PLANNING STRATEGIES FOR THE PERIPHERY OF CHANDIGARH

A DISSERTATION

Submitted in partial fulfillment of the

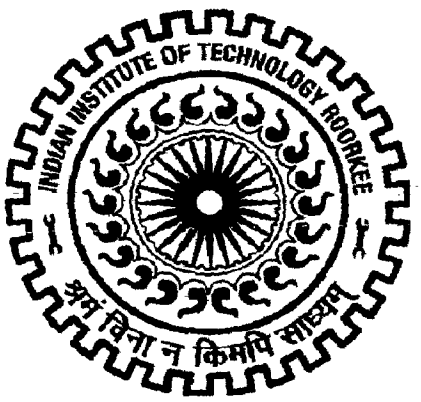
requirements for the award of the degree

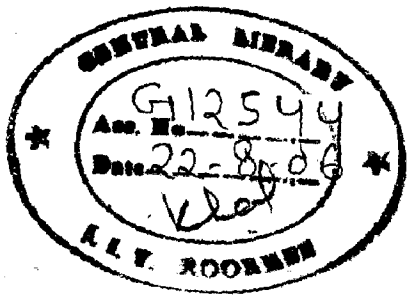
of

MASTER OF URBAN AND RURAL PLANNING

By

JASKIRAT KAUR





DEPARTMENT OF ARCHITECTURE AND PLANNING

INDIAN INSTITUTE OF TECHNOLOGY ROORKEE

ROORKEE-247 667 (INDIA)

JUNE, 2006

CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the dissertation entitled **'PLANNING STRATEGOES FOR THE PERIPHERY OF CHANDIGARH'** in partial fulfillment of the requirement for the award of the Postgraduate Degree of **MASTER OF URBAN AND RURAL PLANNING** submitted in the Department of Architecture and Planning, Indian Institute of Technology-Roorkee, Roorkee, is an authentic record of my own work carried out during the period from August 2005 to June 2006 under the supervision of Prof. R.K. Jain, Associate Professor, Indian Institute of technology, Roorkee

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

Place: Roorkee
Date: June7, 2006

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

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CERTIFICATE

Certified that this dissertation entitled **'PLANNING STRATEGIES FOR THE PERIPHERY OF CHANDIGARH'**, which has been submitted by Ms. JASKIRAT KAUR, in partial fulfillment of the requirements for the award of the Postgraduate Degree of **MASTER OF URBAN AND RURAL PLANNING** submitted in the Department of Architecture and Planning, Indian Institute of Technology-Roorkee, Roorkee, is her own work carried out by her under my supervision and guidance. The matter embodied in this dissertation has not been submitted for the award of any other degree elsewhere.

Place: Roorkee
Date: June 7, 2006

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Date: June 7, 2006
Place: Roorkee

JASKIRAT KAUR

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

CHAPTER-I: INTRODUCTION

1.1 Introduction

Humans tend to live in groups since time immemorial. Community life is not a new way of living in the history of human evolution. The size of the group and mode of living depends and are determined by the nature of habits and the capacity of man to organize his common sphere of activities. Humans try to maintain harmony in relation to three elements place, folk and work and attempt for an optimal solution, so that folk and work are organized in place with minimum mutual conflicts.

All settlements at the time of their origin were satisfying above conditions but due to some excessive pull and push factors such as faulty planning targets, reaction in the influence zone of the city, individuals preference and changing; government policies force a certain type of development which are not intended during a period a particular time period on a particular plot at a particular rate of growth and in particular type.

In a planned city it is intended to create a conducive environment so that basic activities of man such as living, working, recreation and communication may give some sense of pleasure, inspiration, security and satisfaction but it is observed more specifically that the disparities between the rural and the urban areas tend to induce migration and the harmony achieved in urban areas is lost. The continued disparities between the have and have not groups of the society, forced the migrants and poor to set up their own shelters in open public land. Thus they suffer not only from substandard habitat but are also subjected to repressive action.

Urban sprawl is characterized as the low density, suburban and exurban style development patterns that have emerged as the dominant mode of growth in the major cities over the last several decades.[1] Sprawl has evolved into one of the most vexing problems encountered by contemporary urban and regional policy. Via a recurring cycle, metropolitan areas continue to spread outward, spurred forward by the autonomy of local governments and their land use regulations.

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[1] "Growth at the fringe: The influence of political fragmentation in United States metropolitan areas", John I. Carruthers, regional Science, 2003

In an effort to check the menace of urban sprawl, different concepts have been mooted over the decades. Some of them like Green belts, Garden cities, linear cities, and vertical cities by Le Corbusier have been applied in different cities across the globe.

When India gained independence, Jawahar Lal Nehru, the then prime minister, sought to build an independent and modern India. Among the many steps that he took towards this goal's achievement was the setting up of Chandigarh as the capital city of Punjab.

1.1.1 Chandigarh

During the partition, Lahore, the capital city and the city so dear to the heart of all the Punjabis went to Pakistan. In a situation where there was a lot of bloodshed and chaos, and absence of capital city, the government decided to make Shimla a temporary capital. But there was a need for a new capital town for Punjab. Taking factors into account like the existing Punjabi cities, expense, political forces etc, and it was decided to build a new capital to cater to ultimate population of five lakhs.

1.1.2 Modern city planning concept

Chandigarh, the first new and planned city of independent India was to be in words of Pt. Nehru, "a new city unfettered by the traditions of the past-an expression of nation's faith in future." Chandigarh was thought to be a modern city – a symbol of India's freedom, democracy and its progressive thinking. The new approach was unsympathetic to Indian culture, old values, societal structure and rich historical traditions.[2]

Thus planning of Chandigarh, the world famous city of Punjab by Le Corbusier, one of the pioneers of modern architecture is an important event in the history as the project functioned as generating point for new ideas of urban planning and guided and shaped the future course of architecture and planning in the rest of India and other countries. City of Chandigarh is a strong statement advocating some of

[2] "Making of an Indian city", Kalia, Ravi, Oxford Publishers

1.1.3 Present Scenario

Heavy influx of people to urban areas due to socio economic constrains for better living and employment opportunities lead to large areas outside the urban limits to be subjected to change in land use on account of new settlers and diversified activities partially or wholly dependent on urban settlement.

At present the fate of the city's periphery is quite different from what it was thought of due to a lot of factors like factors like rapid urbanization. Numerous developments in shape of small villages and unauthorized construction have dotted the belt. These settlements are shear violation of Periphery Control Act.

1.1.4 Planning of Chandigarh

Le Corbusier - the famous French architect - planner of the city conceived the master plan of **Chandigarh as analogous to human body**, with a clearly defined **head** (the Capitol Complex, Sector 1), **heart** (the City Centre, Sector 17), **lungs** (the leisure valley, innumerable open spaces and sector greens), the **intellect** (the cultural and educational institutions), the **circulatory system** (the network of roads, the 7 Vs), and the **viscera** (the Industrial Area). [3]

The conception of the city has been formulated on the basis of four major functions: **living, working, care of the body and spirit and circulation.** The residential houses constitute the living part whereas the Capitol Complex, City Centre, Educational Zone (PGI, PEC, PU) and the Industrial Area constitute the working part. The Leisure Valley, Gardens, Sector Greens and Open Courtyards etc. are for the care of body and spirit.

[3] www.chandigarhcity.com

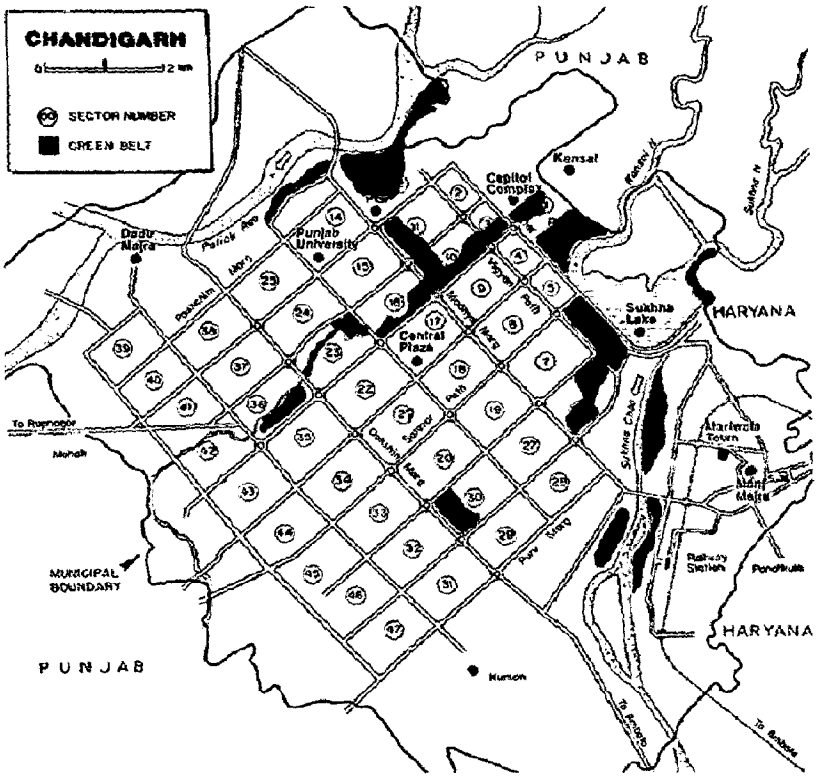


Figure 1.1: Plan Of Chandigarh

(Source: www.chandigarh.nic.in)

1.1.5 Green Belt

A green belt of 5 miles beyond the city was proposed to protect the city from unauthorized encroachment; later it was extended to 10 miles. This was done to achieve:

a) To prevent the bad semi urban conditions on the boundaries of the new city, drawing away the strength of the city by unfair competition immediately beyond the area of local taxation.

b) To protect the rural community from a degradation by contact with urban life, and to lead it towards a harmonious partnership, in which without loss of rural status it may improve its living conditions of the city in the form of milk, eggs, chicken, vegetable etc.

To bring this about it will be necessary first to include an area around the city in a regional town-planning scheme that will safeguard land use for rural and agricultural purposes and prevent exploitation. Such a scheme should include low hills to the north and west of the city. This would be a negative safeguard. In addition a development scheme should be initiated that will:

- Organize the supply o fresh milk, butter etc both at rural and city end.
- Provide light roads without which nothing will work.
- Educate the villagers so that they will make early use of opportunities offered and close the fatal time gap.

Le Corbusier expressed his confidence of these objectives being achieved as a result of his planning in a conference: "*to build an open ground, of easy typology, filled with natural beauty, Chandigarh, thanks to its urban and architectural layout, will be sheltered from base speculation and its disastrous corollaries: the suburbs.* ***No suburb is possible at Chandigarh***". [4]

1.1.6 Development of Chandigarh

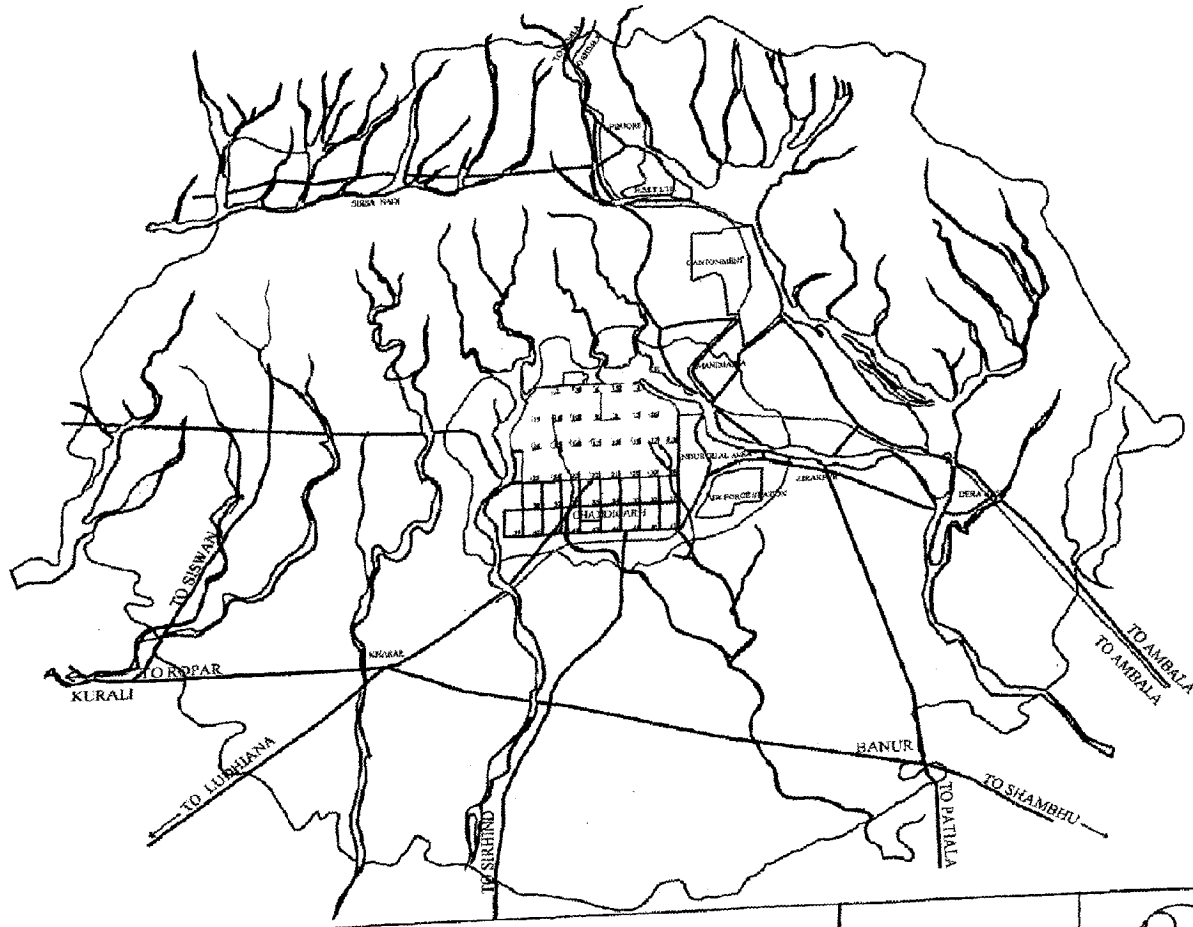
Development of Chandigarh from **Chandigarh city** to **Chandigarh metropolitan Region**

1. **Phase I:** Population 1,50,000
   Sectors: 1-30
   Density: 40 persons/ha
   Total area: 43 sq. km
2. **Phase II:** population 3,50,000
   Sectors: 31-47
   Density: 144 persons/ha
   Total area: 70 sq.km

