cover to the residents. Besides there is a T.B. clinic, polyclinic and a general hospital. P.G.I., the premier medical institution of the country is also located in the city in sector 12. The facilities are keeping pace with the growth of the city and are growing with the increase in population.

6.8 Transportation

Chandigarh is well connected with all important towns of Panjab, Haryana and Himachal Pradesh. Delhi Manali national highway, N.H. 21 passes through the town. Chandigarh is located at a distance of eight kilometres away from Simla Delhi N.H. 22. Since the city is centrally located and connected by good road network with other towns, lot of through traffic is generated. Almost all the Himachal bound traffic coming from Delhi and Haryana invariably passes through Chandigarh. Practically all the towns of Panjab and Haryana and all the important towns of Himachal Pradesh are connected by regular bus service with Chandigarh. For Delhi there is a bus service after an interval of every 10 minutes. In addition to this Chandigarh is connected by bus with distant places like Jammu, Gwalior, Jaipur, Breilly, Hardwar etc. There are 1250 incoming buses in the bus terminus daily.

Chandigarh Transport Undertaking provides local bus service to every nook and corner of the city, besides to nearby villages and towns. It operates 87 local bus routes with a fleet of 270 buses. In addition to this taxies, autorickshaws and cyclorickshaws are other means of public transport. Daily everage 2.13 lakh passengers use the transport facilities. There are a very large number of private cars and twowheelers which use the city roads. By March 1993, Chandigarh had 1, 95,300 two wheelers, 2251 three wheelers, 28,552 cars and 502 taxies among the total 2,34,324 registred vehicals.

6.9 Development in the Periphery Zone

Periphery Zone of Chandigarh extends to a distance of 16 kilometres all around Chandigarh. It includes 525 villages and number of urban centres of Panjab and Haryana. With the development of Chandigarh this area is also developed very fast. Large number of projects like cantonment, factories and new towns have come up in this area. These developments will be dealt in the next chapter.

CHAPTER 7
ASSESSMENT OF THE
CHANGING FUNCTIONS

ASSESSMENT OF THE CHANGING FUNCTIONS

In the last four decades lot of development has taken place in various fields in Chandigarh. The level of various activities taking place in the city has also changed considerably due to various factors. The functions performed by the city are quite different than the functions assigned by Le Corbusier, the planner of the city. The changes which have taken place in the functions over the period of time are discussed in this chapter.

7.1 Service Functions

The service functions of Chandigarh can be classified into three major categories, which are :

1. Administrative
2. Education, Culture and Health
3. Trade and Commerce

7.1.1. Administrative Functions

Basically Chandigarh was designed as an administrative centre to function as a capital city of the state of Panjab (undivided) but today, as a result of political controversies and the further partition of Panjab in November 1966, the partly built city of Chandigarh was brought under the authority of Union Govt. and started acting as a hired headquarters for both the states of Panjab and Haryana. This arrangement was necessitated due to the claim of both the states for the possession of Chandigarh. The controversy still rages and till it is settled satisfactorily, Chandigarh will continue as a Union Territory.

Due to the political situation, there is no change as regards the progress of development is concerned. In fact, it has quickened its pace of development. Fortunately, the first Chief Commissioner to be appointed was Mr. M. S. Randhawa who was also Chandigarh's Chief Landscape Architect and one who understood its ideals only too well. As a result the city has developed so rapidly that the planning of the second phase became essential and within four decades of its inception the city attained its ultimate population.

The political upset brought sufficient changes in the administrative function of the town. Previous to Union Territory it was functioning as a capital of one state i.e. undivided Panjab and today it is the seat of three Govts. i.e. Panjab, Haryana and Chandigarh Administration. Number of offices increased two fold due to the division of offices, almost all types. To house them, private buildings were taken on hire basis as the government accommodation was not enough to meet the demands of administrative functions of two states.

According to Le Corbusier plan, the total consolidated area provided for administrative purpose was 220 acres in the capital complex for state capital functions and about 130 acres for city administrative functions.

In terms of buildings in capital complex, Le Corbusier made provisions for Secretariat, an Assembly Hall, a High Court, Museum of Knowledge and a Sculpture of Open Hand, a symbol of modern age "Open to receive and open to give". The capacity of the Secretariat was designed to be 3000 persons but now it is housing

about 4500 persons. It accomodates many of the headquarters of the two governments. High Court is also common to both the state governments. The total employment in the state capital complex is about 10000.

In the city centre an area of about 130 acres was reserved for city administrative functions in terms of District Court, Police Headquarters, Town Hall etc. Total employment in this part of administration, serving the city is about 5000 persons.

Due to the rapid growth of the city and due to the housing of three governments, the accomodation becomes short and the offices of the three governments i.e. Panjab, Haryana and Union Territory were forced to occupy rented accomodation. Today the office of the government can be found anywhere in any sector in private buildings.

Out of 64000 Govt. and Semi-government employees, about 29% i.e. 18560 are of Panjab Government, 21.85% i.e. 13984 of Haryana Govt., 22.6% i.e. 14464 are of Chandigarh Administration and the remaining 26.55% i.e. 16992 are of Semi-Govt. employees, employed in semi government firms and concerns.

7.1.2. Education, Culture and Health

(a) Educational Facilities

Educational facilities at Chandigarh are of regional importance. Chandigarh has emerged as one of the important educational centres of India. The Panjab University with its teaching departments and well equiped labortaries, located in the

western flank of the city, provide excellent higher educational and research facilities in Arts and Science. Facilities for technical education are also available. The Engineering College, the College of Architecture, the College of Technology and Polytechnic for men and women are built on modern lines. College of Arts, Govt. Central Handicraft Institute, Audio-visual Training Institute and the State Educational Institute are the best and the most modern institutes which provides training facilities in Arts, Science and Handicrafts. Indo-Swiss Training Centre is another important institute for training technicians. Post Graduate Medical and Research Institute provide facilities for medical post-graduates e.g. M.D., M.S. etc. There are Govt. Degree Colleges for men and women and a Home Science College which imparts specialized education to girls. Basic Training College is another good institute to train teachers. There is an Institute of Education in sector 20 and an Institute of English in sector 19 and State Institute of Special Education in sector 18. All these various types of specialized higher educational & research facilities reveal that Chandigarh has become a centre of thought i.e. centre of educational and intellectual facilities not only in whole of Panjab state but catering to the needs of neighbouring states Haryana, Himachal Pradesh, Jammu and Kashmir and Chandigarh itself. What has been achieved regarding the educational facilities of the town, is much more than Le Corbusier thought.

Table 7.1
EDUCATIONAL INSTITUTIONS AND NO. OF STUDENTS IN CHANDIGARH

S. No.	Type of Institutions	1970-71				1980-81				1986-87				1989-90			
		Inst.		Students		Inst.		Students		Inst.		Students		Inst.		Students	
		B	G	B	G	B	G	B	G	B	G	B	G	B	G	B	G
1.	Universities	1	-	4007	1495	1	-	2975	1966	1	-	2808	2248	1	-	2750	2482
2.	Institutions of National Importance	1	-	249	279	1	-	381	99	1	-	462	110	1	-	391	140
3.	Colleges for General Education	3	2	8447	3494	4	3	11342	7467	5	5	12187	8869	5	5	10440	9480
4.	Colleges for Professional & Technical Education	3	-	2020	562	3	-	1389	136	3	1	1354	553	3	1	1313	601
5.	Higher Secondary School	-	-	-	-	4	2	3381	1996	5	2	4714	3612	12	4	11365	9422
6.	High Schools	13	8	5541	2866	34	4	18550	12909	47	4	24717	21958	53	6	22663	25601
7.	Middle Schools	16	-	4594	4322	31	-	8550	7080	33	-	5853	4463	27	-	6207	5145
8.	Primary Schools	37	-	5402	3790	32	-	15907	14366	35	-	5270	4417	49	-	7327	6286
9.	Pre Primary Schools	-	-	-	-	2	2	881	710	87	-	2929	2820	133	-	4003	3686
10.	Schools for Vocational & Technical Education (I.T.I.)	-	-	-	-	2	2	1382	748	2	2	1480	931	2	2	1377	1010
Total		74	10	30260	16808	114	13	64738	47477	219	14	61774	49981	286	18	71836	63858

Source :- Education Department, U.T. Chandigarh

Table 7.2
DETAILS OF STUDENTS AND TEACHERS

Institutions	1970-71		1980-81		1990-91	
	Stud.	Teach.	Stud.	Teach.	Stud.	Teach.
University & Colleges	20553	1742	25755	2160	27602	2217
High/Secondary Schools	17833	1130	27468	1924	84403	2854
Primary and Pre-Primary	9191	N.A.	31864	604	21303	1149
Total	47577	2872	85087	4688	133308	6220
Stud. - No. of Students						
Teach.- No. of Teachers						

Source :- Education Department U.T., Chandigarh.

DETAILS OF STUDENTS (GROWTH : 1971 - 91)

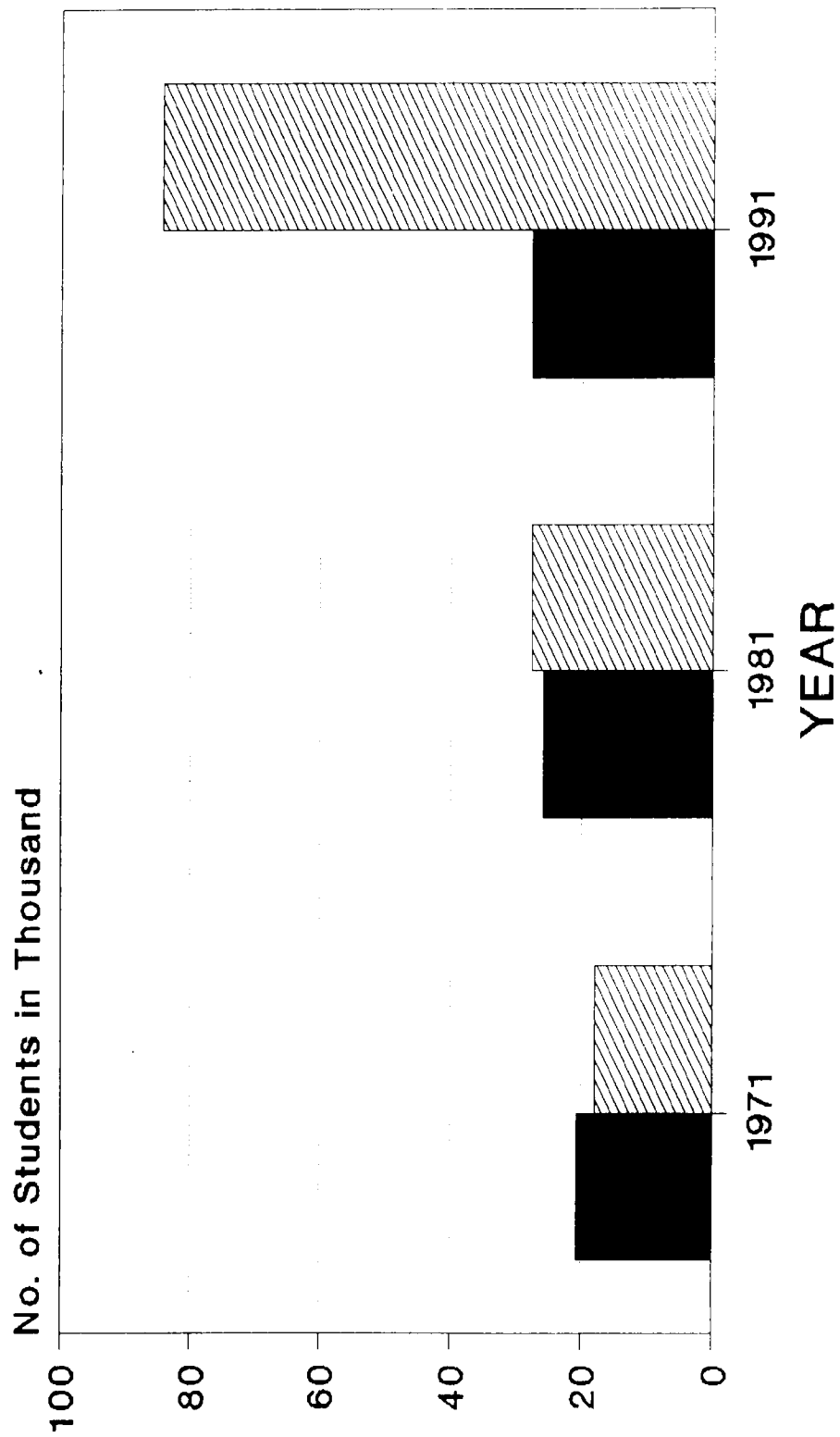


FIG 7.1

Growth of Educational Facilities

Educational institutions and No. of students in the city have grown at a very fast rate. Growth of educational facilities, No. of students & teachers is shown in the tables 7.1 and 7.2.

The No. of students availing the educational facilities has increased very fast and the educational institutions in the city not only serve the city population but much larger area which extends to neighbouring states also.

Even students from foreign countries also come to the city to study, as Panjab University is one of the best universities of the country. Above all, the city provides good environment for studies. These all factors have contributed to the emergence of Chandigarh as an important education centre.

(b) Cultural and Recreational Activities

(i) Akademies

Three important akademies have been set up with a view to promote art, literature, drama and music and to encourage co-operation among artists and writers. These three akademies are :

1. **Sangeet Natak Akademy** :-It deals with drama.
2. **Sahitya Akademy** :-It deals with Hindi, Panjabi and English literature.
3. **Lalit Kala Akademy** :-It promotes painting, sculpture, architecture, photograph and allied arts

These akademies have really stimulated the cultural life of the city.

(ii) Libraries

There are five good libraries easily accessible by the public. These are :

1. Central State Library in sector 17.
2. Dwarka Das Library in sector 15.
3. Gandhi Smarak Libraries in sectors 10 and 14.
4. University Library in University Campus.

Books covering a wide range of subjects are available in these libraries.

(iii) Museums

There are two museums, Geological Museum and State Museum located in sectors 18 and 10. The State Museum was set up with a share of 40% of the assets of the Central Museum, Lahore, received at the time of partition of country in 1947. Actually it was set up in Simla in 1951 and then shifted to Moti Bagh Palace in Patiala in 1959. In 1963, it was shifted to Chandigarh in the College of Arts building. Later it was shifted to its permanent abode near the College of Arts building in sector 10. The Museum and Art gallery Building was designed by Le Corbusier himself. It is one of the most beautiful buildings of Chandigarh.

As in the field of education Chandigarh has many recreational and sports centres. True to the Le Corbusier's concept of extending the facilities of a happy home, bringing joyous activities to its very door steps. Sites for children play grounds have been provided in every sector. Recreational and sports centres have also been provided in different parts of the city. List of sports/recreational centres, clubs etc. is given

below, sectorwise :

1. Chandigarh Club	Sector 1.
2. Sports Complex	Sector 7.
3. Cricket Pavilion	Sector 16.
4. Tennis Club	Sector 10.
5. Football Stadium	Sector 17.
6. Hockey Coaching Centre	Sector 18.
7. Yoga Centre	Sector 23.
8. Swimming Pools	Sectors 1,6,14,23.
9. Boat Club	Sukhna Lake.
10. Golf Course	Sector 6.
11. Shooting Range	Sector 25.
12. Tagore Theatre	Sector 18.
13. Skating Ring	Sector 10.
14. Sports Complex	Sector 42.

Water sports like sailing, rowing and fishing are arranged on the lake under the auspices of Boat Club. The Yatch Club which was designed by Le Corbusier, offers sailing and yatching opportunities. Golf Course has been laid out near Raj Bhawan which attracts many tourists. Chandigarh Club in sector 1, which provides for most modern recreational needs-swimming, tennis and billiards, also permits temporary membership to the tourists.

To provide educational and recreational services to the children of low income groups, the Indira Holiday Home has been located in a beautifully built structure in sector 24. It will promote the habits of discipline, self-reliance, adventure and

group living among the children.

(iv) Leisure Valley and Rose Garden

The Leisure Valley runs 15-20 feet below the general level of the plateau from North to South through the city starting from sector one to sector 42. It has become a place of joyous picnic activity for the residents of Chandigarh. In sector 16, next to the city centre a sprawling Rose Garden has been created in the Leisure Valley itself. Named Zakir Rose Garden it is spread over 30 acres of land and has 50,000 rose plants of nearly 1600 varieties. The Rose Garden has achieved worldwide distinction and is considered as the largest garden of this kind in Asia. It is planned by Dr. M. S. Randhawa, the landscape architect of Chandigarh.

(v) Rock Garden

Located in sector one near capital complex, the Rock Garden is created by Nek Chand. It is spread over an area of four acres. The completed project is expected to cover an area of 64 acres. The only one of its kind in the world, this open-air museum houses art objects fashioned from urban and industrial waste. Rocks, boulders, pieces of chinaware, fused tubelights, broken bangles, stone pebbles, coal slag etc. are shaped into objects d'art by Nek Chand. Inaugurated in 1976, the presence of the Rock Garden in Chandigarh has added a unique dimension to the city's art and architecture.

(vi) Community Centres

The community centres in sectors 1,9,18,21,23,27 and 47 have been built in order to cater to the needs of the community as a whole, specially the middle class families. These are planned to provide them a meeting place for social gathering and serve as much as healthy recreation, including indoor-outdoor games.

(vii) Cinema Halls

There are nine cinema halls in the city-four in sector 17 and one each in sectors 22, 32, 34, 37 and Manimajra, which are well furnished and airconditioned. Total capacity of all the nine halls is about 9150 seats.

(viii) Places of Worship

In almost all the sectors places of worship has been provided. There are total 42 religious centres which include 26 Temples, 13 Gurdwaras, two Churches and one Mosque.

(ix) Other Cultural Activities

There are about 100 cultural groups actively engaged in the promotion of cultural life of the city and the region. The major factor for increase in cultural activities is the low rental of Tagore Theatre and the vast facilities available there. The department of cultural affairs arrange performances by local artists and groups, outside troupes, foreign troupes with the collaboration of Indian Council of Cultural Relations, Govt. of India and troupes from other states/U.T.'s, under inter-state cultural exchange programmes.

So, broadly we can conclude that the rise and growth of various institutions of teaching and research, centre of cultural and intellectual importance, has profoundly affected the composition of the population of Chandigarh. A city which was merely swarmed with clerks and officials in 1955, has now sizeable scientific man-power and intellectual class of scientists, engineers, doctors, professors and eminent scholars in all the possible fields, have provided a new phase to the life of the city.

(c) Health Facilities

P.G.I., a prestigious medical institution, which is located in the city provides specialised medical facilities not only to the residents of Chandigarh, but also to the people residing in J & K, Himachal Pradesh, Panjab and Haryana. Its area of influence extends much beyond the earlier expectations. Western Command Military Hospital is also located in the city. It provides medical cover to large number of ex-servicemen staying in Chandigarh and in the area around.

Saket Hospital for crippled children is also located near Chandimandir Railway Station. The hospital is being run under the supervision and the assistance of the Red Cross Society of India. There are 100 beds in the hospital.

The details of growth of medical facilities is shown in table 7.3 :

Table 7.3
GROWTH OF MEDICAL FACILITIES IN CHANDIGARH

Sr. No	Medical Facilities	Year				
		1970	1980	1985	1990	1993
1.	Hospital with specialised treatment facilities	1	1	1	1	1
2.	General Hospital	1	1	1	1	1
3.	Dispensaries	15	28	32	35	38
4.	T.B.Clinic	-	1	1	1	1
5.	Polyclinics	-	-	-	1	1
6.	No.of registred doctors	112	140	152	166	176
7.	No.of beds*	240	380	500	530	530
8.	No.of beds/1000 population	0.93	0.90	1.0	0.94	-

* -No of beds in P.G.I. and Command Hospital (for exservicemen) not included.

Source :- Health Department Chandigarh Administration.

7.1.3. Trade and Commerce

Chandigarh has become a busy wholesale market of timber, grain, vegetables and fruits. Grain market of Chandigarh, located in sector 26 attracts various agricultural commodities such as wheat, pulses, gur, groundnut, paddy etc. produced on commercial scale in its environs. The chief attractions of Chandigarh market to the farmer are the relatively high price for their commodities, quick sale of produce and ready payment in cash. Besides this Chandigarh is well connected by roads with the villages and the towns around and the rail facility helps in

exporting the above items to other places from the market. These all factors contribute to the emergence of Chandigarh as an important wholesale market.

The area of influence of the commercial places like the city centre and sector 22 market extends much beyond the city limits. People from the nearby villages and the towns converge there for higher order shopping. The city is an important centre of financial institutions, sale purchase of automobiles like cars, scooters, garments and household electrical appliances.

Due to its central location Chandigarh is serving as a transport node for the states of Himachal Pradesh, Haryana and Panjab. It has developed as a transport service centre as a result, large number of vehicle repair and vehicle spare parts shops have come up in the city and in the periphery. Better transport links have given boost to the commercial activities in the city.

In Chandigarh the commercial areas were planned to meet the needs of the local residents. At present the commercial activity is no more restricted to the city only but extends much beyond that and in some cases even to nearby states also. The city is fast emerging as a regional commercial centre. This is evident from the tremendous growth shown by the commercial establishments

as shown in the table 7.4 :

Table 7.4
GROWTH OF TRADE AND COMMERCE IN CHANDIGARH

Sr. No.	Category	1970		1980		1990		1993	
		Unit	Emp.	Unit	Emp.	Unit	Emp.	Unit	Emp.
1.	Shops and Commercial Estabilsh-ments	4614	7543	6529	11230	12427	19883	14275	25693
2.	Banks	38	380	67	603	106	848	107	866
3.	Hotels and Restaurants	213	757	398	1353	475	1606	490	1666
4.	Cinema Halls & Theatres	3	110	5	179	9	305	9	305
Total		4868	8790	6999	13365	13017	22641	14882	28530

Unit - No. of Units., Emp. - Employment
Source :- Estate Office U.T. Chandigarh.

Due to increased commercial activity squatter shops and Rehri markets have come up in almost all residential sectors. Their appearance is attributed to the following reasons :

1. Local shopping areas are not within the walking distance of 10 minutes.
2. Inadequate planned commercial facilities and higher prices at the commercial establishments.
3. Lack of traditional shopping in the city planned shopping areas i.e. there are no shops for dhabas, trunk and box repair shops, cot accessories and repair shops etc.
4. Availability of large open areas in the city left for recreation etc.
5. Lack of effective development controls.
6. Political interest of the politicians.

TRADE AND COMMERCE UNITS AND EMPLOYMENT

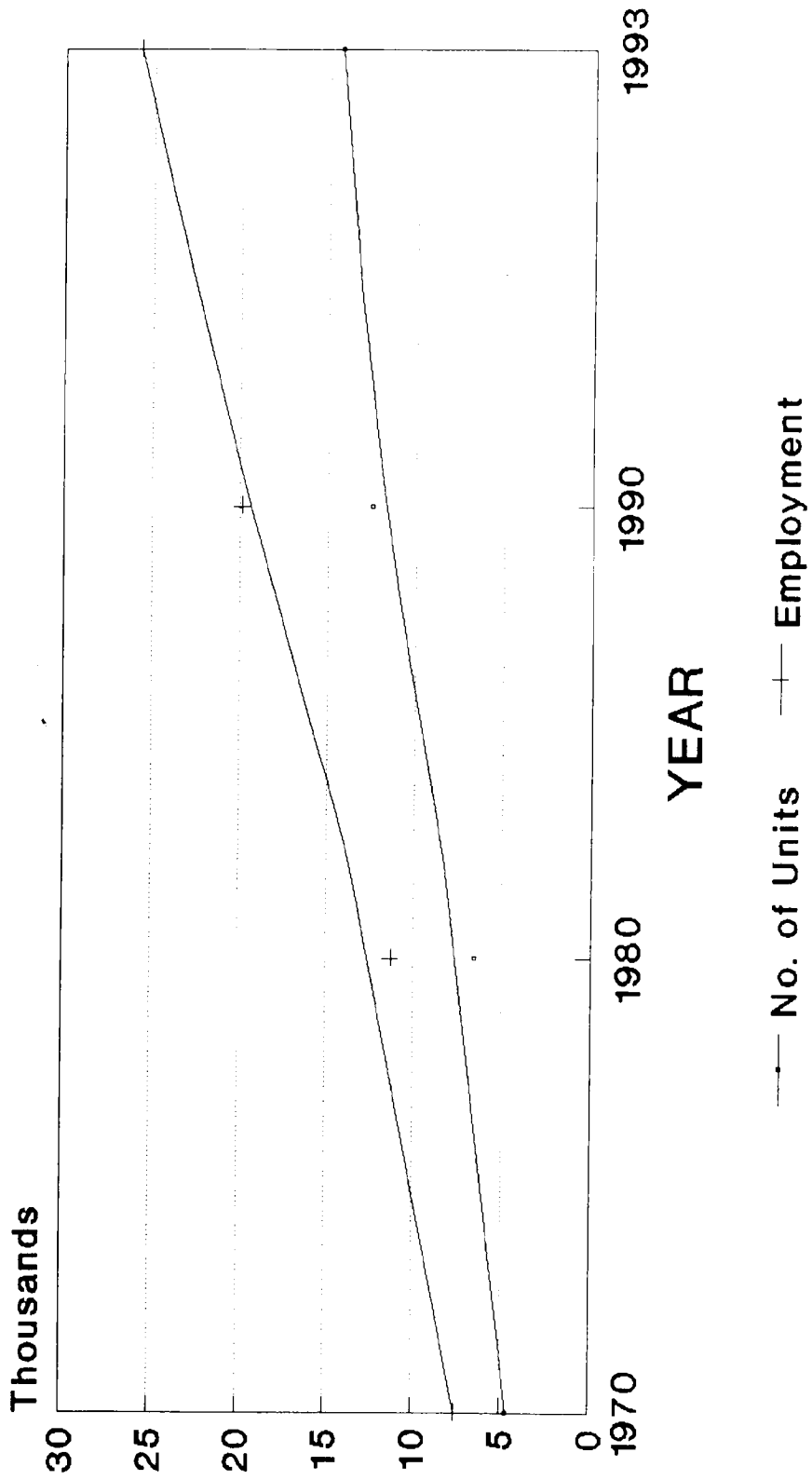


FIG 7.2

7.2 Industrial Functions

The industrial development in Chandigarh has taken place very rapidly during the last four decades and it has come up much more in area units, and employment as compared to the thinking of Le Corbusier in this respect.

In the master plan for Chandigarh, prepared by Le Corbusier, a 580 acres of land was set aside for industry of which 336 acres were to be developed during the first phase of the city. This industrial area was located in the east of the city, near the railway station in order to have easy movement of the raw material and finished products. The industries are to be small or medium size and also must be non-abnoxious, run by power, free from smoke and bad odour. Further the industrial area is separated from residential area by 500 feet wide green buffer of trees etc.

Industrial activity in Chandigarh started in 1957 - 58 when 4-5 industrial units started production but sufficient development of this sector took place after 1960. The development of medium and small scale units in the last three decades is

shown in the table :

Table 7.5
GROWTH OF INDUSTRIES, EMPLOYMENT AND INVESTMENT

Year	Industries (Ind.)	Employment (Emp.)	Investment (Inv.) (in Crores)	%age Growth Rate		
				Ind.	Emp.	Inv.
1960	50	3323	1.5	-	-	-
1970	164	8600	4.28	228	159	185
1980	1262	18785	38.47	669	120	799
1990	3222	33224	102.05	155	76	165
1993	3500	36520	142.70	-	-	-

Source :-Department of industries U.T., Chandigarh.

The abnormal growth rate till 1980 is because the proper development of industrial area took place during this time, but even after that the city has maintained a very high growth rate of 155%. This was possible despite the serious law and situation prevailing in the region and this trend is likely to continue in future also.