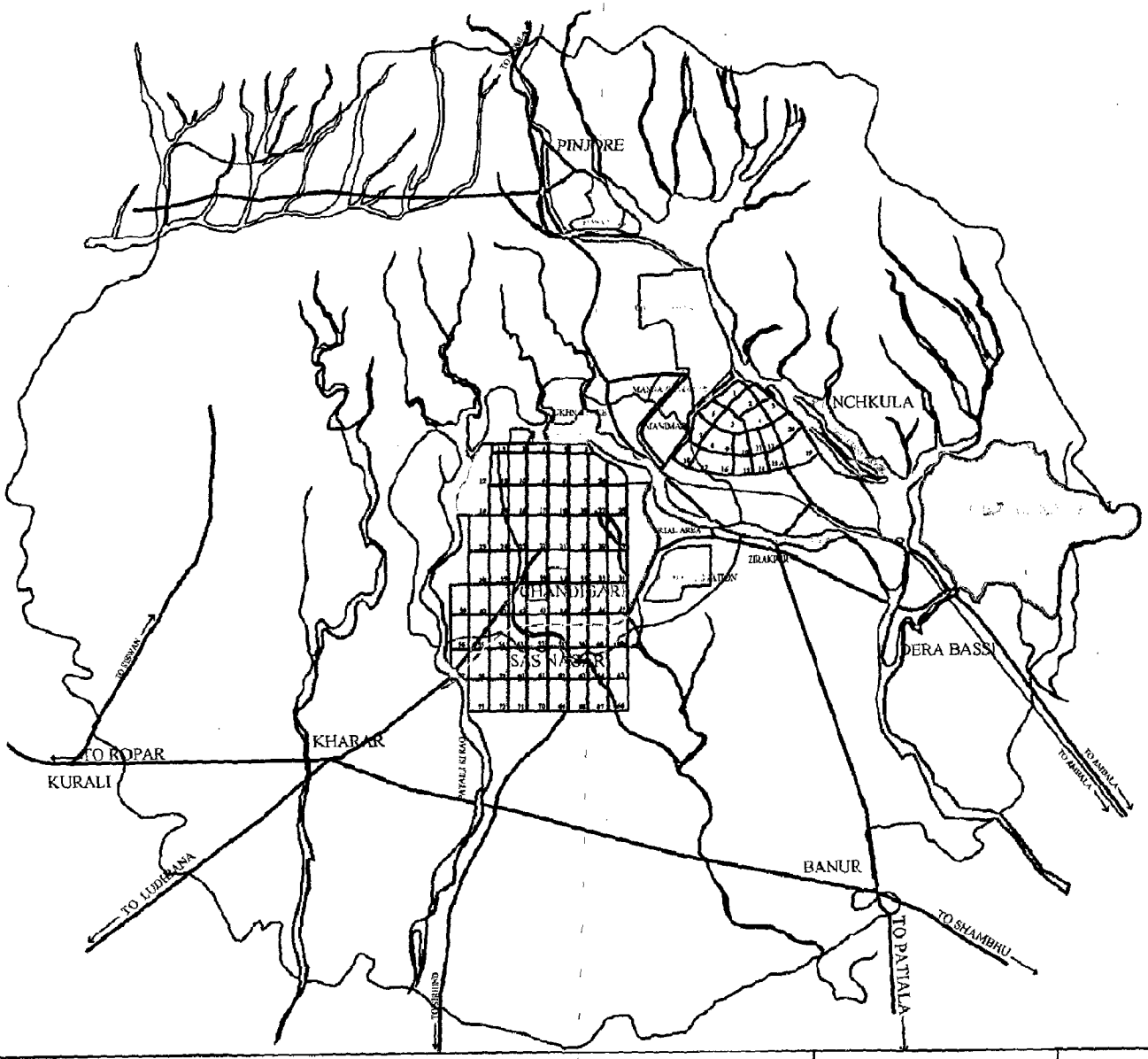
[4] "Making of an Indian city", Kalia, Ravi, Oxford Publishers

3. **Phase III**: Re-densification of the phase 1 if population goes beyond 5,00,000 (present population is touching 1 million mark)

Figure 1.2: Plan showing the Periphery of Chandigarh
(Source: 'Atlas of Chandigarh', Chandigarh Real Estate Department)



MAP NO. 1.1	DEVELOPMENT IN PERIPHERY ESTABLISHMENT OF CANTONMENT 1963	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II



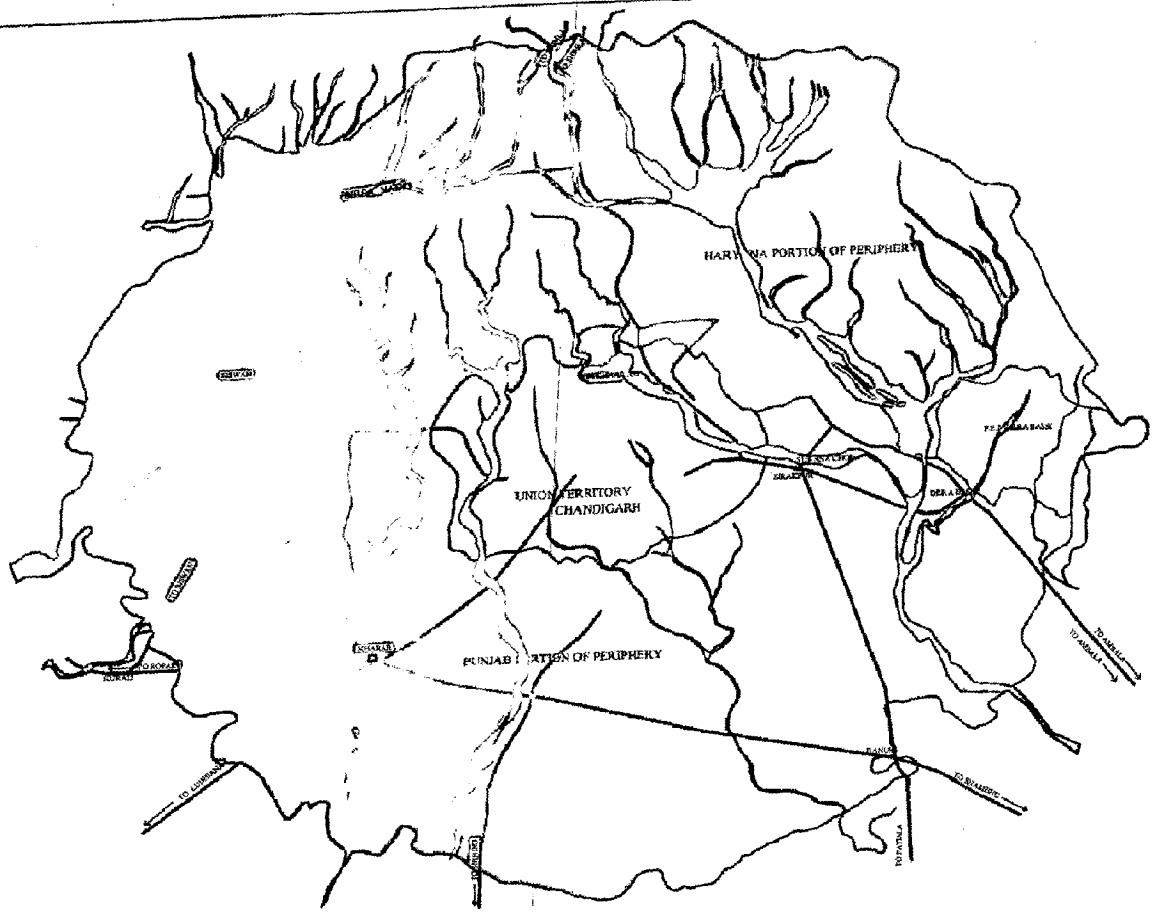
MAP NO. 1.2	DEVELOPMENT IN PERIPHERY POST REORGANIZATION PERIOD (AFTER 1966)	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II

1.1.7 Chronological Events Related To Periphery of Chandigarh

- **1951**- Inauguration of the capital city of Chandigarh
- **1952**- A periphery area of 8 km radius beyond the master plan area is approved
- **1962**- An expanded periphery control area of 16 km radius beyond the plan area boundary
- **1963**- Establishment of the army cantonment area by the centre near Chandi Mandir area in the Haryana falling within the control area boundary. The center becomes the first party to violate its own act.
- **1966**- The state reorganization involving restructuring
    - Chandigarh UT 44 sq.km
    - Punjab Portion of periphery 1021 sq. km
    - Haryana Portion of periphery 295 sq. km
- **1970**- Both Punjab and Haryana begin to plan and develop new towns, Mohali in Punjab and Panckula in Haryana.
- **1994**- Punjab government under the congress rule announces its plan to build a new town called New Chandigarh on western outskirts of Chandigarh. Congress looses election and the plan is abandoned.
- **1999**- Chandigarh interstate metropolitan region plan prepared by EFN Reberio for a radius of 50 km, including the parts of Punjab, Haryana, Himachal Pradesh. Four governments have no response to the plan and neither do they come up with any co-ordinated plan for the periphery.

Year	Growth rate percentage
1951-61	394.13%
1961-71	114.59%
1971-81	75.5%
1981-91	42.16%
1991-2001	40.3%

Table 1.1: Decadal growth rate of Chandigarh *(Source: Statistical Abstract,PB,2002)*



MAP NO. 1.3	PERIPHERY OF CHANDIGARH AFTER THE REORGANIZATION PERIOD (AFTER 1966)	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II

Density Trend in Chandigarh

Year	Residential area (In acres)	Population	Density person/acre
1971	2260	217443	97
1981	2486	379600	153
1991	2486	642015	258
2001	2940	928796	314

Table 1.2: Density Trend in Chandigarh

(Source: Town Planning Office, U.T.)

Population of towns in Punjab portion of Chandigarh periphery.

Town	2001	1991	1981	1971	1961
S.A.S. Nagar	1,23,283	78,457	32,351	-	-
Kharar	42,415	26,109	21,807	10,687	8,216
Zirakpur	25,006	-	-	-	-
Derabassi	15,690	9,602	7,421	4,051	5,070
Banur	15,005	10,014	7,453	5,459	4,308

Table 1.3: Population of Towns In Punjab Portion of Chandigarh

(Source: Statistical Abstract of Punjab, 2002)

1.2 IDENTIFICATION OF THE PROBLEM

- Le-Corbusier had designed Chandigarh as an isolated city with no construction activity in the 16km radius around it.
- The setting up of military cantonment, Hindustan Machine Tools factory at Pinjore, an industrial factory near Kharar and unauthorized growth centre near airport has violated this.
- The original plan fell short to the growing population and thus more and more sectors had to be added.

- The setting up of SAS Nagar and Panchkula by the respective governments of Punjab and Haryana to cash on the infrastructure facilities available in excess in Chandigarh has further strained the city.
- Besides these two, many other small towns like Mani Majra, Zirakpur, Kharar etc have come up. All these lie on the national and the state highways linking Chandigarh with major cities of the region. So the development is taking place rapidly. The lower land prices at the fringe areas are attracting both people and the land developers.
- Since all these places come under different governing bodies of different states, there is no coordinated planning. Thus an urgency to develop the capital on the basis NCR.
- The informal sector was not given much attention in the original plan. But the presence of job opportunities both skilled and unskilled has brought people from different states.

Chandigarh is a city designed with a precise function and consequently a precise quality of inhabitants. It was not to be a big city. Chandigarh was originally conceived essentially as an administrative city but has gradually extended its role to act as an important regional center of manifold activities. It grew to be a place of opportunity. Construction activity at Chandigarh invited large population of skilled, unskilled labor seeking employment, which later settled in the city as permanent dwellers and adopted various professions. They are further joined by the influx of yearly immigration force to city from several parts of India. If this growth pattern continues it may lead to deterioration of quality of life, infrastructure and other facilities.

The respective governments set up large industrial estates in Panchkula and SAS Nagar and took advantage of the facilities of the city. These towns are acting as cushions to absorb the overspill from Chandigarh. Chandigarh has a peculiar situation as three governments govern its periphery. Land use and settlement development is a matter of state government and the central government has no role to play in the development of this area. Lot of unauthorized construction is taking

place in the peripheral ares in the hope that it would be regularized too. This is happening for quite some time now under the influence of politicians.

A proof to this is the Punjab government's decision to approve the new periphery policy on 17th November 2005. This was kept under tight wraps as the decision could have serious political impacts.

1.3 NEED FOR THE STUDY

- There is a need to bring out the various issues regarding the fate of the periphery.
- And the direction in which the growth is taking place.
- To find out major problems in our planning system; it is necessary to study indepth the characteristics and the process of change in the concept of the periphery.
- An effort to bring out the major faults in our planning, implementing and monitoring systems. Also, would suggest some measures for planned development in the area.

1.4 AIM AND OBJECTIVES

Aim: To develop guidelines for rational spatial development in the periphery.

Objectives:

- To assess the nature of developments taking place in the periphery of Chandigarh and the various factors governing development in the periphery.
- To visualize the impact of these developments on the overall development of Chandigarh urban area.
- To study the relationship between the settlements in the periphery with the core city.
- To analyze the mechanism of planning and implementation by various agencies in the periphery and the various efforts taken by government for the periphery.

1.5 METHODOLOGY

Step I: Selection of Topic

Framing of Aims and objectives

Literature survey

Step II: Collection of data from Primary sources

Collection of data from Secondary sources

Analysis of the data

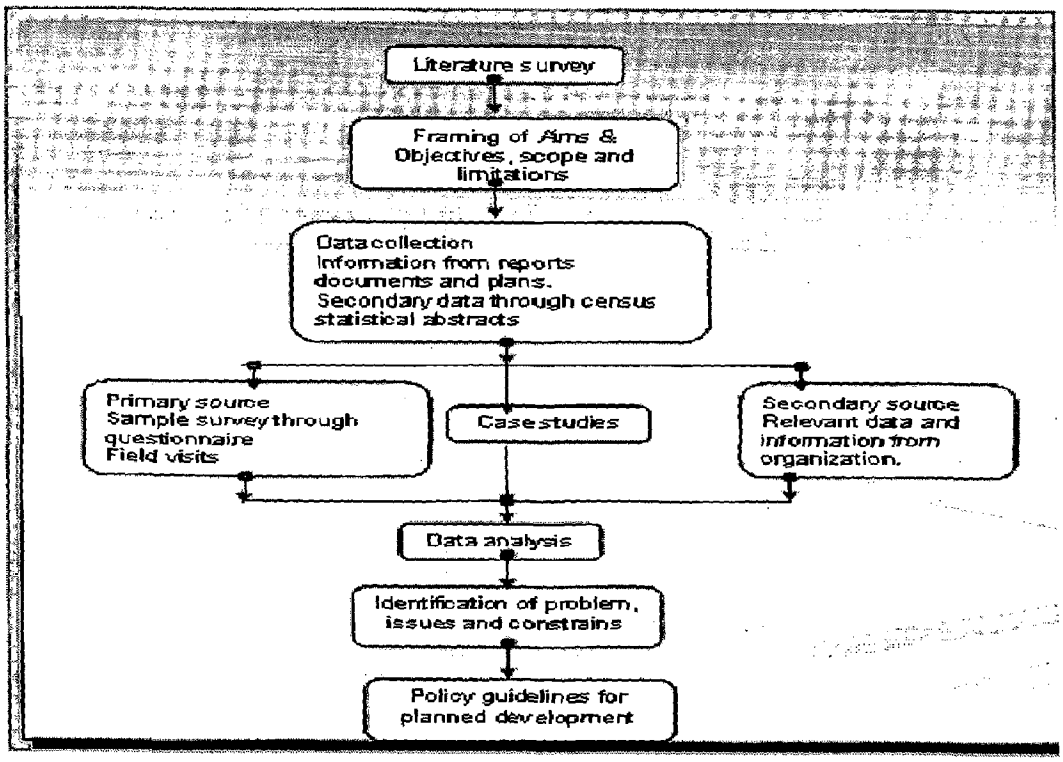
Step III: Identification of Issues and Problems

Framing of policy guidelines and recommendations

1.6 SCOPE AND LIMITATIONS

The major emphasis will be on studying the physical development, administrative and legal aspect of the problem

Due to time constrains there might be some gaps in the study.



CHAPTER-II: THEORETICAL FRAMEWORK AND CASE STUDIES

2.1 Introduction

Since cities are a dynamic element and are not static, therefore they are bound to grow. The growth of the cities had seen considerable increase after the industrial revolution. Industrial revolution brought stupendous changes both in the manufacturing and transportation systems. Mechanization of manufacturing techniques and communication means resulted in large-scale production and quick transportation. The factors, which in earlier times acted as restrictive measures in the expansion of the towns, also became invalid for this purpose. Improved and fast mode of transport made communications possible from large distances and improved communication techniques ruled out the necessity of face-to-face contact for business transactions.

The economic activities of the town intensified with the increased production of consumer goods and their easy marketability and efficient transport. The increase in the employment opportunities attracted people from the rural areas to urban areas in large number. Thus began the overcrowding of the cities and the subsequent expansion of the cities. The growth of the cities in the outward direction results in the conversion of the outlying agricultural land in the urbanization process.

The urban growth dynamics consists of increasing intensity of use of land in already developed areas, filling of undeveloped areas, development on the periphery of developed areas and merger of outlying settlements as the developed areas expand.

There might be linear expansion of cities along transport corridors or dispersed pattern or the formation of multiple nodes. Concentric growth takes equally along all the directions and there is uniformity in the pattern growth. This type of growth generally takes place when there is no geographical / typological constraints n the site and the city grows naturally without any additional factors influencing its growth.

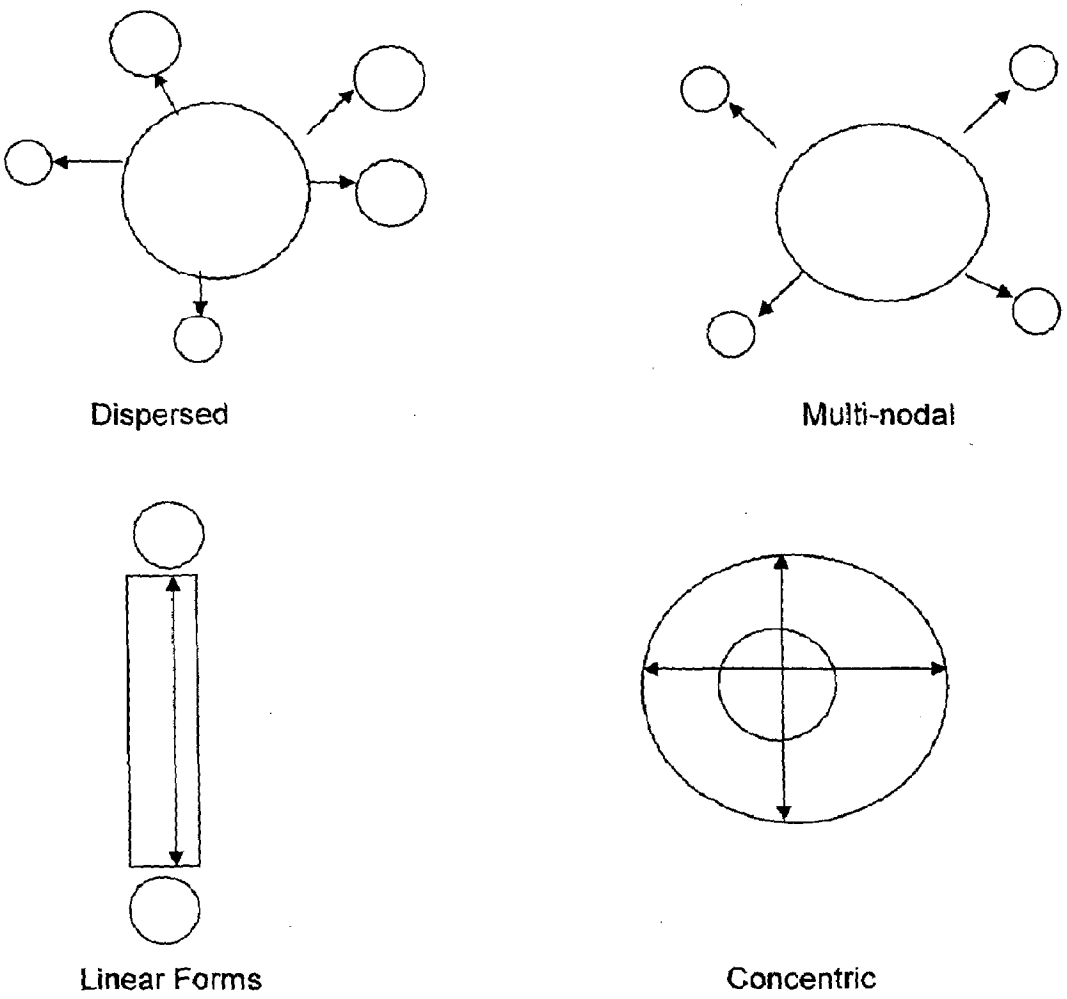


Figure 2.1: General Growth patterns of the city towards its countryside, defined by BRYANT (1982)

(Source: Peri-Urban Development: Alternative models for Ahmedabad, SDR 9.5 Sept-Oct 2002)

2.1.1 Core: Core is considered to be a highly urbanized region in which both the population and economic actions are concentrated. Generally, the area having the highest population density is considered as core.[5]

[5] *"Sustainable urban growth in peripheral area"s. Pornov, B.A. et. al., Progress in Planning, 1999*

2.1.2 Periphery: It is defined as an area predominantly agricultural in use located around proposed urbanizable limit. Its contrastingly sparse population and lagging economic development distinguish periphery from the core.

The asymmetrical relationship which exists between 'core' and 'peripheral' populations is typically one of dependence: since a peripheral region often lacks the resources to sustain its growth over time, its potential for urban development is largely reliant on processes within the core. Peripheral depopulation and core overcrowding are interrelated processes that are both triggered by inter-regional inequalities.

Availability of abundant land and expanding population pressures make opportunities for development in the peripheral areas attractive.

There are many factors that help distinguish between the core and the periphery. Some of them are:

- Population: The population of the core is much higher than the peripheral areas, though the area of the periphery is many times the area of the core.
- Population density: the population densities tend to be very high in the core areas while the population density is low in the periphery.
- Per capita income: per capita income is also on higher side in the core due to better job opportunities.
- Employment growth rate: most of the economic activities tend to concentrate in the core, so the employment growth rate is higher in those areas only.
- Remoteness: peripheral areas are marked by their remoteness that makes their accessibility difficult and thus lack of economic development.

2.2. Development Policies

With a view toward stimulating urban growth in the periphery, various development policies are used. These policies fall into distinctive groups:

1. Core-restricting policies

2. Periphery-stimulating policies[6]

- **Core restricting policies:** In this approach, a *'polynucleated structure'* for the future growth of the region is prepared and to restrict the migration flow to the congested cities. Free-standing cities and satellite towns are established. In addition to the substantial state investments in the economy of these growth centers and satellite towns (housing construction, job creation, provision of basic services and facilities), restrictions on industrial and office development, used in the UK in the late 1960s to encourage manufacturers to leave London in favor of peripheral areas, represents an example of growth discouragement policies.

- **Periphery stimulating polices:** in contrast to the above core-restricting policies, the other one is to directly stimulate the urban development in the periphery.

  The incentives stimulating from this policy are:

  - **Location aid:** state loans, outright grants and guarantees, refunds for removable costs) designed to encourage both establishing and expansion of industry in designated peripheral centers;
  - **Employment aid:** including training grants, employment premiums and covering of transport costs.

The patterns of urbanization in the periphery are more scattered than those in the core. Due to this lower density of urbanization, considerable distances can be found between the established urban localities in peripheral areas. It causes a shortage of joint services and cultural structures.

[6] *Sustainable urban growth in peripheral areas, Pornov, B.A. et. al. , Progress in Planning, 1999*

The periphery is at advantage of having land resources in abundance. These resources tend to be cheap and abundant in the periphery while they are rather scarce and expensive in the core areas.

2.3 FRINGE AREA

Fringe area may be defined as that area outside the central city that has a strong functional, economic and social linkage with the central city and is characterized by higher degree of interaction between the city and the surrounding areas. It is a transitional belt around the main urban developed area where both urban and non-urban characteristics functions exist side by side. The term fringe belt was first applied by geographer Herbert Louis (1936) to the zone of extensive land uses that developed at the urban fringe during pronounced hiatuses in urban growth, among which those associated with the city fortifications were obvious. Following renewed urban growth, such low-density zones were generally not acquired for house building, but became successively embedded within the urban area, surviving as recognizably distinct zones separating older from younger residential development.

Fringe basically denotes a transition between rural and urban way of living. It connotes that it actually lies on the periphery of urban areas, surrounding it and distinguishing it from the rural areas.

The term URBAN FRINGE is used as a co-terminus to the periphery of towns and cities, where the process of sprawling has started or taken place. T.L. Smith employed it to signify the "*built up area just outside the corporate limits of the city*". But later Carter propagated a review to the attitude of two aspects to urban fringe. First, there is a notion of the fringe as a distinctive area, which is neither urban nor rural in character, and which is primarily designated by mixed land use patterns. Second, there is a notion that the social characteristics of the population of the fringe are transitional between those of the urban and those of the rural.

- ❖ Lower land prices at the peripheral areas in comparison to the main city.
- ❖ Under utilization of land in the urban development limit.

2.3.3 ISSUES IN CONTEXT WITH THE PERI-URBAN AREAS

The development pattern of the peri-urban area has strong relationship with the development plan of the city and the direction of the actual physical growth. In most cases, the boundary of the permissible developed area is rigid and inflexible, as in the case of Chandigarh, and does not recognize the fact that development occurs extensively beyond the urban development authority limits

There is a subdivision of the plots and the process of direct conversion of agricultural land to residential or any other use by the original landowner himself or by the new owner. In terms of market share, the informal subdivision and sale of land is the major urban housing market.

While the peri-urban areas provide outlet to the growth pressure on the city, there are some negative features that are cause of concern.

- Underutilization of the areas lying within the development authorities
- Lack of infrastructural and other amenities

Land values decrease with the increase in distance from the city. Figure below depicts the relationship between the distance from the core and land value.

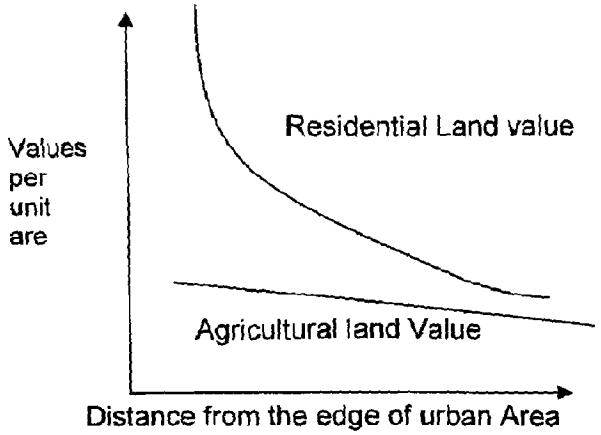


Figure 2.2:Schematic representations of land values around cities,

(Source: Per-Urban Development: Alternative models for Ahmedabad, SDR 9.5 Sept-Oct 2002)

2.4 DIFFERENT CONCEPTS TO CHECK URBAN SPRAWL

2.4.1 Theory of Garden city and agricultural belt

In 1898, Ebenezer Howard in his book *'City of tomorrow: a path to peaceful reform'* focused attention to creating new cities and outlined the principle involved ads a garden city. Garden city was a town designed for a healthy living and industry. Town of a size that makes possible a full measure of social life but not very large in size to face problems of other cities. Land was to remain in a single ownership of community or held in trust of the community.

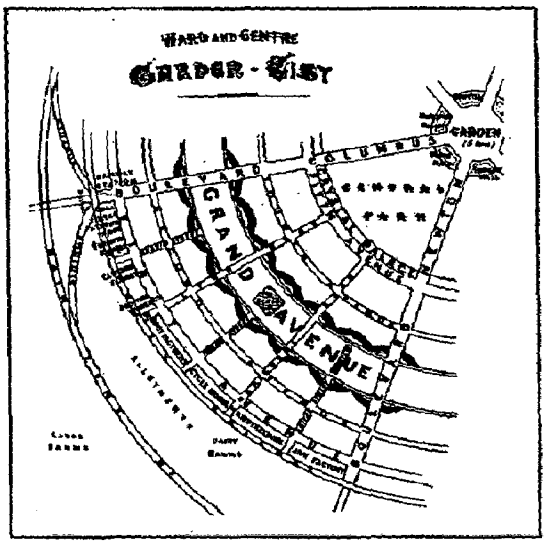


Figure 2.3 : Sketch of Garden City

(Source: "City of Tomorrow: A path to peaceful reform")

It was to be a complete working city of population 30,000 approx. the town area would be about 1000 acres. A large central park containing public buildings and surrounded by dwelling in all directions at a density of 12 families/acre. The railroad would pass the town, meeting the town at a tangent.

2.4.2 Welwyn Garden City

Established in 1920.The average density was to be no more than 5, for a population of 40-50,000 on 4536 acres.

608 acres of land was set apart as agricultural land that was too small but it was considered that other land

Figure 2.4: Fountain in a park at Welwyn *(Source: www.welwyn.com)*

would be available for future use. By 1947, the town had a population of 18000 and a total of 70 factories. One important feature was the lack of metalled roads suitable for road traffic. Most of the roads had no visible curb stones or pavements and so the grass verges molded into the roads in a very country manner. This has, with the advent of motor traffic, long since gone, and a great amount of the character has been lost.

Figure 2.5: Residential areas

(Source: www.welwyn.com)

The actual houses in the residential districts had purpose built outbuildings, built by the company, so that tenants did not erect unsightly sheds. The reason given for cul de sacs was to make maximum use of the land with minimum service expenditure. Welwyn for a long time, because of the commercial policy, lacked adequate means of socializing. No public houses were built; the council built a single community centre on the periphery of the town, and a single theatre held a monopoly together with the department store.[8]

2.4.3. Letchworth

Letchworth, the first garden city 35 miles from London was established in 1903. The town area was about 500 acres and the town was designed for a population of 35000. Out of the total area, 3000 acres was a green belt. By 1947, the town had a population of 16000 and about 100 industries.

Figure 2.6: Letchworth

(Source: The Urban Pattern- City Plannning and Design – Gallion, A.B)

[8] The Urban Pattern- City Plannning and Design – Gallion, A.B

2.4.4 GREEN BELT/ PERIPHERY CONTROL: CONCEPTS

The green belt is defined as an area predominantly agricultural in use located around the urbanizable limit. It is a mean to arrest sprawl by designating a wide zone all around the urban core. This open land, used for agriculture and general recreation is to be the natural counter part of the old defensive walls, that it would limit the size of the city and discourage expansion beyond it.

The green belt is defined as an area predominantly agriculture in use located around the proposed unbanizable limit. The purpose of green belt is

- To check the further growth of a large built up area beyond the urbanizable limit.
- To preserve neighboring town from merging into one another.
- To preserve the special character of town.
- To encourage compact development of city for optimum utilization of land and services and reduce the community distance for home to work.
- To preserve area of scenic beauty and recreation.
- To ensure supply of milk, vegetable, fruits, and flowers etc.
- To preserve and improve environmental conditions of the city.

Green belt is helpful in providing the framework to city depending upon its nature, size, and importance. Green belt acts as a moderator of microclimate in terms of rainfall, temperature, humidity etc. Green belt acts as wind tunnels to draw the air into interior of the city. Now days there is large hue and cry about the environmental pollution due to increasing rate of vehicles and industries. Green belt is being proposed to check the further degradation of environmental particularly air. The uses mostly permitted in the green belt like agriculture, horticulture, dairy, poultry, cattle shed farmhouses, brick kilns etc are helpful in catering the needs of the people of city in terms of agriculture products, flowers, milk, eggs, bricks etc. economically due to less transportation in preserving the physical structuring of needs of main city. The area under green belt should be properly managed otherwise it will be encroached by slums, unplanned unauthorized linear ribbon development because of no taxes being charged as development in the periphery

comes outside the municipal limits low land values, availability of land and non-applicability of municipal building bye laws.

2.4.5 Periphery Control

The concept of periphery control is not new in a sense even in case of ancient village one finds the periphery area. It is beyond the limit of village beyond which lay the agricultural fields.

2.5 Raymond Unwin-Green Girdle, London

Raymond Unwin who was advisor to greater London Regional Plan Committee, 1929 saw the green belt as providing open recreational land on the edges of large urban areas to compensate for lack of space within the city boundaries. He estimated that 250 sq.km. of open space was required on the edges of London to serve its nine million populations.

He later purchased land to form a green girdle, preferably a continuous tract of land 3 or 4 km wide around London. In 1914, it had a population of 4 million. At the core of this area is the city of London, one mile square with 5000 people. The city is the financial and political heart of the British Common Wealth. Farming out from this center Greater.[9]

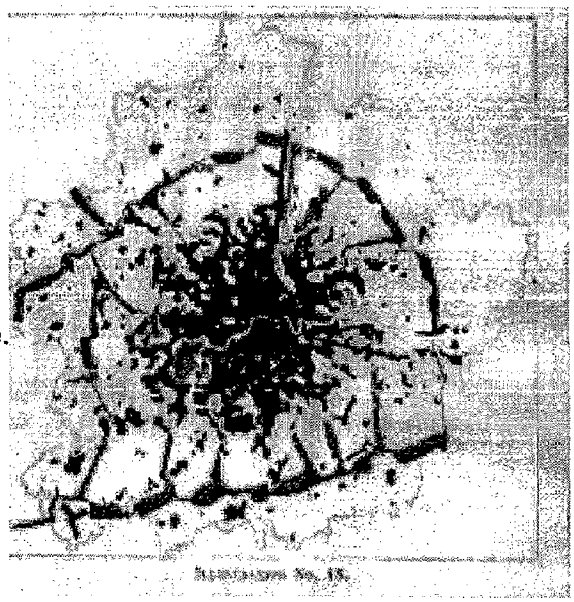


Figure2.7: Green Girdle :London

[9] The Urban Pattern- City Plannning and Design – Gallion, A.B

2.6 LONDON

Planning program 1944 (Patrick Abercombie and FJ forshaw)

Main features:

- Broad green belt ring ranging from 5 to 15 miles reserved.
- Density in the inner ring proposed from 70 -100 persons/acre
- Sub-urban ring : 50 persons/acre
- Within green belt existing towns permitted to increase within the plotted area of their jurisdiction.