There are no large scale industries in Chandigarh. The city has only medium scale and small scale units. Small scale units have maximum contribution in terms of number and employment. Group wise break up of small scale units, their employment and growth

GROWTH OF INDUSTRIES EMPLOYMENT & INVESTMENT

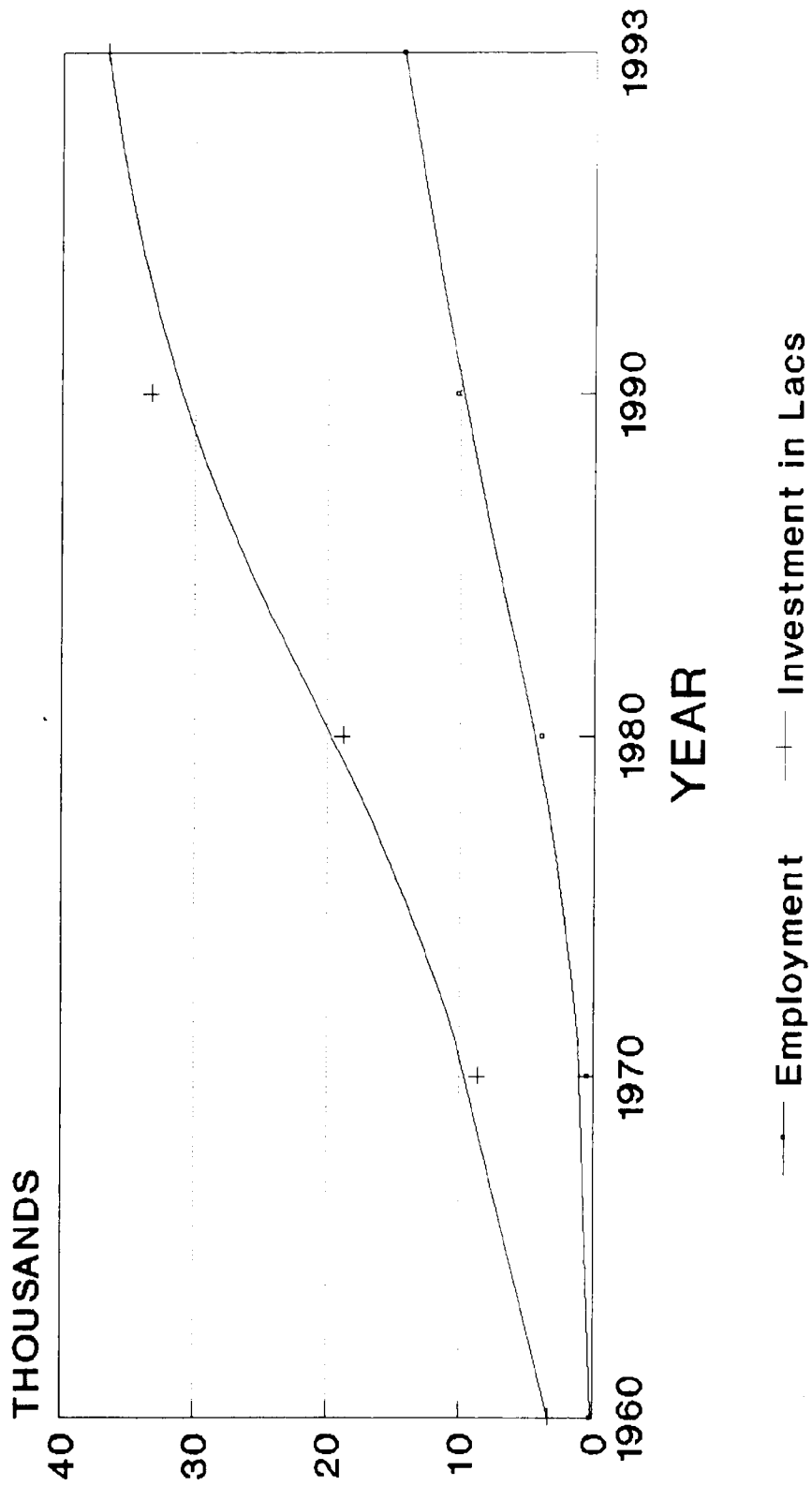


FIG 7.3

in the last three decades is given in the table :

Table 7.6
TYPE OF INDUSTRIES, THEIR EMPLOYMENT AND GROWTH

S. Industry Group No	1970		1980		1990	
	Units	Empl.	Units	Empl.	Units	Empl.
1. Food Products	8	227	25	705	182	1727
2. Textiles/Hoisery	2	43	5	103	54	734
3. Non-metallic Mineral Products	7	190	12	330	43	805
4. Wood	18	51	30	76	134	1006
5. Paper and Paper- products	10	368	16	590	129	1040
6. Chemicals	76	637	118	960	288	1740
7. Basic Metal Alloy	29	376	68	849	126	1149
8. Machine Parts and Spares	24	482	43	855	152	1422
9. Auto Parts	93	865	187	1781	310	2021
10. Electronics	14	241	38	600	101	756
11. Iron and Steel Forging	126	982	381	3118	639	4851
12. Leather	5	26	14	80	31	198
13. Miscellaneous	65	1376	134	2922	571	4157
Total	477	5855	1071	12969	2760	21320

Source :- Department of Industries U.T., Chandigarh.

It is evident from the table that all types of industries are growing at a very fast rate. No particular type of industry is favoured for growth and all have shown a similar growth rate.

Reasons for Heavy Demand of Industries in Chandigarh

The heavy demand of industrial plots is due to the following reasons :

1. Saturation of industries in other industrial towns like Ludhiana etc.
2. Availability of better and sufficient infrastructure and better living environment in Chandigarh.
3. Availability of good markets for finished goods.
4. Central location of the city in its three neighbouring states of Panjab, Himachal Pradesh and Haryana.
5. Availability of good and sufficient road network connecting the industrial area to all other important towns and cities.
6. Availability of cheap and adequate hydroelectric power.
7. Availability of abundant potentialities for ancillary industries based on existing industries.

Type and nature of industries coming up in Chandigarh clearly show a deviation from the traditional ideas of industrial locations. If we see the ultimate growth of industries in Chandigarh, we can say that they have grown very rapidly in the last three decades, much faster and more in area than thought by Le Corbusier. His concept of industries was just to meet the requirements of the inhabitants of the city and not for making the city an important industrial centre. The land use pattern as it exists at present, shows an increasing trend in the percentage of industrial area. Originally Corbusier provided 2% of the developed area for industry. At present it is 9.2% which is close to the highly industrialised city of Ludhiana, which has 12.2% of

the developed area for industries. With Mohali emerging as phase three of Chandigarh, city will not merely remain an administrative city but become industrial one also, which Corbusier never wanted.

7.3 Peripheral Growth

The periphery of Chandigarh extends to 16 Km. on either side of the town based on the available physical features. It extends to Kalka on the north, includes Kharar on the west and Banur and Derabassi in the south. The total area of the periphery is about 1316 Sq. Km. and is known as "Zone of Peripheral Control".

Before reorganisation of Panjab, the area was under capital project of Panjab Govt., and the development of this area was controlled solely by the Chief Administrator of the Capital Project and a written permission was essential for any proposal of development. There was an attempt to control all types of development in periphery of the town.

The peripheral area was having a population of 9,21,000 in 1991. The important towns of the area includes Kalka, Panchkula, Mohali, Kharar, Derabassi and Banur. There are 525 villages in the periphery zone, the details of which is given below in the table :

Table 7.7
TEHSIL WISE DETAILS OF VILLAGES IN THE PERIPHERY ZONE

Tehsil	District	State	No of Villages Notified Under Periphery Control
Kharar	Ropar	Panjab	421
Sirhind	Fatehgarh Sahib	do	8
Rajpura	Patiala	do	79
Naraingarh	Ambala	Haryana	17

Source :- T.C.P.O Chandigarh.

Special projects like H.M.T. factory at Pinjore, Chandigarh Cantonment at a distance of 13 Km. from Chandigarh and Air Force Station at a distance of 5 Km. from Chandigarh were accommodated under certain provisions of the Peripheral Act. The areas reserved under these projects are :

Cantonment	2500 acres
H.M.T. Complex	900 acres
Air Force Station	2000 acres

At present, the fate of Chandigarh's periphery is quite different from what it was thought. After the reorganization of Panjab in 1966, Chandigarh and its periphery came under the control of three governments, Panjab, Haryana and Chandigarh Administration.

The control of developments in the Chandigarh Union Territory is under the Chandigarh Administration and 70% of the town periphery is under the control of Panjab Govt. and the rest is under Haryana Govt.

As there is no single authority to control developments in the town's periphery, growth in the periphery is taking place unchecked, unplanned and is quite far off from the concept of green belt as thought by Le Corbusier. Developments particularly industrial activities and defence projects have come up in their own way and almost all the small and big settlements in the area are expanding very fast, due to the shortage of plots, both industrial and residential in Chandigarh.

CHANGING

**FUNCTIONS OF
CHANDIGARH**

ULB-REGIONAL PLAN CHANDIGARH

LEGEND

- STATE HIGHWAY
- DISTRICT BOUNDARY
- URBAN COMMUNITY BOUNDARY
- RAILWAY LINE
- NATIONAL HIGHWAY
- OTHER ROADS
- PROPOSED RAILWAY LINE
- PROPOSED ROAD
- WATER BODY

**DEVELOPMENT IN
THE PERIPHERY**

- 1. MOHALI TOWN
- 2. PANCHKULA TOWN
- 3. MANIMAJRA TOWN
- 4. CANTONMENT & DEFENCE PROJECTS
- 5. INDUSTRIAL TOWNS OF PINJORE
SURAJPUR, DERABASSI & KHARAR
- 6. EXPANSION OF KALKA, KURALI,
BANUR ETC. TOWNS.



Scale 1:50,000

Map No. 100

MOA

1961-62

CHANDIGARH

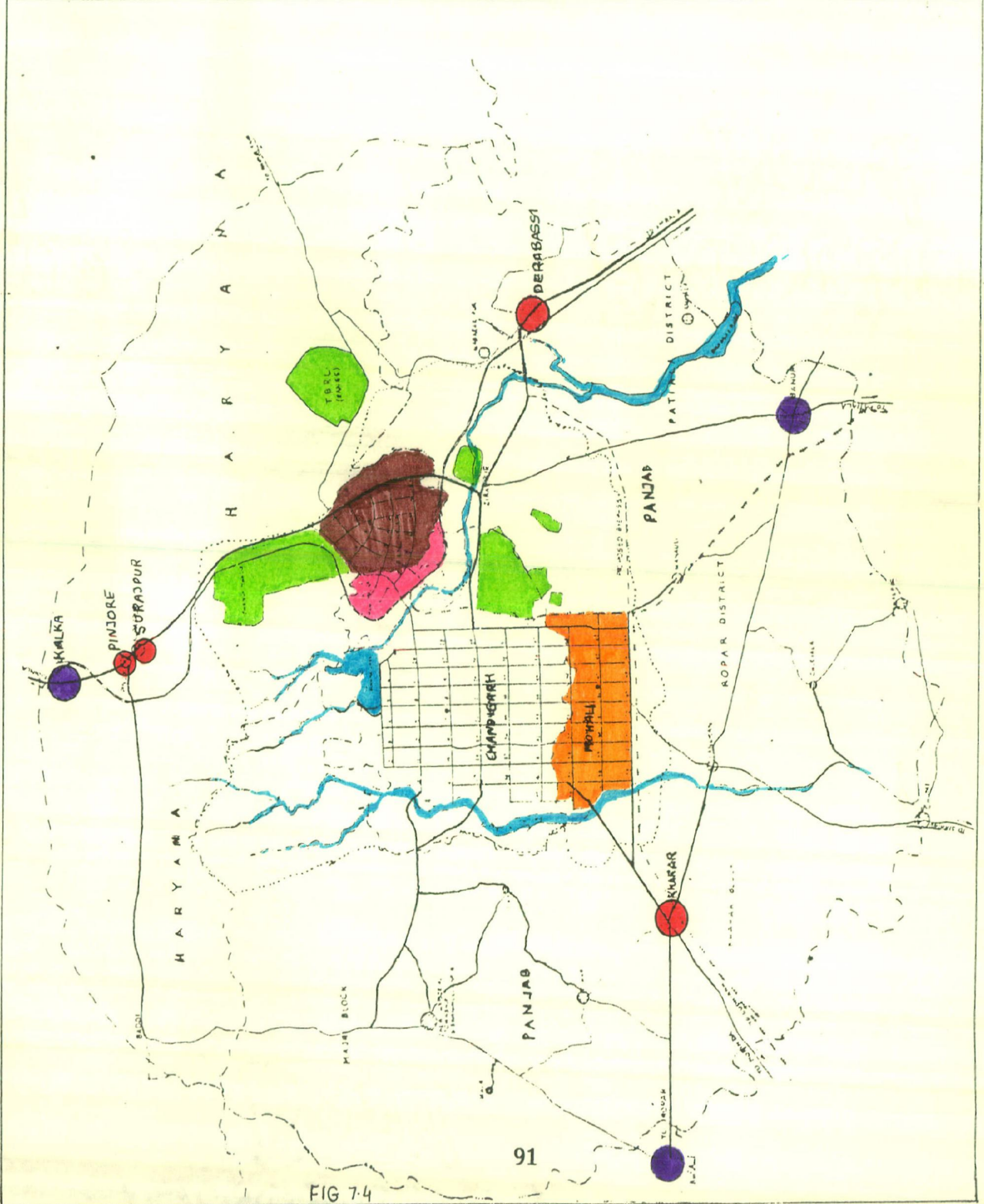


FIG 7-4

7.31 Emergence of Mohali and Panchkula Towns

After the division of Panjab in 1966, Chandigarh became Union Territory. Both the states of Panjab and Haryana staked their claims for the capital city. When no decision was given by the central govt., the two states in 1967 decided to create new towns of Mohali and Panchkula on the outskirts of Chandigarh in their respective territories in the green belt area. It was a clear violation of Periphery Control Act. Mohali is planned in the western side of Chandigarh and is contiguous to it. It has sectors similar to Chandigarh and are numbered from 48 to 73. The city had a population of 77, 852 in 1991. It is a residential town having its own local level shopping facilities, a degree college and a number of schools. Panjab School Education Board office is also located there.