Beyond the green belt the existing towns are permitted to increase within the plotted area of their jurisdiction but the balance is reserved for recreation. Beyond the green belt and within the Greater London region are the outer ring of villages and small towns separated by open countryside. The plan encompassed the total area of 2600 sq. miles.

The new towns act provided for creation of development corporations to plan, build and manage the new towns. The corporation obtained 60 years loan from the ministry of housing and local government to finance the acquisition of land, prepare the plans and improve the land within all utilities and road system.

The earliest towns were located in London region. These towns from 18-30 miles from London were intended to accommodate the overspill of people and industry to implement the London plan.

Overspill from the larger cities has not been the principle reason for building more new towns. The purpose has shifted to economic support and development on regional level.

Existing towns in the green belt have been filling up. Administrative firmness in much of the open country remaining in the green belt rings has led to shortage of land for housing, an inflammatory push on land values and a continuing demand that more green land should be released for development.

Temporal Changes and Local variations in the functions of London's green belt
After the World War II, green belts came as an effective tool in planning for separating the countryside and the urban areas.

London's green belts have been criticized for being outdated. Studies have revealed that ecological and amenity value of wasteland inside the city can often be higher than the farmland and golf courses preserved by the green belt. Yet, the wasteland does not enjoy same level of protection.

The research has shown that London's green belt is not effective at limiting development in the urban fringe. At the local level green belt is effective at limiting development in the urban fringe. At the regional scale, development 'leapfrogs' the green belt into deeper rural areas. Such development has been linked to higher car use and longer car journeys

The growing feeling among the planners that the green belt is outdated, unfair and inefficient has led to a variety of proposals for its reform. The town and country planning Association and the Royal Town Planning Institute issued statements in 2002, stressing the need to explore the green space concepts that have new functions eg., green corridors and green wedges while acknowledging the need for control development.

Table 1
Green belt surface area in England (Office of the Deputy Prime Minister, 2003)

Green belt	Area (ha)		Change (%)
	1997	2000	
England	1,652,600	1,677,400	1.5
Tyne and Wear	53,350	66,330	24.3
York	25,430	26,190	3.0
South and West Yorkshire	249,240	255,620	2.6
North West	253,290	257,790	1.8
Stoke-on-Trent	44,090	44,080	0.0
Nottingham and Derby	62,020	61,830	−0.3
Burton and Swadlingcote	730	730	0.0
West Midlands	231,290	231,530	0.1
Cambridge	26,690	26,690	0.0
Gloucester and Cheltenham	7,030	7,030	0.0
Oxford	35,010	35,000	0.0
London	513,420	513,330	0.0
Avon	68,660	68,780	0.2
SW Hampshire and SE Dorset	82,340	82,500	0.2

Table: 2.1: Change in green Belt surface area in England

(Source: "Temporal Changes and Local variations in the functions of London's Green Belt', Amati,M. et. al . Landscape and Urban Planning, 2005)

The central government guidance suggested that the use of land in green spaces has a positive role to play in fulfilling a number of objectives:

- To provide opportunities for access to the open countryside for the urban population;
- To provide opportunities for outdoor sport and outdoor recreation near urban areas;
- To retain attractive landscapes, and enhance landscapes, near to where people live;
- To improve damaged and derelict land around towns;
- To secure nature conservation;

- To retain land in agricultural, forestry and related uses.

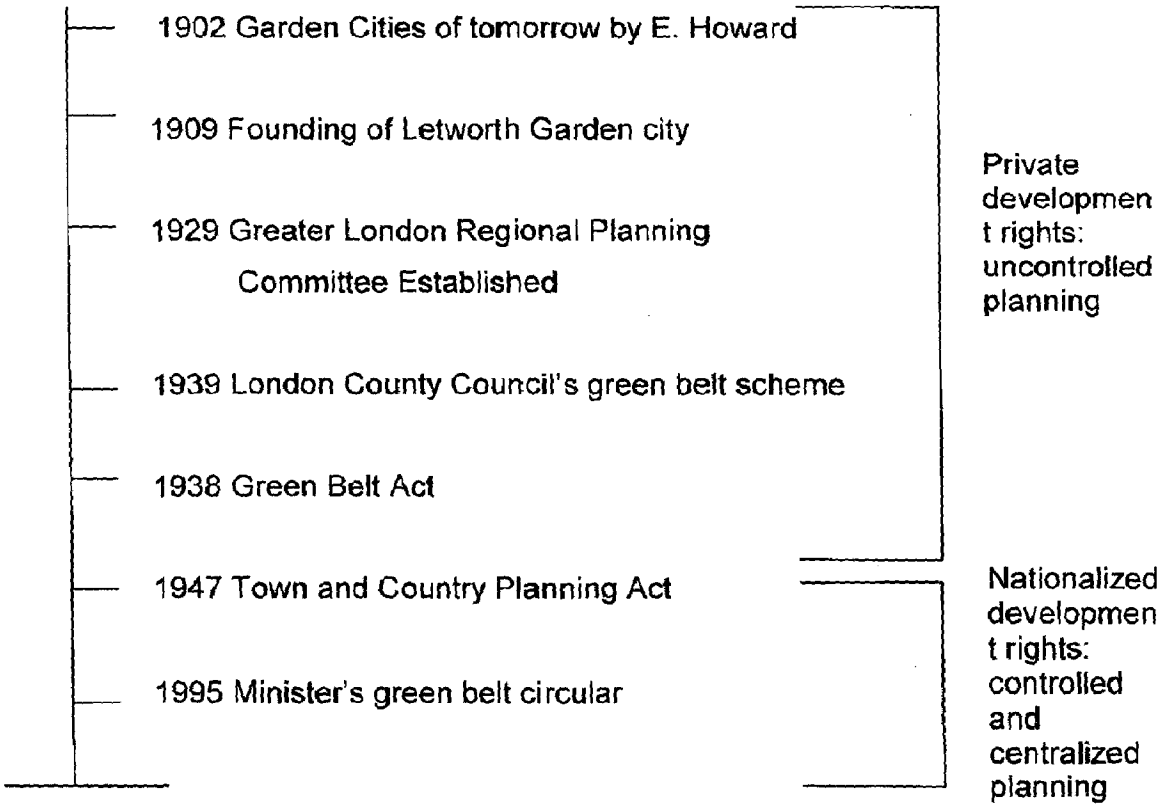
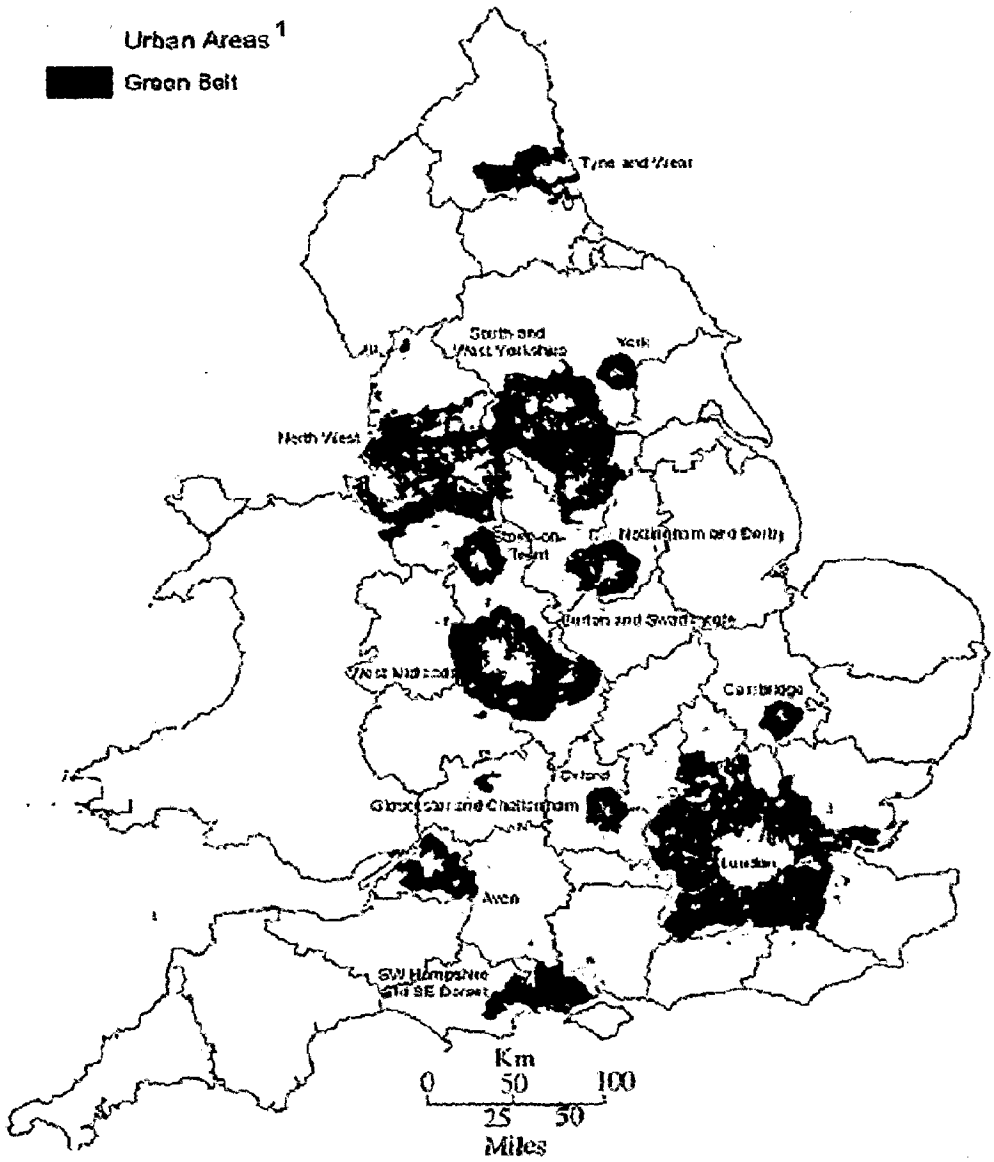


Figure 2.8: Evolution of Green Belt policy over the years in England

(Source: "Temporal Changes and Local variations in the functions of London's Green Belt', Amati,M. et. al . Landscape and Urban Planning, 2005)

With the changing times, the aim of the green belts was also changed.

In 1927, the greater London planning committee report advocated the use of the green space for playing fields. In 1934, it was suggested that the green belt might be useful to Air and Army ministries for aerodromes and barracks.(Ref. Fig 2.6.1)



[1] Urban areas exceeding 500 hectares and within 10 km of Green Belt land

Figure 2.9: Green belts of London

(Source: 'England Rural Development Program 2005-2006', Ministry of Agriculture and Fisheries and Food)

Types of policies observed in the London green belt

Group	Policy category	Explanation
I	Preserve openness	The main aim of the green belt is to preserve 'openness' – any development which infringes this, e.g. large agricultural buildings are rarely permitted
II	Allows/controls some growth	Some of the local authorities use the green belt to direct development into certain areas. This group of policies makes provisions for 'white land' – i.e. land that may be built on at some stage in the future
III	Anti-speculation	Development for agricultural or forestry use is generally permitted in the green belt. Developers seek planning permission by building a residence which is ostensibly for a farm but then change this designation with comparative ease. These policies aim to prevent this (Phillips, 1996)
IV	Rural character	The plans looked at still view the green belt as having a rural preservation function. This group includes policies that prevent high-grade agricultural land from being built-on, controls the size and function of farm shops and controls the conversion of rural buildings into other uses
V	Amenity	This includes provisions for using open space in non-agricultural uses, including Country parks, allotments, leisure facilities
VI	Landscape protection	These policies protect the landscape by regulating equestrian activities which have a negative effect on the landscape (Munton, 1983). Also, the green belt is used to give extra development control to areas of outstanding natural beauty
VII	Landscape restoration	Some of the local authorities contain areas in the urban fringe with a degraded landscape. These policies aim to encourage the restoration of landscapes, e.g. through the use of community forests
VIII	Nature conservation	These policies aim to maintain biodiversity and rural sustainability
IX	Liminal development	Often the urban fringe is also a place for development that is difficult to define. Caravans and gipsy sites fall into this category, these policies control the permanence of such settlements and their location
X	Infrastructure	These policies control the infrastructure developments such as airports and motorways and the added development control that is needed around them
XI	Local facilities	These policies encourage low-cost housing in rural areas and to promote community facilities
XII	Unavoidable urban fringe development	Certain activities – e.g. a waste development site, require an urban fringe location. Others, e.g., mineral extraction cannot take place elsewhere. The policies are intended to control such development

Figure 2.10: Types of Policies observed in the Green belts of London

(Source: "Temporal Changes and Local variations in the functions of London's Green Belt', Amati,M. et. al . Landscape and Urban Planning, 2005)

The main factors due to which the green belt's aim varies over space are:

1. Varying development pressure
2. Local authorities that use the green belt to oppose government's plans
3. Political pressures
4. Lack of technical knowledge

Conclusions

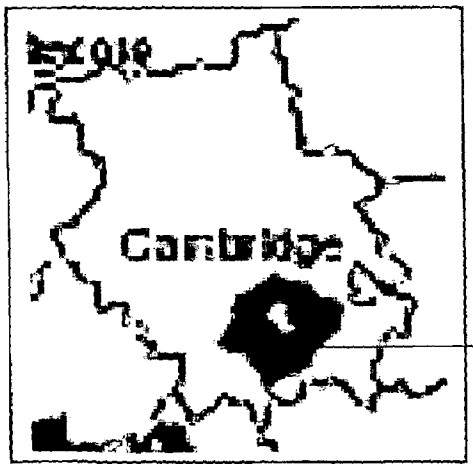
- Green belts should be made more useful by utilizing the land for different purposes like recreational spaces, landscaping maintaining ecological balance instead of merely serving as a vacant land.
- Any alternative to the green belt (eg. Green wedges or green corridors) will have to be implemented in a similarly flexible way to have wider acceptance.
- Green belt reforms should involve searching beyond its functions to underlying motivations and values that support the green belt.

2.7 Cambridge

Cambridge is world famous for its university. Cambridge was to serve the purpose of being an educational city with the population not allowing to exceed 1,00,000 by restricting development in the city and the villages. This was done by providing a strong green belt around the city.

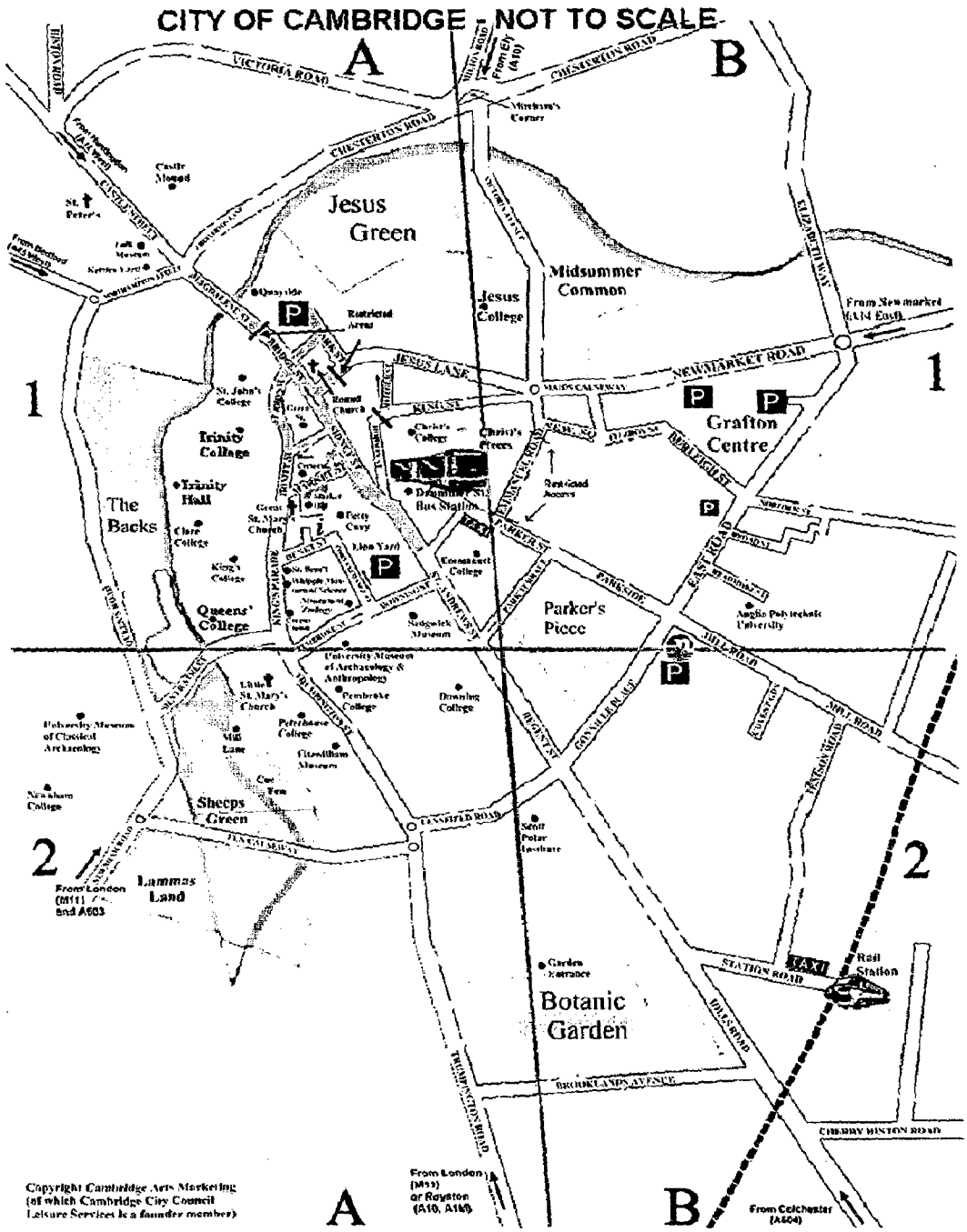
Figure 2.11: Cambridge University

(Source:www.googleimages.com)



Plan of Cambridge city with green belt around

Figure 2.12: Green Belt around Cambridge



Map 2.1: City of Cambridge

(Source: www.cambridgecity.com)

2.7.1 Expansion of employment

- Trinity Science Park and other employment clusters were established. This led to the so-called Cambridge Phenomenon.
- The surges of hi-tech firms have with 30,000 employees in and around the city, make it Europe's prime growth area.