Panchkula town is located in the east of the town in Haryana. It is also based on sectors but they are not rectangular like Mohali. It has 22 sectors of different sizes. The city had a population of 70,782 in 1991. Panchkula has its own commercial and industrial areas, but it lacks in other facilities like higher education, medical, transport and recreation etc.

Both the towns of Mohali and Panchkula are located in the places where actually green belt should have been there. They are heavily populated but lack in facilities like higher order of shopping, higher education, transport, communication, medical and recreation, for which they are dependent on Chandigarh. They have put a heavy strain on the infrastructure of Chandigarh and are still growing unchecked.

7.3.2 Industrial Developments

(a) Hindustan Machine Tools (H.M.T.), Pinjore

This industrial project came here in 1962 under the programme of Third Five Year Plan. This could not be located in the industrial area of Chandigarh because of :

1. Grossly inadequate provision of industrial area in the Master Plan of Chandigarh.
2. H.M.T. being a big project, required its own housing etc.
3. H.M.T. project is such, could be located on any flat site as it is not tied to local raw material or market.

Area of land allotted to this project is 846 acres out of which, factory occupies about 45 acres whereas the township has 380 acres of land. Sufficient provision for future expansion is kept in order to meet the future requirements. The factory is manufacturing machine tools i.e. milling machines of different sizes and specifications and tractors. It has 8300 persons employed.

In the factory township, there are 2240 houses which are located at a walking distance of 10-15 minutes from the factory site. It has got two wings of township, one on the same side as factory while the other is just opposite to the administrative building, across the National Highway, for upper class officers.

The township is not catering the housing requirements of the employees fully and large number of persons have to come daily from Chandigarh city. Township also lacks in medical, recreational and educational facilities and the inhabitants have to depend on Chandigarh. Factory has got its own transport facilities and

hence the inhabitants have easy accessibility to Chandigarh for their requirements. The total population of the town is about 15000.

(b) Surajpur Cement Factory

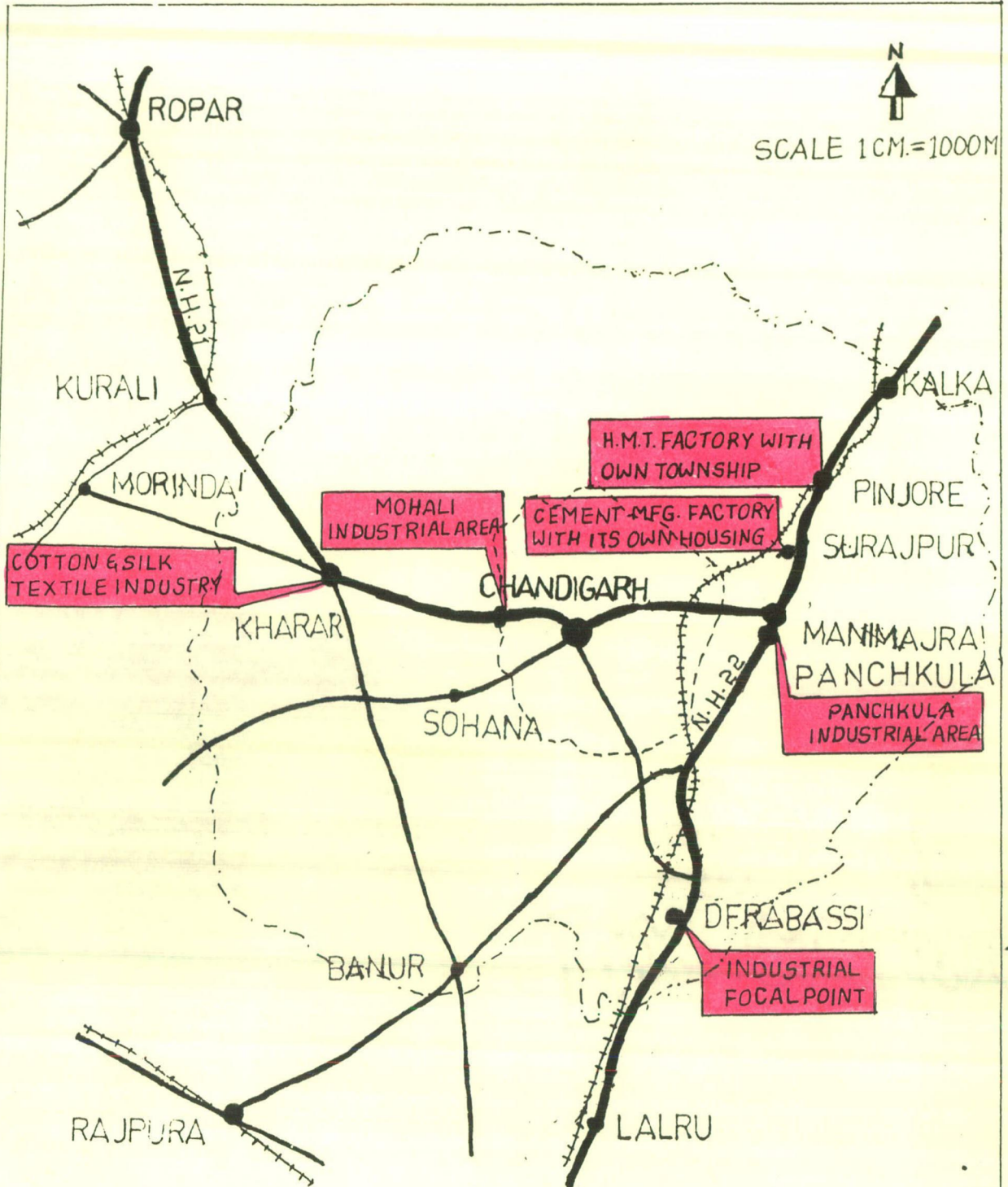
Very near to H.M.T. factory towards Chandigarh side, a big cement factory was located before the birth of Chandigarh. The location was thought suitable because of :

1. Availability of raw material i.e. limestone in abundant quantity.
2. Proximity of the National Highway.
3. Availability of the unskilled labour in the near vicinity.
4. Heavy demand of cement in the region.

The factory has about 2600 workers. It has got its own housing arrangement for some of its employees. The housing area can only accommodate 2000 persons and rest of the labour come from the nearby villages








(c) Mohali Industrial Focal Point

Due to heavy demand of industrial plots in Chandigarh as against the limited provision for it in the Master Plan, the Panjab Govt. has developed some 450 acres of land for industrial activity in Mohali in south west of Chandigarh. This area is beyond second phase of Chandigarh where Le Corbusier also suggested the location of additional industries. Due to the partition of Panjab, this area lies in Panjab territory and Panjab Govt. is the authority to develop this area. Government



N
 SCALE 1CM.=1000M

LEGEND

-  RAILWAY LINE
-  NATIONAL HIGHWAY
-  STATE HIGHWAY
-  RIVER & NALLAHS
-  TOWNS & SETTLEMENTS
-  PERIPHERY BOUNDARY
-  U. T. BOUNDARY

INDUSTRIAL DEVP. IN CHD. PERIPHERY

<u>PLACE</u>	<u>AREA</u> (ACRES)
MOHALI	450
PANCHKULA	300
DERABASSI	135
PINJORE	846
SURAJPUR	350
KHARAR	150

FIG 7.5

has planned about 1200 acres i.e. two rows of sectors just extending the city downward even after second phase is developed. So far 450 acres of land has been developed for industrial activity and 855 plots have been carved out of it. Out of this 761 plots have already been allotted to private investors and large number of small and medium scale industries have come up.

(d) Panchkula Industrial Town

Just to counter balance and to compete with Industrial Focal Point, Haryana Govt. has developed the Panchkula area as another industrial centre in the vicinity of Chandigarh in order to attract the industrialists in the territory of Haryana. This area is located towards the east of the town near the junction of the National Highway leading to Simla and the Road going to Chandigarh. About 300 acres of land has been reserved for industries and plots are being allotted to the interested people. This area is not yet fully developed and is still in the development stages.

(e) Derabassi Industrial Focal Point

Located on the National Highway No 22, Derabassi is a small town with a population of 9375. It has been developed into Industrial Focal Point by the Panjab Govt. Due to the location and its well connectability, the town is best suited for location of industries. 135 acres of land has been developed into 178 plots and out of that 162 have already been allotted. Although the industrial area is in the development stage quite a few industries have already come up. These include chemical, food processing and leather units. Recently a unit named 'Panjab Meats

Ltd./has been set up with an investment of 30 crores and it will produce tinned beef which will be fully exported.

There are no housing facilities available in the town, nor any infrastructure exists at present for accomodation as the town is very small. All the workers comute daily to the town for their work.

Other industrial developments are coming up in the urban centres of the Chandigarh surrounding area i.e.in Kharar, Manimajra, Naraingarh, Sohna, Siswan-mulapur etc. Some scattered locations of industries have come up along the National Highway between Chandigarh and Ambala.

Reasons for Peripheral Industrial Growth

Industries in the periphery of Chandigarh are coming up very fast due to few favourable factors such as :

(a) Availability of Resources

1. Agricultural raw material leading to industries based on:

- (i) Oils, soaps, wheat etc.
- (ii) Floor mills
- (iii) Cotton-ginning, pressing hosiery, textiles.
- (iv) Sugarcane - sugar - mollasses - alcohol.
- (v) Fruits - canning.

2. Forest raw material leading to industries based on:

- (i) Paper and pulp.
- (ii) Synthetic fibre.
- (iii) Photo chemicals.
- (iv) Wood and timber furniture.

3. Man power - enterprising and ambitious people.

- (b) Availability of water from tubewells and Ghaggar river.
- (c) Cheap electrical power.
- (d) Good network of roads.
- (e) Ready market for consumer goods.
- (f) Progressive and encouraging policy of the Govt.
- (g) Availability of building material like bricks, cement and lime etc.
- (h) Availability of sufficient infrastructure and of good living environment for the industrialists in the new town of Chandigarh itself.

So, we find that many industries have come up and many more are to come in the near future but there is no conformity and relation between them as there is no periphery development plan and there is no single authority to control the development within the periphery of Chandigarh.

7.3.3. Development of Cantonment and Other Defence Projects

(a) Development of Cantonment

The major development in this regard is Chandigarh Cantonment. It is located about 13 Km. from Chandigarh on the bank of Ghaggar River. National Highway No. 22 and Delhi-Kalka Main Railway line run through the area. The site is interspersed with nallahs and rivulets.

Le Corbusier was not in favour of locating the cantonment very near to Chandigarh, as it was to be located in the area left for green belt and after big controversies, the decision was taken in 1962 to locate the Chandigarh cantonment at the present site.

The location of the site was due to the following reasons :

1. Strategic location of the area.
2. Near to the source of water supply.
3. Availability of the National Highway and main railway line.
4. Site was clear of existing settlements.
5. Ready made survey data was available due to the fact that the site was sited for the new capital town in the beginning of the capital project.
6. Proximity to the city Chandigarh in order to have the close relation with the civilian population.

The main features of the Master Plan of Chandigarh Cantonment are :

1. Area and Population

The Master Plan for the area of about 3075 acres for the population of 35,000 was prepared and according to the plan work on it completed. But later the area was extended by another 4000 acres towards the north west of the earlier location accommodating the total population of 75,000.

2. Planning of the Area

According to the geography of the site, the area is divided into three terraces and the major land use pattern under the Master Plan is as follows:

- First Terrace - Residential use.
- Second Terrace - Central shopping area.
- Third Terrace - Certain amenities like Hospital, Police Station etc. and the location of the offices and Headquarters of the Western Command.

3. Roads and Communication

The pattern and nature of the roads is eventually similar to the Chandigarh pattern of grid iron system.

4. Recreational Areas

Sufficient area is planned for this purpose by taking out a main canal from Ghaggar river. Whole of the area around this canal and river is reserved for recreational purposes.

5. Offices Location

A suitable site for the offices of the Cantonment Board Administration, Cantonment Board Hospital, Cattle Pond has been marked in the Master Plan with a sector for civilian accomodation for the supporting population of the Cantonment.

6. Utilities and Services

The total water supply requirment with possible 50% expansion of the population was calculated to be 50 lakh gallons per day. This demand will be met by Chandigarh Administration to the extent of about 30% i.e. 15 lakh gallons per day and the rest will be met by Tube Wells to be provided in the bed of Ghagger river.

Beas project administration has constructed dam across the Ghagger river on the north east boundry of the cantonment which is meeting the total requirment of 50 lakhs gallons per day.

Regarding electricity, there is no problem as it has been connected with the regional grid and the total demand of 2500 K.V.A. is easily met.

For sewerage etc., sewerage disposal plant has been located in the south east of the Cantonment.

The area is easily accessible by road and the average daily handling of the stores and dry supplies of about 85 tons per day is dealt by providing a railway siding from Chandi Mandir Railway Station in the Cantonment limits in the vicinity of the supply company.

(b) Other Defence Projects

There are many strategic locations for defence projects like firing ranges, Terminal Ballistic Research Laboratories (T.B.R.L.), working under D.R.D.O. and their missile testing range, Ordnance Cable Factory, Chief Engineer Chandigarh Zone (M.E.S.) and the Air Force Station besides other small defence projects.

So, we see that the developments in the periphery of Chandigarh are taking place every now and then. These projects and developments are planned in themselves and are not related with each other and to the city of Chandigarh, with the result that the concept of periphery which is totally lost and the Act, provided for this purpose, is of no use as this periphery is owned by two states i.e. Panjab and Haryana and there is no authority to exercise the peripheral control. These various developments in the periphery have given rise to numerous problems in the new town and to the surrounding area in terms of transportation, infrastructure, housing, community facilities etc. These will be discussed in detail in the next chapter.