2.7.2. Consequences of these policies

- The increase in the number of jobs and households within a restricted land supply have led to rising property prices
- People employed in the City and their fringes have been forced to live beyond the Green Belt where cheaper housing more than offsets the cost of travel into Cambridge.
- Population growth in surrounding villages and market towns has been amongst the highest in the country.
- As a result there is a daily influx of nearly 40,000 workers from outside the City, increasingly outnumbering resident workers.
- Congestion in the access roads has risen, increasing emissions and pollution.

Increase in housing costs: Over the years typical housing costs have doubled in real terms (i.e., after taking account of inflation). Traditional employers such as the University find it increasingly difficult to attract qualified personnel. Salaries have not kept up with rising house prices and thus with the cost of living in the area.

Population location

Middle and low-income groups have been forced to locate beyond the Green Belt as property prices and the cost of living in the City have risen. Apart from those protected in Council housing, price increases have meant that it is mainly wealthy professional and managerial groups who can afford to locate in the City.

Land development

- Most new development has been forced onto market towns within 25 miles of the City: Ely, Mildenhall, Newmarket, Saffron Walden, Royston, Biggleswade, St Neots, Huntingdon and St Ives have taken the brunt of the expansion.

- Cambridge's northern fringe has been developed for housing Some housing has been developed to the south

- New villages have been developed, such as Bar Hill, or are under development, such as Cambourne beyond the Green Belt.

- The outline of the villages around Cambridge has not altered. This implies that a substantial infilling has taken place, providing homes for the increasing numbers of those who commute into Cambridge.

Transport

- Within the City of Cambridge, there has been very little improvement of the transport network. Outside Cambridge, trunks roads such as the M11 and A14 have been developed to take through-traffic out of the City. In recent years these roads have become part of a major trans-European transport corridor, with substantial increases in freight through-traffic.

- The trunks roads are now operating at capacity because of the additional commuter traffic. The A14 suffers long periods of congestion every day; accidents, emissions and pollution increase.

- Most commuters come to Cambridge by car, as public transport is not viable for serving dispersed locations.

- Congestion on the access roads has increased tenfold. Long traffic delays are a daily occurrence, especially during the morning and

2.7.5 Estimating the impacts

Evaluation - 2 'E's

The options have been compared under three headings:

- **Efficiency**: Economic efficiency is measured by calculating the cost of living and production costs for each area and for the region as a whole. The cost of living includes housing, goods, services and transport. Cost of production, measured by employee, includes floor space rental, wage levels, services and transport. Options that increase the region's costs would probably also threaten its prosperity, making it less competitive.

- **Environment**: Environmental quality can only be established by more subjective criteria. Nevertheless some quantitative estimates are possible, particularly traffic congestion, vehicle emissions and pollution levels. The amount of open space in the form of private gardens and agricultural land is another indicator of quality. Impacts on man-made amenities such as buildings and public spaces are more difficult to assess.

A consideration of aspects – efficiency& environment – should lead to a proper assessment of the sustainability of each option. Both aspects are relevant and if one of them falls short, the long-term sustainability of the region will be impaired

2.7.6: Six different models have been proposed for guiding the growth of the Cambridge.

Option 1 - Minimum Growth

This option explores the idea that Cambridge should do nothing to encourage further the kind of expansion of Cambridge.

Option 2 - Densification

This option considers the impact of concentrating as much development as possible in the City of Cambridge

Option 3 - Necklace

This option looks at concentrating development in the villages (existing or new) and Market Towns beyond the Green Belt

Option 4 - Green Swap

Development would be allowed in selected areas of the Green Belt which are of less scenic value and are not available for public use.

Option 5 - Transport Links

Development would be allowed in areas within easy access of a public transport corridor.

Option 6 - New Town

Development would be concentrated in a single location beyond the Green Belt.

2.7.6.1 Scenario 1: Minimum Growth

The Policy

- To preserve the City of Cambridge and the surrounding area much as it is today.
- No additional buildings within the City and South Cambridgeshire beyond existing planning permissions.
- New development allowed in market towns.

- Replacement or renewal of buildings allowed within the City and South Cambridgeshire (e.g., conversion of houses into flats, or warehousing into offices, etc).
- Transport to remain as it is now (e.g., no increase in road capacity or public transport).
- Subdivision of houses into flats and reductions in household size would allow some increase in households in the City and South Cambridge shire.
- Big increases would occur where development is allowed in East Cambridge shire and Huntingdonshire.
- Employment continues to grow in the City.
- This is despite restrictions due to existing permissions for development, and the substitution of extensive space users (i.e., warehousing and manufacturing) by intensive space users (e.g., high-tech business, private and public services).

The results

- Dwelling costs increase substantially within the City and South Cambridge shire.
- Displacement of middle and lower socio-economic groups in the City by wealthy managerial and professional groups.
- Commercial floor space costs increase substantially within the City and South Cambridge shire.
- Displacement of traditional jobs in the City by more competitive high-tech and private service jobs.
- Increased separation of jobs and houses that would generate extra commuting into Cambridge and its fringe.
- Increased cost of living.
- Increased cost of production.

Transport implications

The increased separation between jobs in and around the City and households would generate increased levels of commuting which for the period 2001 to 2016 would imply:

- an increase in travel distances of 29%
- an increase in travel time of 79%
- a trebling of queuing delays within the City
- An increase in energy consumption by 56%.

- The majority of trips would be by car as public transport is unsustainable with dispersed population location.
- Increase in emissions and thus pollution.
- Radical measures would be necessary to reduce congestion.

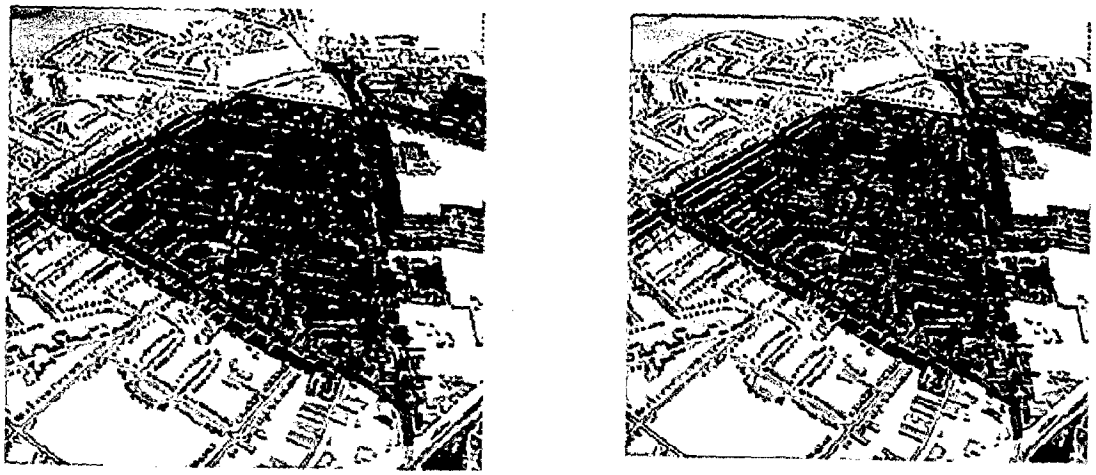
Efficiency	**Environment**
Efficiency would be impaired	Good protection of environment
Difficulty for export oriented firms	Increase in emissions due to commuting

Table 2.2: Comparative Analysis of the two factors

2.7.6.2 Scenario 2: Densification

The Policy

- To provide maximum development where it is most wanted, i.e., the City of Cambridge.
- To protect the remainder of the area surrounding the City from further development.
- No additional buildings beyond existing planning permissions except within the City.
- Replacement of buildings encouraged within the City (e.g., replacement of two storey houses by four storey buildings, low rise offices by higher buildings, etc).
- Transport improved within the City e.g. (bus and cycle priority lanes, improved junctions etc).



Open spaces to be targeted.

Figure 2.13: Before and after Densification
(Source: Report ' Planning for future Cambridge', 2004)

The Results

- Housing costs fall within the City but continue to increase elsewhere.
- Housing becomes more affordable for lower socio-economic groups within the City.
- Employment costs increase slightly within the City.
- Improved prospects for employees in traditional jobs in the City due to lower labor costs.

Transport implications

- Increased levels of congestion, despite the expected higher use of public transport, cycling and walking.
- Traffic delays within the City rise substantially.
- Emissions and thus pollution increase within the City.
- Significant improvements to the City's transport network would be necessary, which would affect the buildings next to the road widening schemes.

Evaluation

Efficiency	Environment
Efficiency would be maintained	Good protection of environment
Easier for export oriented firms	Reduction of private open space
-	Substantial traffic congestion
-	Increase in emissions and pollution

Table 2.3: Comparative Analysis of the two factors

2.7.6.3 Scenario 3: Development of necklace villages

The Policy

- To continue the current policies of protecting Cambridge and the surrounding countryside by only allowing further development in a necklace of villages beyond the Green Belt.
- No additional buildings beyond existing planning permissions in the City and Green Belt.
- Replacement or renewal of buildings allowed within the City (e.g., conversion of houses into flats, or warehousing into offices, etc).
- Some new development allowed in market towns of Ely, Huntingdon, St Ives, St Neots.
- Transport to remain as it is now (e.g., no increase in capacity of roads or public transport).

There would be a slight increase of households within the City despite the restrictions, due to existing permissions for development; subdivision of houses into flats, and reductions of household size.

There would also be a continuing increase in employment within the City and South Cambridgeshire, despite the restrictions due to existing permissions for development, substitution of extensive space users (i.e., warehousing and manufacturing) by intensive space users (e.g., high-tech business, private and public services).

The Results

- Dwelling costs increase substantially within the City and less so within South Cambridgeshire.
- Displacement of middle and lower socio-economic groups in the City by wealthy managerial and professional groups.
- Commercial floor space costs increase substantially within the City and South Cambridgeshire.
- Displacement of traditional jobs in the City by more competitive, high-tech and private service jobs.
- Increased separation of jobs and houses which would generate extra commuting into Cambridge and its fringe.

The cost of living within the City and parts of South Cambridgeshire would increase substantially, due to increased house prices and rentals, costs of goods, services and transport.

The cost of production within the City and parts of South Cambridgeshire would increase substantially, due to increased labor costs, floor space rentals and congestion.

Transport implications

The increased separation between jobs in and around the City and households beyond the Green Belt would generate increased levels of commuting and longer shopping trips.

- The majority of trips would be by car, as public transport is generally unsustainable with dispersed populations.
- Similar increase in travel distances to that in the Minimum Growth option.
- Even more traffic queues than in Minimum Growth, as more traffic is generated by trips to Cambridge for services and shopping.
- Increase in emissions and thus pollution.

- Would necessitate radical measures to reduce congestion, such as road pricing.

Evaluation

Efficiency	Environment
Economic efficiency impaired, putting at risk the competitiveness of the region	Good protection of the environment of the city and the surrounding green belt
Increase in production costs for export-oriented firms	Increase in emissions and pollution due to congestion in access roads to Cambridge.

Table 2.4: Comparative Analysis of the two factors

2.7.6.4 Scenario 4: Green "Swap"

The Policy

- To allocate development in areas nearest to demand in the City of Cambridge without changing the existing City environment.
- No additional buildings beyond existing planning permissions except within designated areas of the Green Belt.
- Developers to provide new public green areas outside the Green Belt to replace those used.
- Replacement or renewal of buildings allowed within the City and South Cambridgeshire (e.g., conversion of houses into flats, or warehousing into offices, etc).

- Transport to remain as it is now (e.g., no increase in road capacity or public transport).

The area is Cambridge Airport, where operations could be transferred to a nearby disused airfield, thus releasing valuable land for development. Newmarket Road runs across the bottom of the picture.

Figure 2.14: Green Swap
(Source: Report 'Planning for future Cambridge',2004)

Results

- Dwelling costs increase
- Less displacement of middle and lower socio-economic groups in South Cambridgeshire by wealthy managerial and professional groups
- Commercial floor space costs increase fairly evenly across the areas.
- Traditional jobs along with new high-tech and private service employment will grow in the City and its fringe.
- Increased supply of houses near jobs reduces need for more long distance commuting

Transport implications

- The close connection between jobs and households means that travel distances will not increase as much as in other options.
- A higher proportion of trips are made by walking, cycling or bus
- The sheer number of extra people living on the fringes would increase the number of vehicles circulating on the City's roads.

- Traffic delays set to quadruple during the period up to 2016, thus increasing congestion substantially.
- Emissions and thus pollution increase.
- Would necessitate radical measures in and around the City to arrest growing traffic congestion.

Evaluation

Efficiency	Environment
Economic efficiency would be maintained.	Good protection of the Environment of the city.
Increase of about 1.5%production cost for export-oriented firms but balanced by efficiency gains.	Reduction in green belt amenity but compensated by new public spaces further afield.
-	Protection of environment outside green belt
-	Net increase in public green facilities
-	Substantial increases in emissions and pollution in the city due to concentration of population, employment & traffic.

Table 2.5: Comparative Analysis of the two factors

2.7.6.5 Scenario 5: Growth along Transport Links

The Policy

- To preserve the City of Cambridge and its surrounding area as much as it is today.
- New residential development only allowed within walking distance of public transport to reduce environmental impact of private car travel.

Figure 2.15: Transport corridor

- The majority of trips would still be by car, maintaining congestion but improving average speeds on certain roads.
- Average distance of car trips increases by only 13%
- Traffic delays increase by a smaller percentage.

The cost of living within the City would rise due to increased house prices and rentals, costs of goods, services and transport. The cost of production in all areas would rise steadily and fairly evenly, following increased household and labor costs, floor space rentals and congestion.

Efficiency	**Environment**
Economic efficiency would be moderate and unlikely to improve the competitiveness of the region.	Good protection of the environment in the City and the countryside generally.
Export-oriented firms such as those in the high- tech sector would find it relatively demanding to complete with the rest of the world, facing a 25% increase in production costs between 2001 and 2016.	More intense utilization of land in the transport corridors might slightly raise emissions and pollution locally, despite rail use, but protects green land elsewhere

Table 2.6: Comparative Analysis of the two factors

2.7.6.6 Scenario 6: A New Town

Policy

- Concentrating all new development in one new town.
- Some new development allowed in market towns of Ely, Huntingdon, St Ives, St Neots.

- Replacement or renewal of buildings allowed within the City and South Cambridge shire (e.g., conversion of houses into flats, or warehousing into offices, etc).
- Transport to remain as it is now (e.g., no increase in capacity of roads or public transport) except for new links between New Town and City.

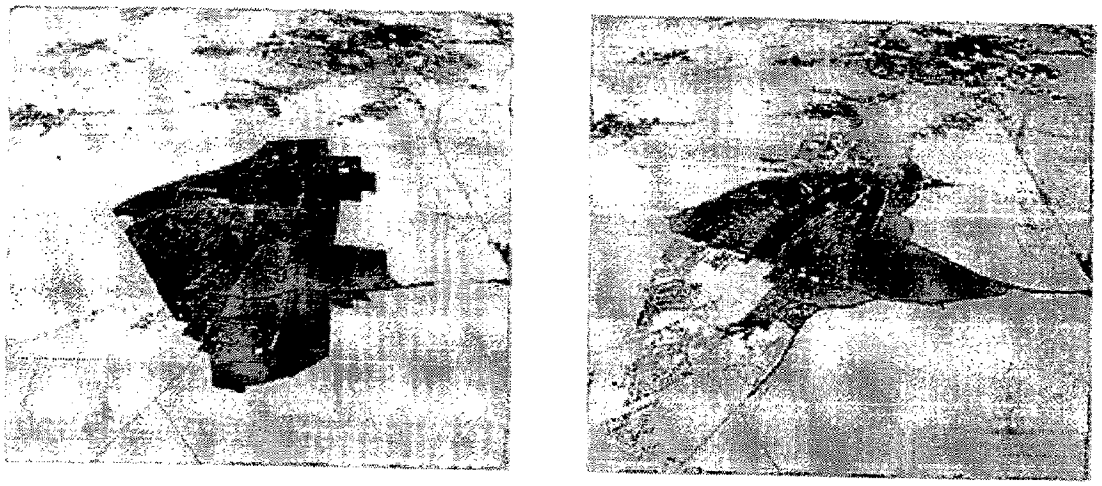


Figure 2.17: Area where a New Town could be developed. Utilizing Ministry of Defense barracks, and both privately owned and County Council land.

Results

- Dwelling costs increase on average in all areas.
- Displacement continues of middle and lower socio-economic groups
- Production costs increase very substantially in all areas except the New Town itself.
- Displacement continues of traditional jobs in the City by more competitive, high-tech and private service jobs.
- Concentration of jobs and houses in the New Town
- The cost of living in all areas would increase substantially on average, especially within the City, due to increased house prices and rentals, costs of goods, services and transport.

The cost of production in all areas would increase substantially on average, especially within the City, due to increased labor costs, floor space rentals and congestion.

Transport implications

- The proximity of the New Town to the City would generate high levels of traffic between them, requiring additional road capacity.
- A rail link would reduce the use of private car.
- Emissions and thus pollution increase between the City and the New Town.
- Reduced congestion within the City.

Efficiency	Environment
Economic efficiency would be impaired.	Good protection of the environment in the City and the countryside generally.
Export-oriented firms such as those in the high- tech sector would find it relatively difficult.	More intense utilization of land in the transport corridors might slightly raise emissions and pollution locally, despite rail use, but protects green land elsewhere

Table 2.7: Comparative Analysis of the two factors

2.7.7 CONCLUSIONS

The options analyzed can be grouped into three classes:

1. Those, which would *prevent* further development of the City and its immediate area. (Option 1: Minimum Growth, Option 3: Necklace and Option 6: New Town)
2. Those which would *encourage* the development of the City and its immediate area (Option 2: Densification, or of the surrounding Green Belt, such as Option 4: Green Swap)

3. Those, which would *allow a measure* of development within the City but spread the rest. (Option 5: Transport Links).

S.No	Prevent	Encouraged	Measure of dev.
1	Reduced area's economic efficiency	Maintain economic efficiency	Reduced economic efficiency
2	Increased social segregation	Improved social equity	Similar social equity
3	Protect the man-made environment and open spaces in and around the City	Reduced open space in and around the city. Reducing more agricultural land conversion	Uptake of green open space is minimal, 'brown' land is used for more intensive development.

Table 2.8: Comparative Analysis of the all the options

(Source: Drawn by author after analyzing different options)

Since each option has different strengths and weaknesses, some sort of combination should be sought as most nearly meeting the criteria of the two 'E's –, *efficiency, environment* – thereby leading Cambridge boldly and confidently into the next century.

2.8 Bangalore Metropolitan Area

Bangalore is witnessing a phenomenon of high growth. The Bangalore metropolitan development authority has drafted a structure plan for the metropolitan area.

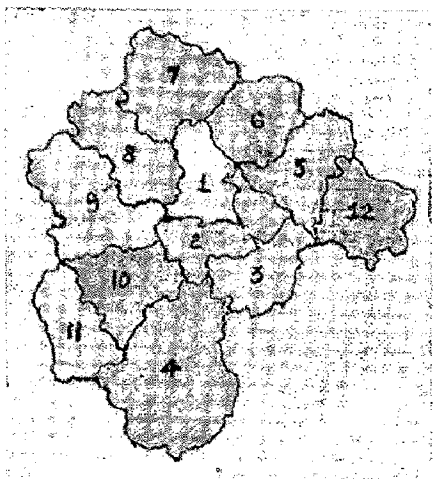


Figure 2.17: Different Taluks in Bangalore Metropolitan
(Source: Report on 'Planning of fringe Areas: case study Bangalore')

	Taluk	Area (m2)	Population (million,1991)	Density (persons/km2)
1	Bangalore N.	902	0.93*	1027
2	Bangalore S.	709	1.01*	1425
3	Anekal	528	0.19	360
4	Kanakapura	1590	0.32	201
5	Hosakote	546	0.18	330
6	Devanahalli	457	0.16	350
7	Doddaballapur	798	0.22	276
8	Nelamangala	524	0.14	267
9	Magadi	798	0.19	238
10	Ramanagaram	625	0.21	336
11	Channapatna	545	0.24	440
12	Malur	637	0.17	267

Table 2.9: Area and population of different Taluks

(Source: Comprehensive Development Plan, Bangalore)

2.8.1 Green Belt Area

In the outline Development Plan prepared for Bangalore city in 1961 and the Comprehensive Development prepared Plan prepared in 1976 under the Karnataka Town and Country Planning Act, 1971, the entire Bangalore Metropolitan Area of 500 sq. km was classified in two major categories: a continuous built up area (conurbation area) of 321 sq. km by 2001 and a 'rural tract' surrounding the proposed built up area where only agricultural activities would be permitted to expand within a radius of about 200 meters beyond the Gramthanas. In 1995, the demarcation for the conurbation and the "green belt" was revised to 597 sq. km and 682 sq. km. to accommodate the growth the city.

There was no proposal to acquire land within "rural tract" which was to be preserved as a green area through strict enforcement of zoning regulations and provisions under the Land revenue Act. However, due to the population explosion during 1971-1981, the establishment of heavy industries within and beyond the green belt area and unauthorized housing development, the rural tract has been reduced. Therefore, in the comprehensive development plan prepared in 1984, the extent of Bangalore development Area was increased to 1279 sq. km. within the conurbation or urbanisable area was to be 449 sq. km. as per the "Green Belt"

The present green belt around the delineated urbanisable area of the city is about 5 km wide and consists of about 543 villages. Some of the industries and other developments that were earlier outside the rural tract came under the new green belt area by virtue of shifting of boundary. Much of this is in the form of ribbon development along the highways leading to the city. [10]

2.8.2 Land Values and Change of use

There is a rise in the land prices in the green belt although the prices have remained at $1/5^{th}$ or $1/10^{th}$ of those prevailing in the BDA area. There seems to be some acquisition by rich people for farm houses and speculative purpose in the green area and also unauthorized sub-division of lands for house-sites by land developers for lower and middle income people working in the local industries. The farmers are tempted to sell their lands for prices that are relative to those prevailing for agricultural land. Alternatively villagers may rent housing to industrial workers. Also there are many industries along the arteries. The government from time to time regularizes these.

[10] Planning for fringe areas – case study Bangalore, TCPO report,1998

2.8.3 Problems as recognized by the BDA

- Expansion of cities along main transport corridors. Large tracts of land lying vacant between the core city and the ribbon development. The cost of providing services to these becomes very costly.
- Unchecked growth of fringe has resulted in the degradation of environment
- Supply to the city of vegetables, fruits, dairy products and poultry have been affected.

Housing: Gap in the housing market and excessive demand. Though this has lately been reduced due to the private developers and builders. Karnataka Industrial Development Area Corporation acquired 500 acres of land for the development of "Electronic City"

Transport: Expansion of villages and industries has created a demand for services and transport to be provided by local services. BTC is running buses to the villages and industrial areas.

Employment: Industries such as KEONICS in Hosur road, industrial estate in mysore road, private industries along Tumkur road have created demand for housing, services and land.

Lack of finance: Financial constraints prevented BDA to acquire full land.

Political pressures: Politicians force the authorities to regularize the illegal developments

Local Panchayats: The Gram Panchayat Act has vested the local panchayats with certain rights to operate independently irrespective of the provisions of the CDP. [11]

The conversion of land and registration of properties has been a source of revenue to the Government and in 2004-05 alone the State earned Rs. 1,916.18 crores. The

[11] Planning for fringe areas – case study Bangalore, TCPO report,1998

revenue has dipped this year by Rs. 600 crores following a ban since April 24, 2005 on registration of properties.[12]

A majority of the converted land has been used for formation of layouts and construction of houses. In Anekal taluk, 2,174.33 acres of agricultural land have been converted followed by Bangalore North Additional 1,382.28 acres, Bangalore South 1080.21 acres, Bangalore East 909.5 acres and Bangalore North 748.19 acres.

In all, 153.36 acres of land was converted for industrial purposes in the three taluks — Anekal (49.14 acres), Bangalore North (6.07 acres) and Bangalore East (98.15 acres). 11,126.27 acres of agricultural land has been converted for housing and 600.17 acres for other purposes during the last three years in the Bangalore Urban district alone. On an average, 1,041 properties are being registered in the sub-registries in the city.

The overcome the above drawbacks, the BDA have come out with a new Comprehensive development Plan and in that it has given guidelines for the development of the city.

2.8.4 Purpose of the structure plan

- Provide the strategic policy framework for planning and development control logically;
- Ensure that the provision for development is realistic and complements with national, state and (SKR) regional policy guidance; as well as
- Securing consistency between local plans for contiguous or neighboring areas

2.8.5 Objectives

- Encourage the concentrated decentralization from BDA to satellite towns, growth centers and nodes in the periphery of BMRDA.

[12] www.thehindu.com

- Alleviating excessive burden of demand on urban services and resources of BMRDA
- To relieve Bangalore of the excessive development pressure.
- Introduction of strategic policy measures through the introduction of planning tools.

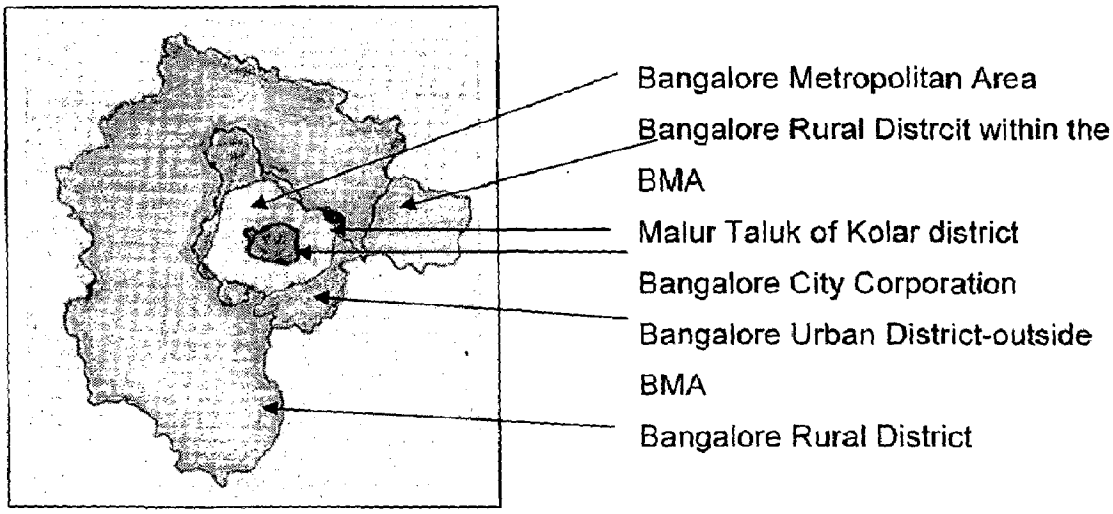


Figure 2.18: Bangalore Metropolitan Area

2.8.6 The metropolis Hinterland – The Urban Fringe

- The *metropolitan fringe* is a dynamic zone that is increasingly being subjected to urban growth and migration pressures as centrally land becomes scarcer, land values increase and the inconvenience of accessing central locations more apparent.

In parallel within the Bangalore metropolitan Region the absence of a policy and strategic guidance plan for BMR means:

- Building sanctioning procedures and development control regulatory capacities are unable to keep pace with demand.

- Industrial and infrastructure investment decisions are uncoordinated particularly in the peri-urban areas where pressures for urban expansion are increasingly pronounced and difficult to monitor and control.

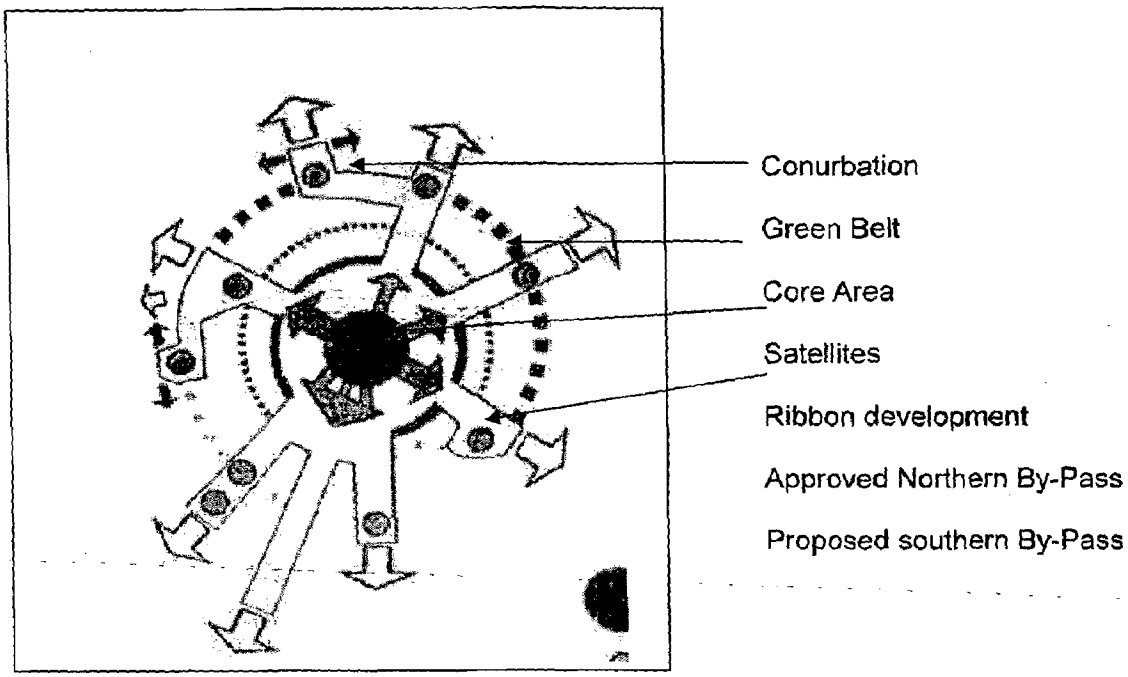


Figure 2.19 : Growth directions as identified in the CDP plan

2.8.7 Green Belt Corridor Development Zones

To reduce the green belt in the comprehensive development plan (CDP) by 2015 from 742 sq km to 221 sq km. Each of the APZ's green belt corridor development zonal policies is formulated for each of the primary transport corridors.

Special set of 'best use' policies have been drafted to ensure that as far as possible a pragmatic and rational approach to sustaining the green belt be maintained.

2.8.8 Master plan strategies:

- Conservation of environmentally sensitive lands from developmental activity that could be detrimental.
- Adaptive and complementary uses for upkeep of the areas such as security cabins, essential housing, etc.

Permissible land use

- Agro-industrial units/ complexes
- Urban amenities such as burial grounds, education, etc
- Uses required for the natural expansion outside the villages in
- Public utilities such as solid waste land fills, water treatment plants,
- Piggeries and poultry farms.
- Dairy and livestock rearing.

Plot area and FAR:

Maximum ground coverage: 5% of the surface area of the land

FAR of 1.0 and G+1 floor only.