CHAPTER 8
PLANNING IMPLICATIONS
OF CHANGING FUNCTIONS

PLANNING IMPLICATIONS OF CHANGING FUNCTIONS

In the previous few chapters, we have seen the extent and scale at which Chandigarh is performing its functions. To what extent, they are in conformity with the thinking of its great, well-known planner Le Corbusier? After making this study, a question arises in our mind i.e. what is the impact of Chandigarh or its changing functions in the nearby small or big settlements and what is the effect on the city structure due to certain unforeseen developments which have come in the last four decades in the periphery of Chandigarh. The following aspects will be covered in this chapter:

1. Trends in the urban growth in the periphery.
2. Impact of changed functions and peripheral growth on the city structure.
3. Emerging problems of the city.
4. Validity of Le Corbusier's concept.

8.1 Trends in the Urban Growth of the Periphery

To know about trends of urban growth in the surrounding area of Chandigarh, certain factors such as demography, industry, infrastructure, transportation, trade and commerce were taken and nature of urban growth has been related to the increase or decrease of these factors during the past four decades.

Before Chandigarh came into existence, Amritsar, Ludhiana, Jalandhar, Patiala, Ambala, Kalka and Simla were the major settlements in the eastern part of Panjab. With the creation of Chandigarh and its rapid development, a number of

smaller settlements lying on the major highways, connecting Chandigarh with Kalka, Ambala, Patiala and Ludhiana have been growing rapidly. Chandigarh and these major towns have exerted a gravitational pull on these smaller settlements. Various aspects of changing trends in the peripheral towns is shown below in table 8.1 :

Table 8.1
TRENDS OF URBAN GROWTH IN THE PERIPHERY

Factors Considered	Kharar	Kurali	Mori- nda	Kalka	Banur	Sohna	Dera Basi
1. Demography							
Population							
1961	8216	6390	7540	18068	4308	3350	4051
1971	10686	9776	9326	23500	5459	5000	5807
1981	21807	12637	13505	31725	7453	7650	7421
1991	26093	17567	17439	45049	9501	12316	9375
Population Growth (Per annum)							
1961-71	+2.5	+2.8	+4.35	+3.35	+9.85	+5.5	+6.75
1971-81	+10.4	+2.9	+4.48	+3.50	+3.70	+5.3	+2.80
1981-91	+1.96	+3.9	+2.91	+4.20	+2.70	+6.1	+2.60
Literacy Rate (Percent)							
1961	58	57	62	67	63	61	68
%age of Workers (of total male population)							
1981	55	36	45	33	39	29	28
1991	58	40	55	60	48	35	40

Continued

Factors Considered	Kharar	Kurali	Mori-nda	Kalka	Banur	Sohna	Dera Basi
2. Occupation Structure (in % of total workers)							
Primary 1981	10.4	12.4	8.4	1.6	41.7	36.7	16.2
1991	5.0	8.0	6.0	1.5	30.0	30.0	12.2
Secondary 1981	37.66	25.2	16.6	10.1	20.9	19.3	35.0
1991	25.0	30.0	20.0	15.0	28.0	22.0	35.0
Tertiary 1981	51.94	62.4	75.0	88.3	37.3	44.0	48.8
1991	70.0	62.0	74.0	83.5	72.0	48.0	53.0
Changes in Occupation Structure (in % for 1981-91)							
Primary	-5.4	-4.4	-2.4	-0.1	-11.8	-6.7	-4.2
Secondary	-12.66	+4.8	+3.4	+4.9	+7.1	+2.7	0
Tertiary	+18.06	-0.4	-1.0	-4.8	+4.7	+4.0	+4.2
3. Infrastructure							
Water Supply (Source of W.S.)	Tube-wells	Hand pumps	Hand pumps	Tube wells	Hand pumps	Hand pumps	Hand pumps
%age of pop served	-	-	-	68.0	-	-	-
Sewerage	-	-	-	35.0	-	-	-
Power							
%age of population served	100	100	100	100	100	100	100
Communication							
No. of telephones/ 1000 population	135	105	96	90	30	35	65
No of news papers/ 1000 population	54	48	40	45	20	22	25
Community and Education (Per 1000 population)							
No. of seats in colleges	19	-	-	21	-	-	-

Continued

Factors Considered	Kharar	Kurali	Mori-nda	Kalka	Banur	Sohna	Dera Basi
No. of Hospital beds	4.1	2.2	0.4	0.4	-	-	-
No. of seats in cinemas	22.0	-	-	25	-	-	-
4. Industry							
No. of Units	84	45	51	5	-	-	22
Employment/1000 population	130	105	80	20	-	-	10
5. Transportation							
Distance from Chandigarh (in Kmms.)	13	19	25	22	26	10	13
Commuters to Chandigarh/1000 pop.	20	18.7	15	9.5	25	28	10.8
Total commuters/day to Chandigarh	520	327	226	428	237	336	98

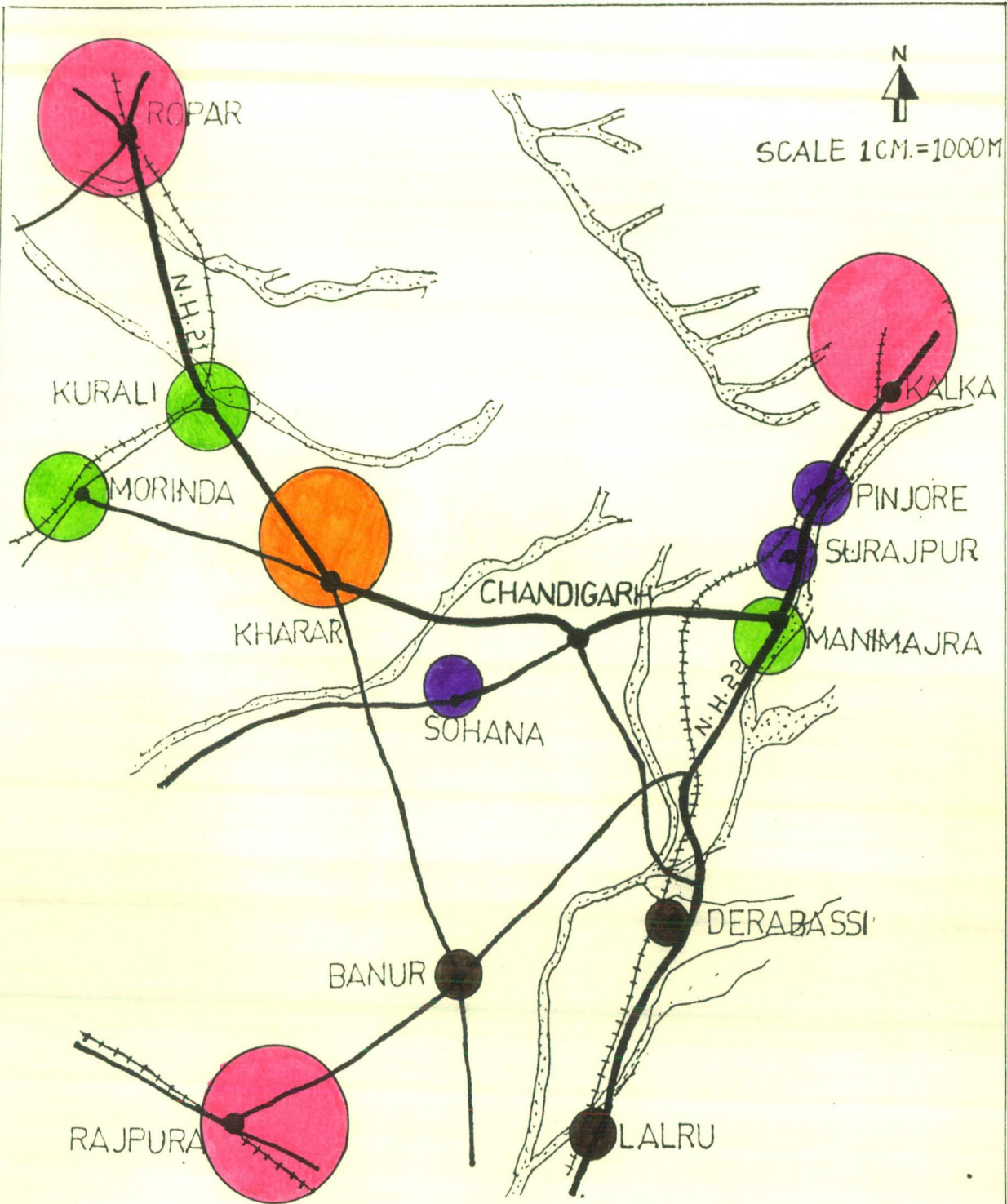
Source :- Panjab T. & C.P. Department.

8.1.1 Typology of Settlements






The hierarchy of settlements can be based on size as well as functions, permitting their urban type to be identified. For instance the smaller settlements like Kharar, Surajpur and Morinda may be classified as manufacturing towns, while Kurali is a trading town and Kalka a transport and storage town. On the other hand Sohna and Banur are agriculture towns in which about 25% of the population is dependent on cultivation for livelihood.

8.1.2. Population Growth in Settlements Surrounding Chandigarh

In decade 1961-71, high rate of population growth was recorded in Banur (9.85% per annum) and Derabassi (6.75% per annum). In the decade 1971-81, Kharar recorded the highest growth



LEGEND

-  RAILWAY LINE
-  NATIONAL HIGHWAY
-  STATE HIGHWAY
-  RIVER & NALLAHS
-  TOWNS & SETTLEMENTS

POPULATION OF TOWNS SURROUNDING CHANDIGARH

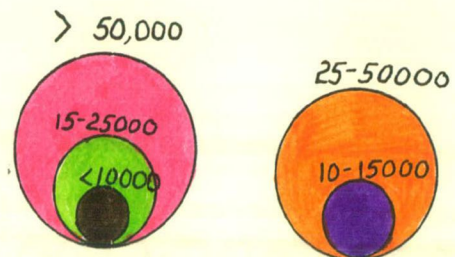


FIG 8-1

CHANGING

FUNCTIONS OF

CHANDIGARH

SUB-REGIONAL PLAN CHANDIGARH

LEGEND

- STATE BOUNDARY
- CANTONMENT BOUNDARY
- URBAN CORP. BOUNDARY
- RAILWAY LINE
- NATIONAL HIGHWAY
- OTHER ROAD
- PROPOSED AIRWAY LINE
- PROPOSED ROAD
- WATER BODY

COMMUNITY & EDUCATIONAL FACILITIES IN PERIPHERAL TOWNS

- HIGH SCHOOL
- COLLEGE
- CINEMA
- HOSPITAL
- VETERINARY HOSPITAL
- POLICE STATION



Scale 1:50,000

Major Perimeter Road	Major Drain
M.U.P. BOUNDARY	RAILWAY LINE
V.O.R.	RAILWAY LINE
RAILWAY LINE	

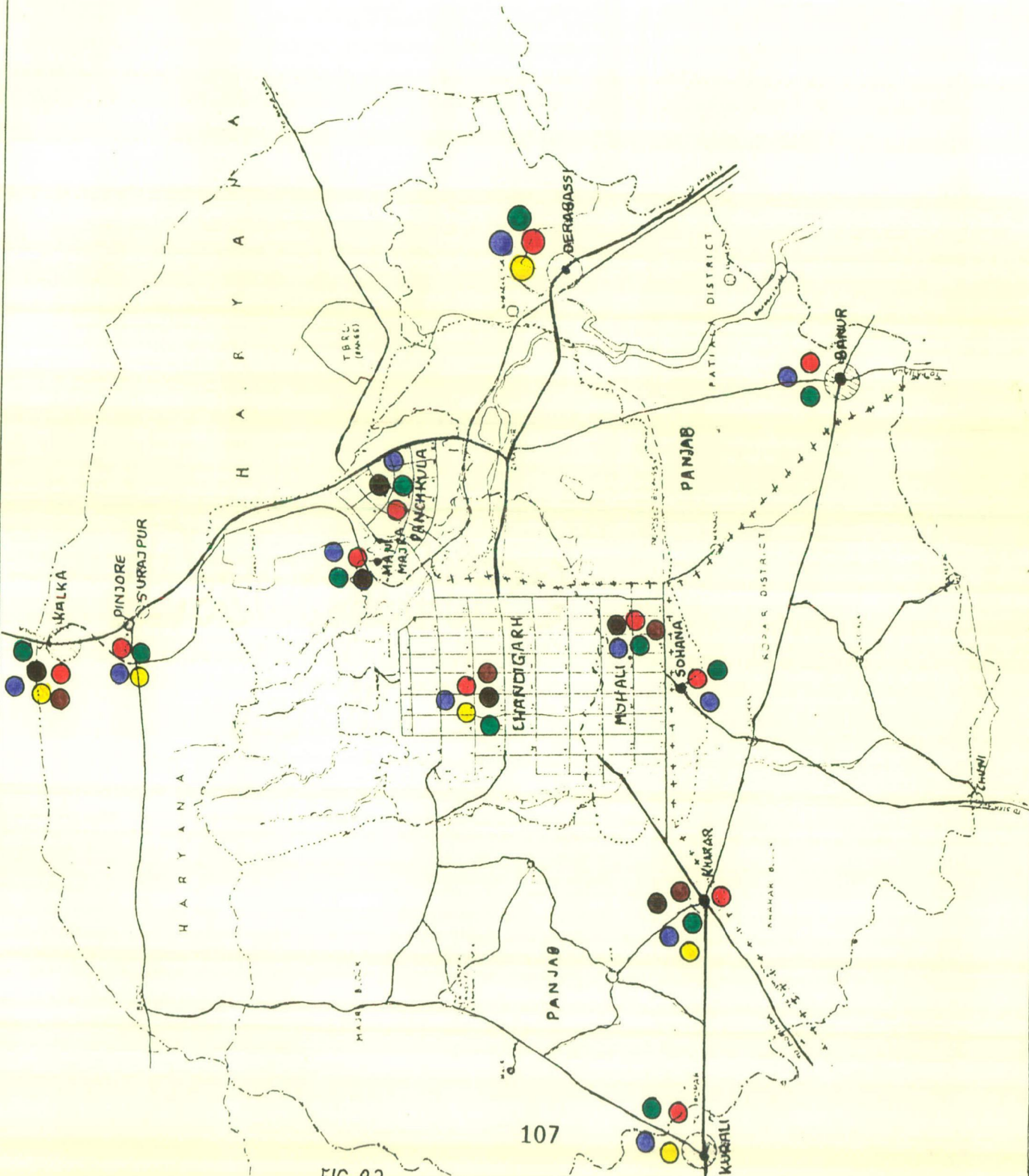


FIG 82

rate of (10.4% per annum). In the last decade of 1981-91, Kalka and Sohna recorded very population growth rates. Creation of Chandigarh is the main cause of these abnormal population growth rates. Due to this, rapid changes in typology of the towns took place from agriculture to service. Chandigarh provided more job opportunities for the people and better amenities became easily accessible for the people in these towns.

8.1.3. Occupational Structure of the Towns

All the settlements around Chandigarh have shown a decreasing trend in the primary sector in the last four decades, conveying the trends of urbanization in the area. Number of workers per 1000 male population in secondary and tertiary sectors have increased considerably. Among the total number of workers of these towns, tertiary sector has a maximum share of about 70%, majority of which are working in Chandigarh. Similarly in secondary sector also more jobs are created due to installation of industries and ancilliary units in these towns.

8.1.4. Transportation (Flow) in the Periphery

Heavy flow of raw material (inward) is there in case of Morinda due to location of sugar factory and in Kalka and Kharar for the requirement of building material and raw material for woolen and textiles industry respectively.

Passenger flow is more in case of transport nodes i.e. Kalka (92 passengers/1000 population) and Kurali (72 passengers/1000 population) as compared to Chandigarh (82 passengers/1000 population).

In Chandigarh which is very well linked with Ambala, Kalka, Ludhiana, Patiala, Amritsar and other major cities by road and is easily accessible from Delhi by rail, the ratio of road to rail traffic to and from Chandigarh is 30:1 inbound and 25:1 outbound. Even in case of goods traffic, highways play more important role than the railways. Inwards goods traffic is much heavier than outward goods traffic, the ratio being 10:1.

Due to the close proximity of the small urban settlements, commutation flow to Chandigarh takes place to the extent of 28 persons/1000 population in case of Sohna, 20 in case of Kharar, 25 in case of Banur and 21 in case of Manimajra. This commutation constitutes students and industrial or service workers.

8.1.5. Community and Educational Facilities

Only Kharar and Kalka are having colleges. Most of the towns lack the community, health and recreational facilities. More or less, all the settlements are to depend on Chandigarh for higher education, recreational health facilities and Chandigarh being well equipped in these facilities, meets the requirements of the vast area of these settlements in its surroundings.

8.2 Impact of Changing Functions on the City Structure

Due to the changing functions of Chandigarh the various factors which have affected the city structure are as follows :

8.2.1. Planning for Finite City

No city is finite, therefore it would be wrong on the part of planners to assume and plan for a finite city. This shortcoming limited the capacity of the city to cater for the

unforseen growth and development and absorb the shock caused by developmental forces. It has adversely affected the basic fabric of the city.

8.2.2. Population Growth

The major problem facing the city due to changing functions is the enormous population growth. There is also rapid increase in the floating population. People come to work and avail the services in the city. In fact, it is the increase in human numbers which is causing anxiety to the planners and the administrators.

Distribution of population within the city is also not uniform. Population density in first phase sectors is much lower than in the second phase sectors. Since the second phase was developed later, the impact of growing population was felt by then and the plot size was considerably reduced, without considering the impact on quality of life. This has led to social stratification within the city.

8.2.3. Shortage of Accomodation

Due to multi-administrative role of the city there is an overall shortage of office accomodation. The city has become a seat of three governments. The existing office accomodation is unable to accomodate the increased number of offices, which are now located in the hired accomodation, meant for residential and other uses. The increased commercial activity has also caused shortage of accomodation for commercial establishments. The unprecedented population growth due to increased job oppertunities has lead to acute shortage of residential

accomodation. This in turn has lead to high house rents and mushrooming of substandard accomodation.

8.2.4. Traffic Problem

The city plan conceives zoning the city into distinct areas earmarked for living, working and leisure and accordingly one would have to travel for going from one place to the other. Thus travel is inherent in the city plan. The travel componant assumes complex proportions with growth of the population and the people subject to long and unnecessary travel. This leads to traffic related problems.

Emergence of the town as a regional town due to changed functions and coming up of various development projects in the environs has lead to heavy traffic through the city. N.H. 22 passes through the city and besides that Chandigarh is connected by road with all important towns of Panjab, Haryana and Himachal Pradesh. These linkages cause heavy through traffic on the city roads, giving rise to many traffic problems.

8.2.5. Piece-meal Planning Approach

During the first phase of development of the city, land of all the villages including the villages were acquired. But in the second phase due to certain reasons four villages were left unacquired. These villages don't come directly under city administration. Because of heavy population pressure and demand of residential and commercial accomodation people turned towards these villages. Since no bye-laws are applicable there, unchecked development took place. Low quality multistoreyed

buildings and showrooms are mushrooming there. These four villages have a combined population of 27,025 (1991). In the absence of appropriate and basic amenities, these villages have become a source of nuisance to the adjoining planned area and may ultimately affect the quality of life in the sector considerably.

8.2.6. Chandigarh Urban Complex

As per the original planning, green belt was created all around the city and the city limits were restricted. Because of changed scenario and geopolitical situation and security requirements of the country, urban settlements and the cantonment have come up on the out skirts of the city in the green belt area. These include Mohali, Panchkula, Manimajra towns and Chandimandir Cantonment. They all including Chandigarh, form Chandigarh Urban Complex. But due to involvement of two state governments and the Union Territory, no comprehensive planning has been done. In fact, what happens in these towns is bound to affect Chandigarh. Any population pressure in Mohali or Panchkula will in turn pressurise the city services and road network.

8.2.7. Growth of Settlements in the Periphery

Rapid development of Chandigarh and unexpected growth of population resulted in high land values. Chandigarh provides job opportunities to large number of people staying in the areas around also. Due to high rent of houses, the people prefer to stay in the urban settlements around the city and commute daily. These towns lack facilities like higher education, medical and

CHANDIGARH

FUNCTIONS OF CHANDIGARH

LEGEND

- CHANDIGARH URBAN COMPLEX BOUNDARY
- STATE UT BOUNDARY
- NATIONAL HIGHWAY
- SH/OTHER ROADS
- RAILWAY LINE
- PROTECTED PARKWAY LINE
- WATER BODY
- BUS TERMINUS
- REFERENCE LAND

CONSTITUENTS OF U.C.

- CHANDIGARH
- MANI MAJRA
- MOHALI
- PANCHKULA
- CANTONMENT



Scale
1:50,000
1 cm = 500 m

CHANDIGARH URBAN COMPLEX

Major Planning Birds	M.U.C.P. THESE
M.U.C.P. No. & Tr.	YEAR 1955-54
U.C.R.	
REVISED	

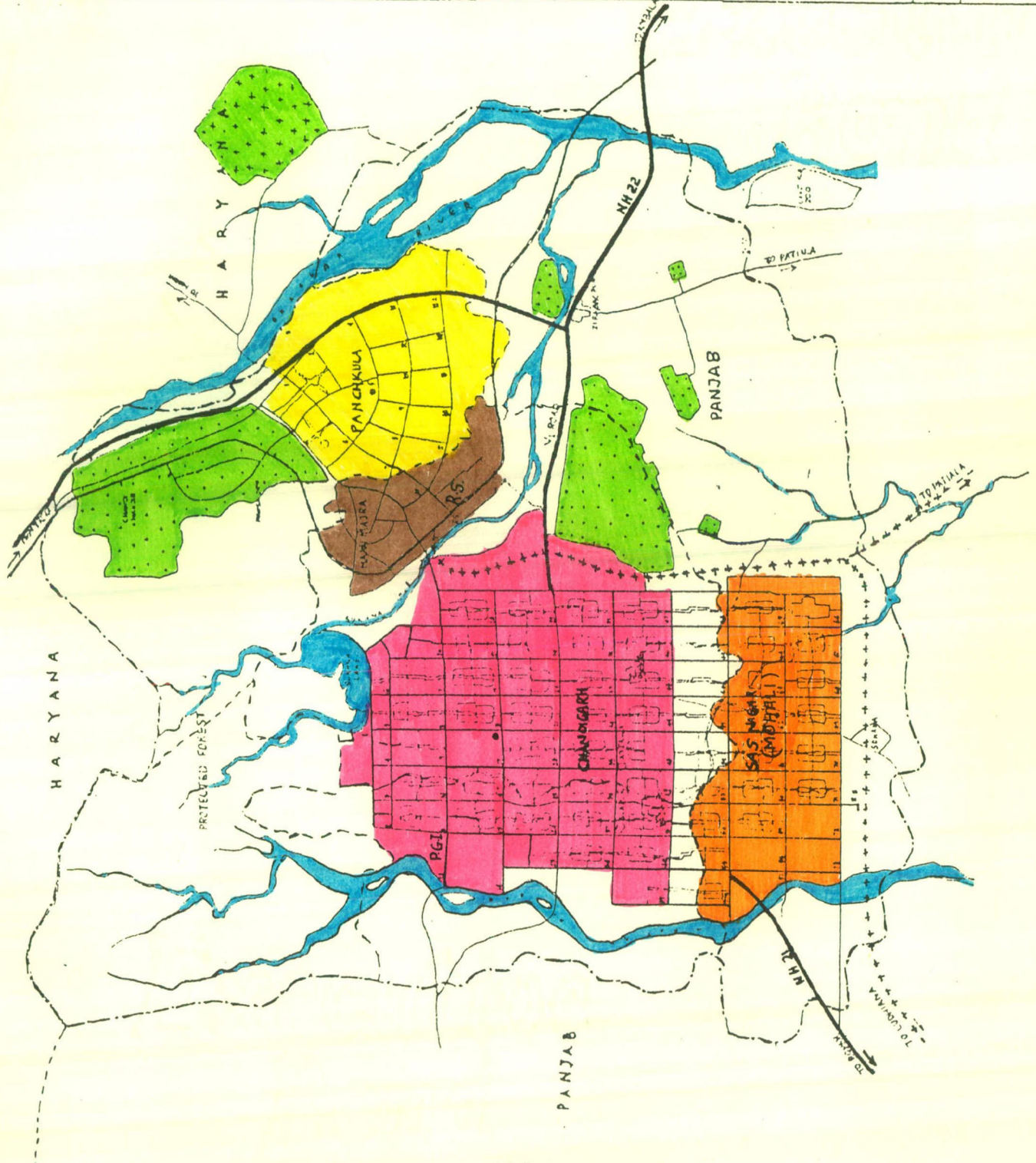


FIG 8-3

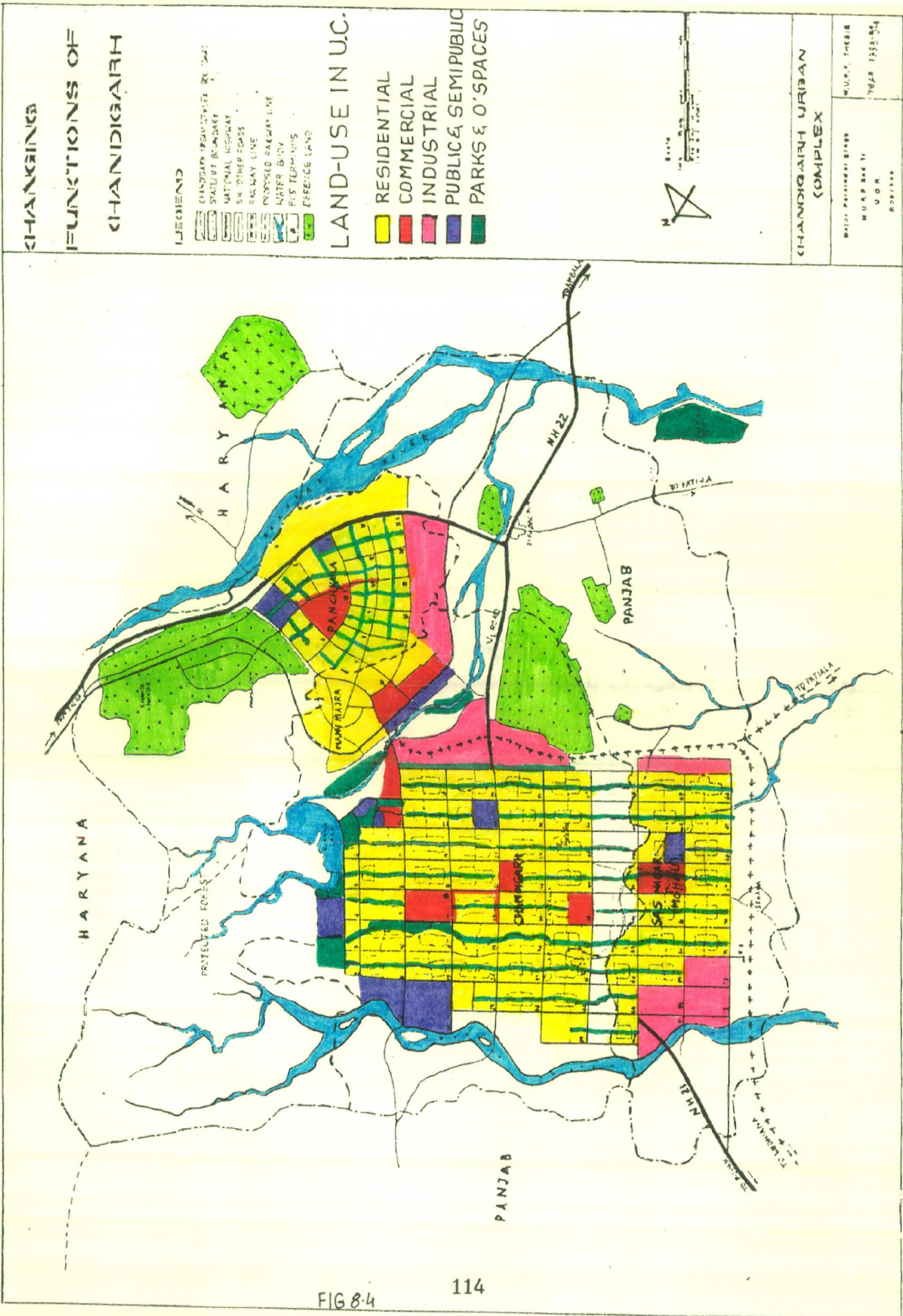


FIG 8.4

higher order shopping. These towns have virtually emerged as unwanted satellite towns of Chandigarh, straining its infrastructure.