Maximum height permissible: Subject to the height clearances of the Airport authority, microwave, and telecom departments for the constructions associated with farming and agro industrial business.

Setbacks: 10 m Parking: Controlled Parking Regulations shall be applicable

2.8.9 Green belt management

Policy: Within the green-belt and with references to delineated settlement boundaries (village Gram Thana limits) it should be a policy that:

1. Uses be permitted only within the existing village limits (Gram Thana) that accord with development guidelines which seek to upgrade existing socio-economic conditions;
2. Outside the village limits (Gram Thana), only uses are permitted that accord with the structure plan policies and/or other detailed development plans. Otherwise no change of use should be permitted.

Permission for sub-division of land outside settlement envelopes should only be such that no plot becomes less than one hectare in size. Construction of farm houses up to 2 storey and a plinth area not exceeding 500sq m or 5% of the total net plot, whichever is less.

2.9 Delhi

Delhi being the capital of India has attracted lots of migrants from all over the country particularly from the region.

Population Growth Trends

Year	Population in Lacs	Growth Rate %
1961	26.6	52.5
1971	40.7	52.9
1981	62.2	53.0
1991	94.2	51.5
2001	137.8	46.3
2011	182.0	32.0
2021	230.0	26.4

Table 2.10: Population growth trends in Delhi
(Source: Delhi Development Authority)

2.9.1 Recommendations for green belt, MPD 1962

- For the development rural areas outside the urbanisable limits of 1981, MPD 1962 recommended 8 large divisions referred to as rural district centers in Ujwa, Najafgarh, Palam, Nangoli Jat, Bawana, Narela, Shahdra and Mehrauli.
- Expected that each RDC will ultimately be developed into a small rural township by 1981 with a population from 7000 to 10,000.
- Inner rural zone, also called the agricultural belt in the form of a broad area 1.6 km wide around the metropolis with the extension along the main highways.

- Stringent controls were to be exercised over the development proposal.
- Agricultural belt was subject to special aesthetic treatment and protection of its rural character from urbanization.

2.9.2 Purpose of green belt

- Compact and organized urban development within 1981 DUA boundaries.
- To preserve land under intensive agriculture.
- To preserve the overspill of urban areas.
- To preserve ribbon development along the main highways radiating from Delhi.

Activities permitted in the Agricultural Belt

Vegetable and flower cultivation, Poultry farming, allotment gardening, nurseries, demonstration agricultural farms, farm houses etc. This use permissibility applies to the rural areas as well.

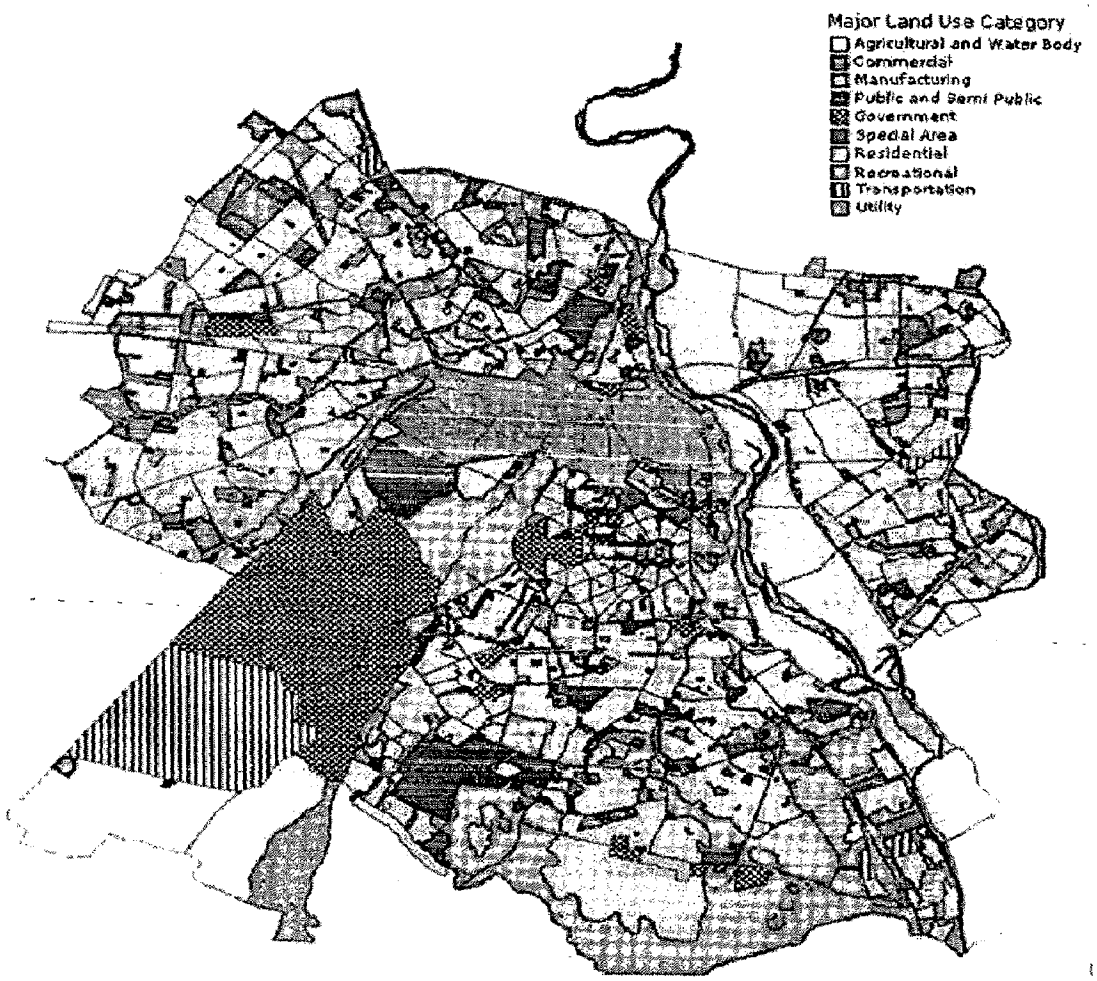
Three Regional parks proposed in Delhi rural areas along

- Mehrauli,
- Tughlaqabad historic monuments,
- Botanical parks along Najafgarh Jheel and
- Park to the north of Delhi up to river Yamuna was proposed

2.9.3 Recommendations for Green Belt, MPD 2001

- Considerable part of green belt proposed in first master plan was utilized for urban extension both for planned and unplanned development, the concept was modified to meet new situation.
- Green belt of 2 km wide all along the union territory proposed.
- Lot of development taken place along eastern, western and southern border.
- Proposal of two growth centers with community facilities and rural industrial facilities in Bhaktawarpur, Bhawana, Jharoda kalan,Dhama, Chawla, Jagatpur Ghoga, Qutub garh Mitaron and Ghumanhera.
- Road linkages between these growth centres were also proposed to be improved.

- As per the Malhotra committee recommendations in 1996 the minimum size of the farm house was reduced to 0.8 acre and covered area increased to 500 sq. yd.
- MPD 2001 expected a population of 121 lakhs by 2001 and showed an increased holding capacity of DUA to 81 lakhs and rest 40 lakhs to be accommodated in urban extension.



Map 2.2: Master Plan-Delhi, 2001
(Source: Delhi Development Authority)

2.9.4 Mini Master plan 1992 proposals

- Mini master plan for planned and integrated development of rural areas of Delhi.
- Construction of physical, social, economic and ecological infrastructure.
- Mini master plan included 195 villages that were divided into 3 tiers. To develop:
- 15 villages as growth centers
- 33 villages as growth points
- Remaining 147 as basic villages.
- To develop the entire rural area as a 'Special Area' based on the concept of residential cum farmhouse in order to retain green and maintain ecological balance.
- Recommended that Lal Dora should be abolished from the NCTD and municipal building bye laws as applicable in urban areas.
- As per industrialization in the rural areas, the plan recommended household industries, which were non-nuisance. Noxious type of industries to shift in DDA industrial areas.
- It recommended that unauthorized colonies should not be regularized and their population should be shifted to NCR towns.

2.9.5 Observations

Major development in the proposed green belt

- 122 unauthorized colonies in green belt
- 7 resettlement colonies
- Dwarka Sub city
- Sarita vihar
- Mayur Vihar
- Radisson Hotel
- Bhalaswa Lake
- Sanjay Lake
- Sainic Farms
- Vasant Kunj
- Uttam Nagar

Major developments in the proposed green belt of 2001 plan

- Ribbon development along G T road
- Ribbon development along Rohtak road
- Illegal form houses
- Najafgarh jheel

Conclusions

- The growth potential along 5 major national highways are not tapped
- 2 rural distinct centers were identified in the green belt
- A lot of population pressure on green belt
- The permanent agricultural belt was used for extension
- The belt was shifted and not retained
- Green belt policy was not discussed
- 6 green centers, 9 growth points and 24 basic villages in the belt
- Plan encompassed an area of 2600 sq. miles
- New towns act provided for creation of development corporations to plan, build and manage the new towns.

Green areas under DDA	
Area	Ha.
Total area of Union Territory of Delhi	148639
Urban area as per Master Plan	44777
Recreational Use	8722
Total green area under the jurisdiction of DDA	5050.97

Table 2.11: Green Areas Under DDA

(Source: Draft Master Plan 2021)

The scenario of Development of Greens for last 15 years is as per below		
Areas	Developed till 1980	Developed till 1995
District Park	342.2 acres	820.65 acres
M.P. Greens/ Green Strips	289.00 acres	1908.00 acres
N.H. Parks	139.13 acres	349.63 acres
Parks/Tot Lots	147.28 acres	143.41 acres

Table 2.12: Development of green areas

(Source: Draft Master Plan 2021)

In Delhi, the government realized that the city would be unable to support the population and the expansion of the city would go unabated. So, the government decided to follow the policy the restricting the growth of Delhi by providing counter magnets and growth centers. The region is being planned as National Capital Region.

2.10 Inferences

1. Green Belts are a viable solution to check the Urban sprawl and the unavoidable peri-urban development.
2. But the rising land costs pressurize and the land constraints in the cities force for violations and encroachments in the green belts.
3. But the frozen development regulations in the belt would force the planners to look for other alternatives for providing more housing stock to the people.
4. In the case of Cambridge, they have tried to access different options by a measurable set of options. Eg. , in "green swap" option, they have proposed development in the selected pockets of green belt and then asking the developers to compensate for that green loss by providing green spaces somewhere else.
5. Another viable solution is the setting u of growth centers and decentralization. This would prevent concentration of people at a particular city. This has been tried in the cities of Delhi and Bangalore. In Delhi several growth centers and counter magnets have been provided. Although the success has been limited.

But with the better provision of infrastructural amenities in those places, their growth would also pick up.

6. In Bangalore they have tried to have development along the main transport corridors. As the city has lots of important transport corridors, development along them is bound to take place & is taking place. Within this best use policies have been drafted to ensure that as far possible a pragmatic and rational planning approach should be followed.
7. The Cambridge study has also analyzed one option of re-densification of the city to have optimum use of the city's potential and prevent the haphazard development of its periphery. This option could be utilized in Chandigarh as Chandigarh has a very low density as compared to the rest of cities in India. Though at this stage it is still premature to talk about the final strategies.
8. The periphery of most of the cities are tried to be regulated by the provision of green belts. But in most of the cases, these serve no other purpose than as mere wastelands and abandoned land attracting more irregular development. London case study ahs provided valuable knowledge as to how we could make different uses or the green belts. They could be utilized for recreational. Landscaping, institutional and other facilties like aerodomes etc.
9. A well-thought and rational approach taking into consideration the future population of the city, and the requirements of the city, the proposals should be made for its periphery.

CHAPTER-III: APPRAISAL OF EARLIER EFFORTS FOR PLANNING OF PERIPHERY OF CHANDIGARH

The government realized that the Growth of the city is not occurring in the perceived manner and there is a need to develop a rational plan for the balanced growth of the region. In this, the earlier attempts by the government to have a balanced regional growth for Chandigarh have been reviewed.

Broadly speaking, three major attempts were made to have a coordinated development in the region. These were:

1. Formation of Planning committee, 1975
2. Inter-state Region plan-1984
3. Chandigarh Inter-state Metropolitan region plan -2001

1. Formation of Planning Committee, 1975

In 1975, the government of India decided to constitute a co-coordinating committee to guide and channelise the growth of Chandigarh and the urban centers coming up in its neighborhood. The composition of the committee was as follows:

1. Secretary, Ministry of Works and Housing, Govt. of India
2. Quarter Master General, Army Headquarters, Ministry of Defense
3. Chief commissioner, Chandigarh
4. Chief Secretary, Government of Punjab
5. Chief Secretary, Government of Haryana

The objectives of the committee were:

a) To study the development plans of UT and those of SAS Nagar and Panchkula townships and to suggest measures for the coordinated development of the region.

b) To assess their impact on the development programs already implemented and those being implemented in the two townships on the development of the

region as a whole and to suggest remedial measures to be taken by the state governments and the Union Territory

c) To prepare an outline regional plan for Chandigarh and the areas falling within the zone of influence.

For this purpose, the co-coordinating committee made sub committees and appointed such members as be necessary. The constitution of those sub committees was as follows:-

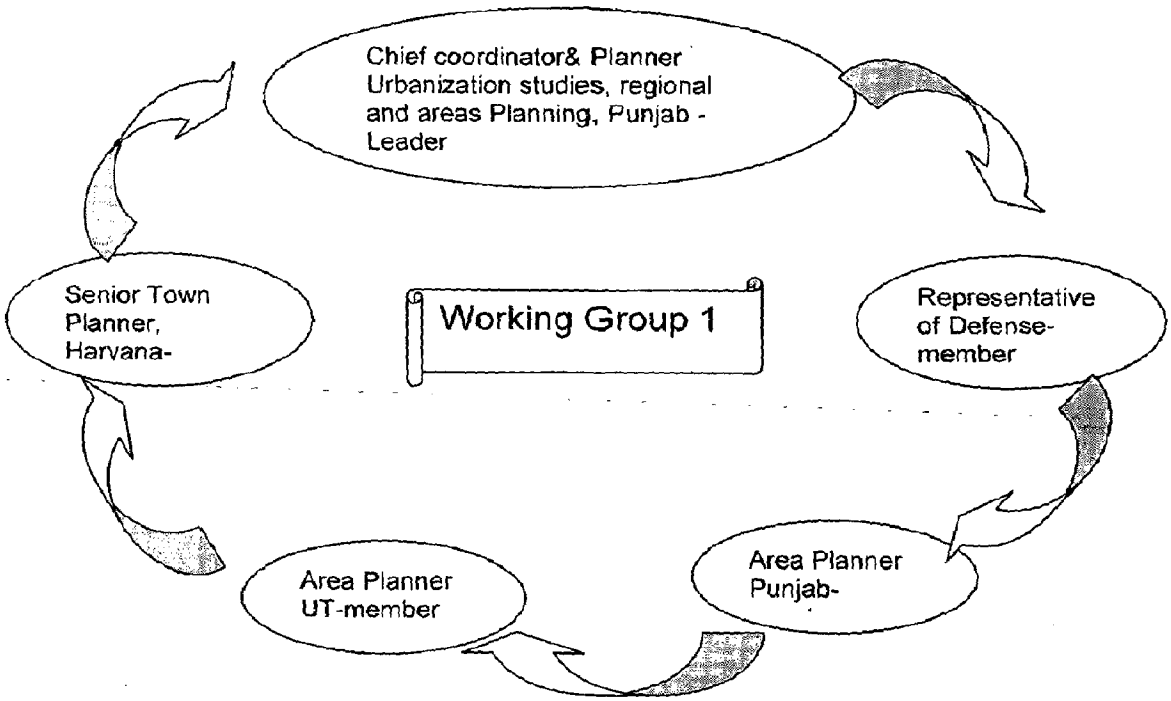


Figure3.1: Constitution of the various sub-committees.