8.3 Emerging Problems of the City

As mentioned above in the impact of various developments on the city structure, many problems have come up in the city, which are listed below :

1. Due to heavy demand of housing and due to its shortage or high rents, slums are emerging in the city. Recent survey shows that there are 19,210 Jhuggies in the city.
2. Due to high population pressure, distinct stratification of the city on the basis of income has taken place e.g. in sector nine, which accommodates relatively high income group people, land man ratio is 430.68 square metres per person, whereas in sector 20 it is 36.62 square metres.
3. So far the experience goes, due to high prevailing rents, one dwelling unit may house as many as two families and in sectors like 44 which has 6757 planned dwelling units, the population may be as high as 50,000 or may be more. Then what will be the future of these sectors?
4. Substandard residential accommodation and unplanned commercial development, which has taken place in the four villages left inside the developed sectors, have become eyesore and is a blot on the name of 'City Beautiful'.
5. Shortage of commercial facilities, lack of commercial space at local level, concentration of shopping in the shopping streets and lack of small shops have given rise to

- commercial slums, Rehri Markets and squatter shops.
6. In many sectors due to increased commercial activity, all the houses facing v 4 have been converted into commercial establishments. Thus the concept of bazar having shops on one side of the road stands violated.
 7. Commercial area locations on v 4 envisaged to serve the needs of the sector concerned, have emerged stronger than they were required to be. Few of them perform city level functions e.g. v 4 of sector 21 where scooter market is located, has emerged a city level facility. Similarly v 4 of sector 28 has developed into a market for car repairs and Car Bazar. These instances are the outcome and play of the economic forces.
 8. Grain, fruit and vegetable markets are located on the south eastern corner of the city in sector 26, whereas maximum population is residing in the western part of the city, far away from the market. This has resulted in large number of mobile fruit & vegetable rehri, creating traffic nuisance.
 9. Due to reorganization of the Panjab state, bifurcating it into two states e.g. Panjab and Haryana, administrative accomodation has become inadequate to house the three Govts. and as result private buildings meant for other uses have been taken on rental basis for the purpose, resulting into the misuse of the land and the buildings.
 10. A cult of encroachments, conversion of land uses and unauthorised constructions has gained considerable momentum in the city. Residential buildings are being used for commercial purposes and schools etc.

PLATE 8.1



Slum Areas of Chandigarh

PLATE 8.2



Villages Inside Developed Sectors of Chandigarh

PLATE 8.3



Booths in Shastri Market in Sector 22 of Chandigarh

PLATE 8.4



Grain and Vegetable Market in Chandigarh

PLATE 8.5



Shortage of Parking Facilities in Chandigarh

PLATE 8.6

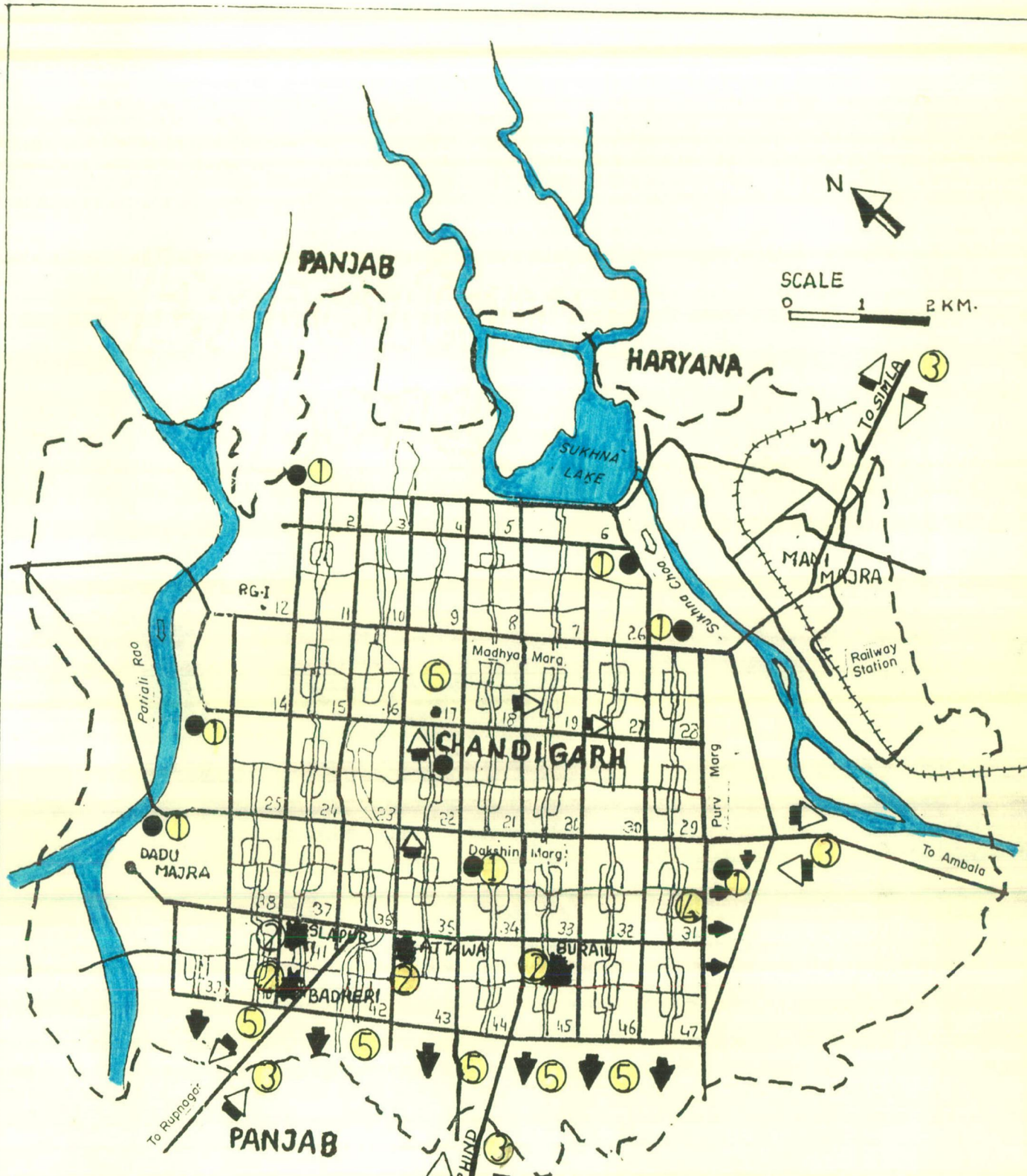


Squatter Shops in Chandigarh

11. In some of the sectors green spaces are being misused. Either institutional buildings are being carved out of them or they have been converted into residential or commercial sites e.g. in sectors 22 and 27 central greens have already vanished due to misuse.
12. There is tremendous increase in the number of people availing the facilities of shopping plazas, markets and other public places and offices. The number of vehicles used by these people are also considerably increased. This has rendered the space left for parking highly inadequate and there is acute shortage of parking places.
13. The rule of 7 V's stands violated at many places. Both sides of some of the important arteries with fast moving traffic, like Madhya Marg and Dakshin Marg (V 2), commercial and institutional buildings have come up directly facing these roads. Hectic activity at these places intrupts the traffic. Also, service lane provided along certain roads have lost their utility by merging them into parking areas.
14. Same road pattern has been adopted in all sectors, irrespective of the population they accomodate. As a result, the road width for thinnely populated sectors is sufficient, whereas for densely populated sectors like 22, it is inadequate.
15. Location of the Bus Stand right in the middle of the town has also resulted in heavy flow of bus traffic on the road arteries (V 3) of the town, leading to traffic problems like



- congestion and accidents.
16. Lot of through traffic is generated in the city due to various developmental projects in the periphery and N. H. 21 passing through the city, which passes through the sector peripheral roads (V 3), not designed for this kind of traffic and causes congestion and other traffic related problems.
 17. The location of the capital complex, the biggest work place is such that, third and fourth class employees with low income and poor means of conveyance (cycles), have to travel a long distance, sloping upwards during their journey from the place of residence, as far as sectors 46 or 47 etc. Moreover lot of traffic is generated at office hours and roads get congested.
 18. Decision of the administration to permit 18 kinds of cottage industries like candle making, tailoring, doll making, ink, baskets, toy making etc., will have far reaching effects. This will encourage misuse of residential places and small workshops will come up in the houses. Corbusier envisaged the industry to be away from the residential area, whereas this decision has brought the industry on the doorsteps of the individual houses.
 19. The services in Chandigarh are provided to cater for the ultimate population of five lakhs. Any addition to five lakhs is going to strain these services and if the present trend of population increase continues, after a couple of years electric and water supply will be inadequate and sewers will get choked.



LEGEND

- U.T. BOUNDRY
- ROADS
- RAILWAY LINE
- WATER BODY
- BUS STOP

EMERGING PROBLEMS OF CHANDIGARH

- SLUMS
- VILLAGES INSIDE SECTORS
- THROUGH TRAFFIC
- EXTN. OF INDUSTRIAL AREA
- EXTN. OF CHANDIGARH
- LOCATION OF BUS STOP

FIG 8.5

8.4 Validity of Corbusier's Concept in the Present Context

New town which was designed as a capital city is functioning today as a multi-functional town accomodating the various other major functions like industries, trade and commerce and transportation services in a bigger way. Town which was conceived as a capital of one state, is functioning today as a seat of three governments, creating the problem of accomodating the government offices. Industries which were thought to meet the requirments of the inhabitants only, have started functioning at the regional scale and the town is growing as an industrial centre and as a regional node.

In the present context of rapid growth of the city and rapid industrialization of the area, the concept of Le Corbusier for the town still holds and it has not been disturbed severely but concept of the green belt around the city is no more valid with the execution of number of development projects and rapid expansion of the nearby settlements.

Concept of the city in terms of organism is still valid and can be well maintained if the city is restricted in its further growth after the second phase development.

The extension of Chandigarh by another two rows of sectors bringing more industrial and residential area in continuation to Chandigarh in the territory of Panjab, will take the city slightly away from the thinking of Le Corbusier.

Housing of administrative offices in the private buildings, scattering all over the town due to the formation of the three governments is also not in conformity with concept laid by the planner. For this, the future of the town must be decided as early as possible so that it should be the seat of one State Govt. rather than three.

If Chandigarh seems different in certain respects from its original concept, it is not that original plan has failed, but it is the planning effort which has become stagnant. But overall, the concept of Corbusier is still valid and it can be well maintained in the future by bringing

1. Adequate development controls.
2. Single authority for the control or good mutual cooperation between different governments in order to have well related and well planned future development of the whole area of the new town and its periphery.
3. Regional structure plan with legal backing giving the guidelines for the future development of the town and its surrounding areas so as to relate the different towns and development projects in order to bring harmony, regularity informity and the required progress in the future development so that the living conditions in the settlements can be made to correspond to the most elementary biological and psychological needs of the great masses of population.

CHAPTER 9
CONCLUSIONS &
RECOMMENDATIONS

CONCLUSIONS AND RECOMMENDATIONS

9.1 Conclusions

1. Chandigarh, as a new town was conceived and designed as a seat of State Government and a centre of educational and cultural importance to meet the deficiency which was faced due to the well established capital of Panjab, Lahore, during the partition of the country in 1947.
2. Since its creation, Chandigarh has been experiencing a rapid growth, faster than anticipated, changing the form and structure of the city in time scale. At present, it is no longer merely a capital city. With the creation of two states Panjab and Haryana during reorganisation of Panjab in November, 1966 and with the execution of number of unforeseen development projects, both industry and defence, in the surrounding area, Chandigarh has attained greater importance. The new town has extended its sphere of influence through the three states of Panjab, Haryana and Himachal Pradesh. It has emerged as a major city in northern India and a nodal point in the developing region.
3. Regarding the functions of the town i.e. scale of operations of the major functions, as thought by Le Corbusier, they are being performed in bigger scale and in multi-direction.
4. The industrial activity which was thought as just to meet the daily requirements of the inhabitants of the city, has changed subsequently in the last four decades. It has

shown considerable increase and Chandigarh has superceded the old well established town of Ambala in this respect and is heading towards to compete with the old industrial town of Panjab, Ludhiana in the near future. The area for this activity was envisaged to be 2.3% of the total developed area but it has recorded as 9.2% by the end of second phase development, with possible future extension of industrial activity. It is estimated that area under this activity will be 10% against 12.2% at present of Ludhiana.

5. Considering the education and cultural functions, Chandigarh has really come up as a centre of thought and knowledge by containing many higher education and research centres of varied and numerous fields, catering to the needs of whole of northern India. It has strong cultural and recreational importance.
6. Due to its central location , Chandigarh has also developed itself as a transport service centre linking the three states of Panjab, Haryana and Himachal Pradesh, it has become a halting station to many tourists, going to Bhakra Nangal and to the hill stations of Simla, Kasauli and Chail.
7. It also functions as a centre of collection and redistribution as far as agricultural and industrial products are concerned. If the proposed railway line from Chandigarh to Ludhiana becomes reality, it will further give a boost to its potential as a centre of trade and commerce for the whole region.

8. The organization of Panjab in 1966 and the changed administrative set up has effected the city structure, socially, economically and physically. The change brought particularly the problem of housing the administrative staff of the three governments Panjab, Haryana and Chandigarh administration. Along with this the town is facing the problems of transportation (volume and direction), housing infrastructure and all the more, a rapid expansion. These problems have been still agravated by the execution of number of unforeseen development projects in the peripheral zone of the town.
9. Many squatter shops and concentration of rehriwalas and hawkers in almost all the sectors have marred the beauty of the new town inspite of unique landscaping, done here and there by an expert to make the city beautiful. In the last four decades, many slums have emerged on the outskirts of the town and also on the vacant land, available within the city limits. This shows that housing facilities in Chandigarh are not keeping pace with the rapid growth of the town.
10. Since the creation of the new capital city, a number of small settlements, situated along the highways, converging on Chandigarh, have grown rapidly in area and population. Their trends in urban growth show an inclination towards further expansion and industrialisation. These settlements have been affected to great extent due to the functioning of Chandigarh. They are dependent on Chandigarh for certain central and special facilities like higher

education, health etc. The persons in these settlements, near to Chandigarh also come to the industrial area and other work places of the town. Virtually these urban centres are functioning as satellite towns of Chandigarh.

11. The concept of green belt around the new town is also now no more in practice as the area of the periphery zone lies under the authority of three governments which have no cooperation or coordination for the development of the peripheral zone or in maintaining it as green belt, dreamt by Le Corbusier. There is no peripheral development plan which can give some guidelines for the future development of this area.

9.2 Recommendations

The problems of Chandigarh are largely attributed by political controversies, which are beyond the control of the planners. But by adopting certain remedial measures some of the problems can be minimised and further deterioration of the situation can be checked. The recommended remedial measures are as follows :

1. A comprehensive regional plan for Chandigarh and its surrounding areas should be prepared for overall development of the region and a high power committee comprising of the representatives of Panjab, Haryana and Chandigarh Administration should be appointed to enforce the implementation of the plan.
2. The planning and execution of development projects in the surrounding area of Chandigarh without considering the

- regional setting should be discouraged, as it will lead to piece-meal development.
3. Panjab and Haryana should be asked to shift their non essential offices and create housing for their employees in Mohali and Panchkula.
 4. The present tendency to extend the industrial area without due consideration to Corbusier's Master Plan should be discouraged.
 5. The order to permit 18 household industries in the residential areas should be withdrawn.
 6. The four villages inside the residential sectors need to be properly planned and developed and provided with basic amenities for effective integration with nearby residential areas and impose development controls on them.
 7. Although land has been reserved in sector 34 for sub city centre, but it has not been developed fully. Its development should be undertaken to ease out pressure from the city centre and other markets.
 8. In order to tackle minance of commercial slums, it is required to earmark larger areas under commercial use, create larger number of commercial sites and increase proportion of booths considerably.
 9. Strict enforcement of laws against encroachments, provision of more low income houses and checking connivence of officials and politicians in the growth of slums.
 10. Misuse and encroachment of green spaces should be prevented.

11. Housing Board must not exercise any control on the development of the area, which should vest with the Estate Office. The design and layout plan evolved by the Housing Board also needs closer scrutiny, so as to minimise the element of misuse. Housing Board should not be allotted land abutting the sector roads, shopping streets or major arteries, so as to minimise the chances of misuse of residential buildings.

12. In order to take care of the inter-city traffic, following recommendations are made :

(a) All missing links between Chandigarh and Mohali should be completed.

(b) Additional linkages with Panchkula should be created, so as to ensure smooth flow of traffic between these two cities and also reduce pressure on Madhya Marg.

(c) A bye-pass from Kurali should be created via Siswan-Mulanpur to Baddi area so as to divert traffic meant for Himachal Pradesh.

(d) The existing Ambala-Banur-Landran-Kharar road should be strengthened and upgraded to take care of all the traffic coming from Delhi and going towards Ropar, Hoshiarpur, Mandi and Manali etc.

13.

Why you have not taken views of your organization or problem of Contaminant near Chandigarh

**CHANGING
FUNCTIONS OF
CHANDIGARH**

SUB-REGIONAL PLAN (HAND-DRAWN)

LEGEND

- [Symbol] STREET SCHEMATIC
- [Symbol] CHANDIGARH BOUNDARY
- [Symbol] STATE BOUNDARY
- [Symbol] RAILWAY LINE
- [Symbol] NATIONAL HIGHWAY
- [Symbol] OTHER ROADS
- [Symbol] PROPOSED HIGHWAY LINE
- [Symbol] PROPOSED CANAL
- [Symbol] WATER BODY

PROPOSALS

1. STRENGTHEN THE EXISTING AMBALA-BANUR-LANDRAN-KHARAR ROAD TO ACT AS BYE PASS.
2. STRENGTHEN KURAL-SISWAN-BADDI ROAD
3. ADDITIONAL LINKAGES WITH PANCHKULA.
4. COMPLETE MISSING LINKS BETWEEN CHANDIGARH & MOHALI.
5. DEVELOP SUB CITY CENTRE OF SECTOR 34.



Scale 1:50,000
1 cm = 500 m

Major National Highways	N.H. 21	N.H. 22
State Highways	S.H. 1	S.H. 2
Other Roads	R.O. 1	R.O. 2
Proposed Highways	P.H. 1	P.H. 2

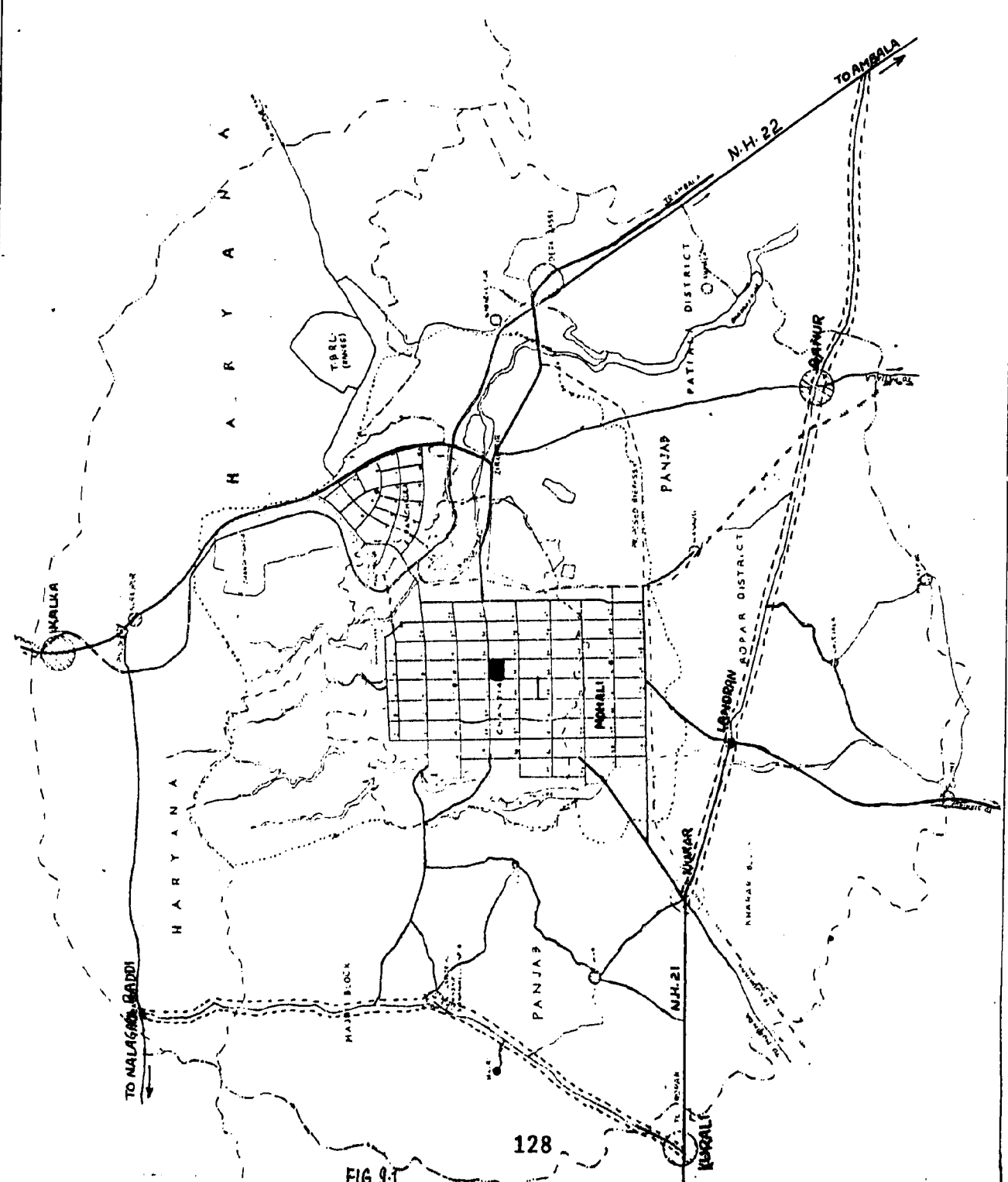


FIG. 9.1

***APPENDICES &
BIBLIOGRAPHY***

AREA AND POPULATION OF UNION TERRITORIES

S.No.	Union Territory	Area in (Sq.Km.)	Total Population	%ageVar. (1971-81)
1.	Andeman & Nicobar Islands	8,249	1,88,741	+63.93
2.	Chandigarh	144	4,51,610	+75.55
3.	Dadra & Nagar Haveli	491	1,03,676	+39.78
4.	Delhi	1,483	62,20,406	+53.00
5.	Goa, Daman & Diu	3,814	10,86,730	+26.69
6.	Lakshadweep	32	40,249	+26.53
7.	Pondicherry	492	6,04,471	+28.15

Source :- Statistical Hand Book of Chandigarh, 1990.

AVERAGE LAND USES OF STATE CAPITALS OF INDIA

S.No.	Type of Land Use	%age of Developed Area	Acres/1000 Persons
1.	Residential	45.0	5.76
2.	Commercial	3.7	0.47
3.	Industrial	5.1	0.66
4.	Public & Semi-Public	17.7	2.27
5.	Parks & Play Fields	4.9	0.63
6.	Roads & Streets	15.5	1.98
7.	Other Uses	8.1	1.04
	Developed Land	- 68%	
	Undeveloped Land	- 32%	

Source :- T.C.P.O. Chandigarh.

EMPLOYMENT IN PUBLIC AND PRIVATE SECTOR IN CHANDIGARH

Type of Employment	1970-71	1980-81	1986-87	1989-90
Public Sector				
Central Govt.	9,311	13,757	17,078	19,626
U.T.Administration	14,031	17,018	21,672	25,187
Central Quassi	1,375	9,275	14,919	15,013
State Quassi	-	-	-	1,471
Local Bodies	-	104	151	182
Total	24,717	40,154	53,570	58,779
Private Sector				
Employment of 25 or More	8,956	12,420	13,021	13,871
10 to 24	464	2,884	2,270	23,134
Total	9,420	15,304	15,291	16,185

Source :- Employment Exchange U.T., Chandigarh.

**OUTLAY EXPENDITURE OF SEVENTH FIVE YEAR PLAN OF CHANDIGARH
(RS. IN LAKHS)**

S.No.	Sector	Outlay	Expenditure
1.	Agriculture & Allied Services	470.04	515.57
2.	Rural Development	155.96	150.30
3.	Irrigation & Flood Control	86.00	96.47
4.	Energy	3590.33	3417.85
5.	Industry	182.12	168.94
6.	Transport	1351.04	1173.62
7.	Science Technology & Environment	20.00	57.27
8.	General Economic Service	361.31	585.68
9.	General Education	1625.00	1761.23
10.	Sports & Youth Services	700.00	547.35
11.	Art and Culture	100.00	115.90
12.	Health	900.00	989.54
13.	Water Supply	1813.00	1801.77
14.	Housing	2860.00	2864.13
14.	Urban Development	6113.00	6091.54
15.	Information & Publicity	40.00	28.97
16.	Labour & Employment	75.00	50.24
17.	Social Security & Welfare	200.00	121.37
18.	Welfare of Ex-Servicemen	25.00	17.29
Total		20309.40	21230.58

Source :- Statistical Hand Book of Chandigarh, 1992

**GENERATION & DISTRIBUTION OF ELECTRICITY IN CHANDIGARH
(IN KWH.)**

S.NO.	1985-86	1986-87	1987-88
1. Electricity Generated & Purchased			
(i) Locally Generated	1744	12731	-
(ii) Purchased from Other States	317558683	356134726	383554000
----- Total	317560427	356147457	383554000
2. Electricity Consumed (Locally)			
(i) Domestic Purposes	93416546	113096576	116582571
(ii) Commercial Purposes	39470841	45938836	48272976
(iii) Industrial Purposes	108726525	113454369	130452410
(iv) Irrigation Purposes	1595235	885049	1926174
(v) Street Lighting	6990290	10729444	10500056
(vi) Bulk	6627117	5096549	5664488
(vii) Miscellaneous	287155	156153	408207
----- Total	256523709	289356973	313806882

Source :- Statistical Hand Book of Chandigarh, 1992

CONSUMPTION OF WATER IN CHANDIGARH

S.NO.	Item	1985-86	1986-87	1987-88	1988-89	1989-90
1.	No.of Metered Connections	56814	56510	56146	65758	66366
2.	No.of Unmetered Connections	9501	8515	8834	8994	9099
3.	Water Consumption (Kilo Litres)	N.A.	630	829	746	696
4.	(i) Domestic	N.A.	504	663	527	557
	(ii) Commercial/ Industrial	N.A.	126	166	149	139
5.	Per Capita Consumption of Water (KL.)	202	100	127	109	97

Source :- Statistical Hand Book of Chandigarh, 1992

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