(Source: Drawn by the author from the report)

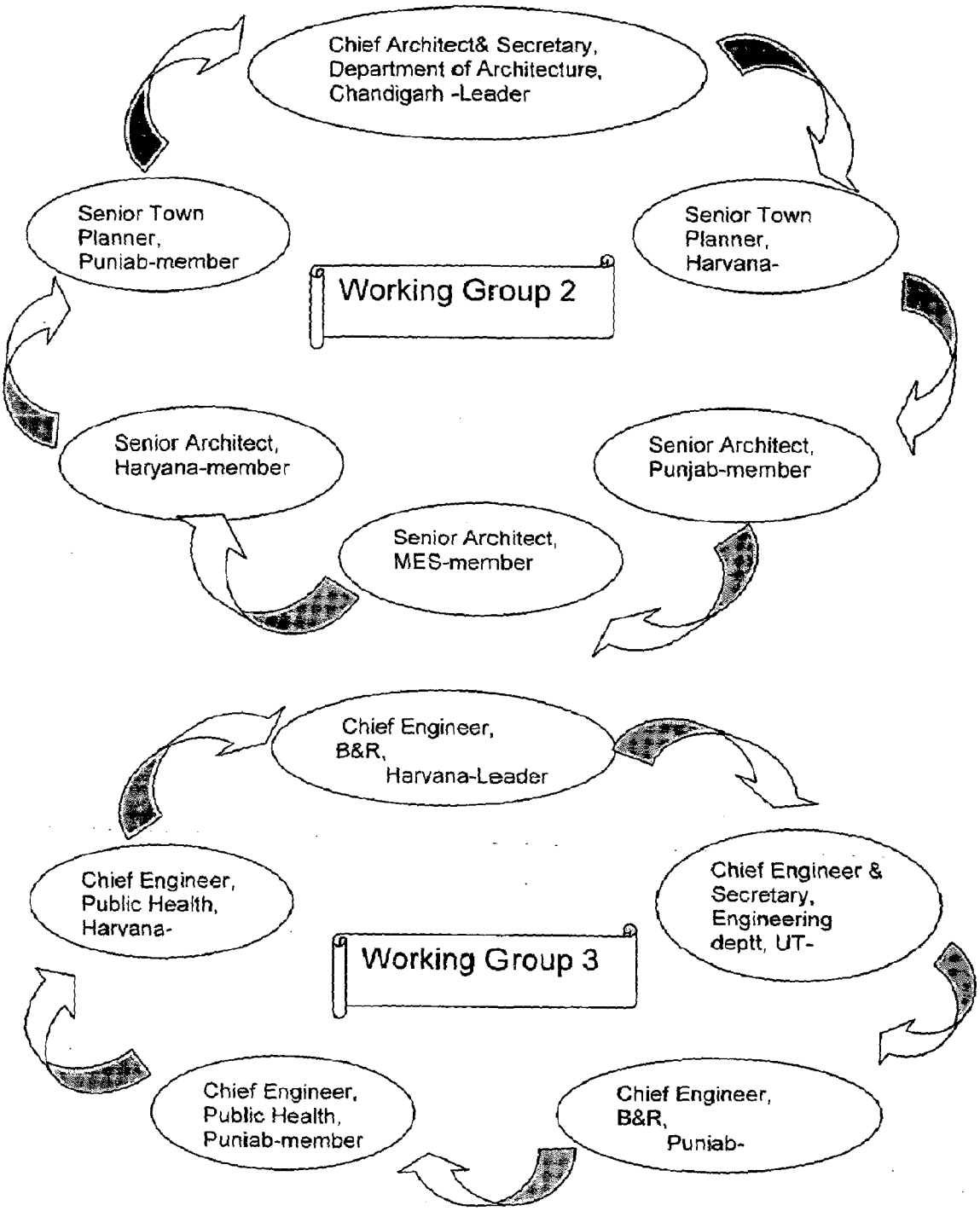


Figure 3.2: Constitution of the various sub-committees.

(Source: Drawn by the author from the report)

Appraisal of the Chandigarh Inter State Metropolitan region (CISMeR) Report

The government realized that the city is coming under undue pressure due to the phenomenal growth. To have a more balanced growth, there was a need to have a well-developed regional plan. Chandigarh region was conceived in 1975 when the co-ordination committee prepared a regional plan. Later, in 1984, the town and country planning organization (TCPO), Delhi prepared a plan for inter-state Chandigarh region. The UT government hired private consultants EFN Ribeiro Associates. A regional plan based on certain factors was formulated. The plan was proposed for an area of 4771.17 sq km. with Chandigarh as the fulcrum. It proposed a structure plan for the proposed Chandigarh metropolitan area (CMC) within CISMeR.

Main features of the report were:

Ten tehsils lying in the states of Punjab, Haryana and Himachal Pradesh were taken in the area. These were Nalagarh, kasauli, Solan, kalka, Panchkula, Narayangarh, Kharar, Rupnagar, Fatehgarh Sahib & Rajpura.

The incremental growth of the region

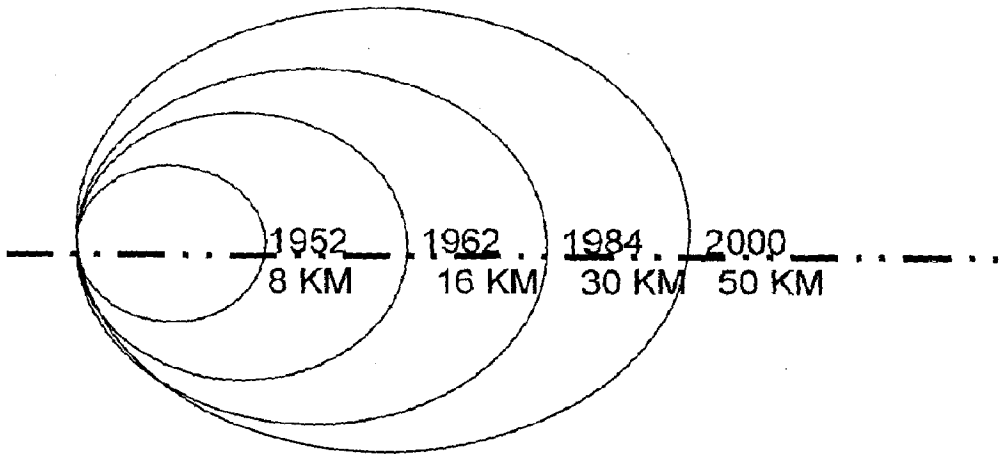


Figure3.3: The growth of the region from the time of establishment of Chandigarh till present date

Layer I: Maximum Population 3.00 lakhs in 2021 AD. 43 sq km of a designed city incorporating 30 sectors of about 1 sq. km. each, Sukhna Lake and a clean industries zone. (Ref Figure 3.4)

- Suited for conservation and incremental redensification.
- Public transport to be improved and para-transit to be restructured accordingly;
- Informal acitivites-around nodes like hospitals, administration areas, public dealing offices, tec to be improves.

Layer II : Maximum population 5.00 lakhs in 2021 AD. 27 sq kms of a planned city incorporating 17 sectors of about 1 sq km each and a clean industries zone. (Ref Figure 3.4)

- Suited for redensification and infusing quality spaces for international and national business houses;
- Public transport to be improved and para-transit to be restructured away from main traffic arteries;
- Urban villages to be integrated with clear rules and regulations;
- Low income housing to be at appropriate standards.

Layer III: Maximum Population 6.00 lakhs in 2021 AD. 44 sq kms incorporating air force station, airport, railway station and railway land, Mani Majra development area, urban and other village abadis, low income settlements and intervening lands in market gardens, landfills, etc. (Ref Figure 3.4)

- Suited for being selectively urbanized on the sector pattern. Rest of the area to have defined land use;
- Villages to be integrated;
- Low income to be improved;

Through a fairly detailed plan for the area, 6.00 lakh people would have to be catered for.

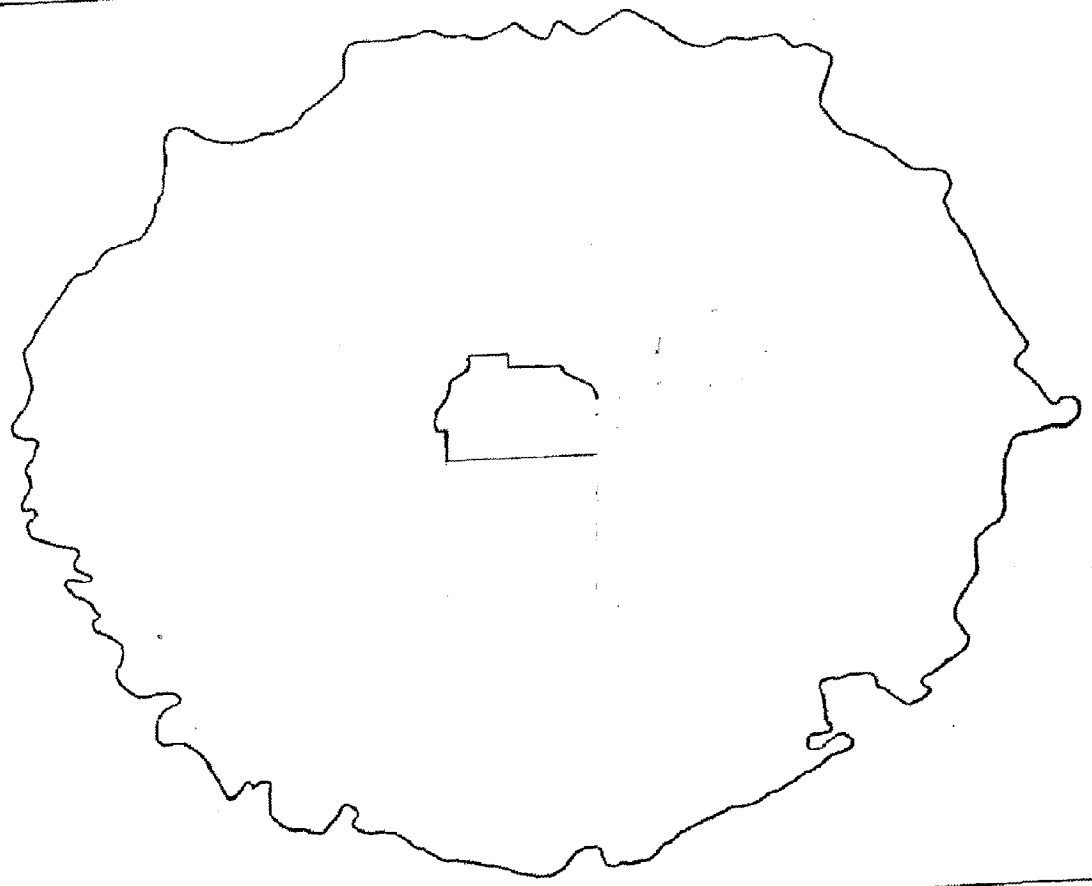
Layer IV: Maximum Population 13.00 lakhs in 2021 AD. *(Ref Figure 3.4)*

- Planned colonies through state level interventions to be bound by workable transportation and other policies to reduce burden on master plan area.
- Policies for low income settlements and urban villages to be uniform with that of Chandigarh.

Layer V: Land within Chandigarh periphery control area in Punjab and Haryana outside CUC area incorporating free enterprise zone. *(Ref Figure 3.4)*
Maximum Population to be 12.00 lakhs in 2021 AD.
New development nodes to be identified in wasteland belt and along transport corridors/ nodes.
Good agricultural land to be conserved and single crop lands to be upgraded to double crop areas through water management.
Farm houses to be as per current policy
Areas for surface mining to be clearly demarcated.

Layer VI: Land outside the Periphery Control Area incorporating growth centers namely Kalka, Morinda, Banur, Baddi, Barwala, Bassi, Parwanoo, Nalagarh, Rajpura and Sirhind. *(Ref Figure 3.4)*
Maximum Population designated to be 25 lakhs in 2021 AD.
Forest lands and agricultural lands to be protected.
Development at identified nodes for market towns, industrial growth areas and service settlements
Ribbon growth to be controlled
Farm houses to be as per current policy
Areas demarcated for surface mining to be demarcated.[13]

[13] CISMeR reort-2021, Department of Town & Country Planning, Chandigarh



LEGEND

- LAYER I
- LAYER II
- LAYER III
- LAYER IV
- LAYER V

N

MAP NO. 3.1	PROPOSED LAYERS IN THE CSIMeR PLAN	NOT TO SCALE	PREPARED BY: JASKIRAT KAUR M.U.R.P. II

The study of the Chandigarh Inter-State Metropolitan Region (CISMeR) has revealed the following points:

- Nothing has been proposed for the Layers I and II of the CISMeR that are the worst hit areas.
- The report concerns with the study of the various settlements within the CISMeR and deals with their existing size and functions while no emphasis has been laid on their future functions.
- No prioritization has been spelt out with regard to the settlements have been identified as growth centers.
- The report is silent on the implementation strategies that form an important part of the report.

No proposal regarding the common planning and development authority that would take care of all the growth centers and coordinates their activities.

CHAPTER IV: STUDY AREA PROFILE

4.1 Location

Chandigarh, capital of Punjab and Haryana, is located 241 miles north of New Delhi, 98 km from Shimla. Topographically this region is characterized by the presence of low hills and subsequent mountainous tract gently sloping to the south of the Bassi and the river Ghaggar and it's tributaries. The northern part of the region comprises of the lower hills of Shivaliks 9avg. ht 600m). To the south of this is Chandigarh-Hoshiarpur plain that is also characterized by a rather steep slope and a large number of choes. To the east of Chandigarh lies the Ambala Plain or the sub-montaine belt. This is also characterized by choes but it also has hilly tracts such as the Morni tract and the Kalesar tract.

Chandigarh and its Periphery

Chandigarh was designated with a population of 5 lakhs to be developed in two phases. The Punjab New Capital (Development and Control) Act 1952 was enacted under which the city was planned and developed. As every city has an influence area that supports the city in terms of basic needs and in turn is benefited from the mother city. This area is called the periphery. City and its periphery thus have close relationship i.e. physical, economic, social and cultural linkages and for effective development they must be considered.

In order to ensure proper development of capital city and to eliminate chances of slum and haphazard development coming around it, the Punjab New Capital (Periphery) Control Act, 1952 was passed by the Punjab government for providing a permanent green belt around the city with the sole idea of regulating development within 5 miles radius around the city. The limit was later increased to 10 miles. Later on, the reorganization in the year 1966 shattered the unity of Chandigarh. It involved the restructuring of Chandigarh into:(ref. Map)

Union territory portion of the Periphery	144 sq km
Punjab component of the Periphery	1021 sq km
Haryana component of the Periphery	295 sq km

S.No	Place	No. of Villages	Towns
1	UT portion	24	Chandigarh
2	Punjab	332	SAS Nagar, Banur, Kharar, Dera Bassi, Zirakpur
3	Haryana	149	Panchkula, Pinjore

Table 4.1 No. of villages and towns in the periphery

(Source: Compiled by the author from the data collected)

4.2 FACTORS RESPONSIBLE FOR THE GROWTH IN THE PERIPHERY

4.2.1Growth Rate of Chandigarh:

Year	Growth rate percentage
1951-61	394.13%
1961-71	114.59%
1971-81	75.5%
1981-91	42.16%
1991-2001	40.3%

Table 4.2 :Growth rate of Chandigarh

(Source: Statistical Abstract of Punjab, 2002)

The tremendous growth rate of Chandigarh describes the pace at which the city is fast developing. The growth rate of Chandigarh though has come down drastically from 394.13% to 40.3%. But this is due to the fact that Chandigarh was established in that decade and hence, the immediate growth. But the present decadal growth rate is also very high, which speaks for the present haphazard growth of the city and its periphery.

4.2.2 Density Trend In Chandigarh

Year	Residential area (In acres)	Population	Density person/acre
1971	2260	217443	97
1981	2486	379600	153
1991	2486	642015	258
2001	2940	808796	275

Table 4.3: Density Trend in Chandigarh
(Source: Town Planning Office, U.T)

The residential density in the city has increased from mere 97 persons /acre to 275, increasing nearly three times. This is much higher than what actually the different sectors were designed for. Thus a city designed with tailor made needs and infrastructure is under considerable stress

4.2.3 Housing Shortage In Chandigarh

Year	1991	1997	1998	1999	2000	2001
(In million)	0.03	0.03	0.03	0.03	0.02	0.02

Table 4.5: Housing Shortage in Chandigarh
(Source: NBO/Working Group on Urban Housing for the 9th Plan)

There is a shortage of approximately 0.02 million houses in the Chandigarh. This shortage of housing in the core is forcing the direction of development towards the periphery. The periphery offers land in abundance and at cheaper prices. Therefore, the development especially residential is occurring in the periphery.

4.2.4 Land Values

There is a great difference in the land prices between the core areas and the peripheral areas. The core city of Chandigarh has a high level of infrastructure whereas the peripheral areas are devoid of any well organized planning. Scarcity of land, rising population along with the high rate of migration have led to steep increase in the prices of both commercial and residential properties in the cities.

This factor is acting as peripheral growth stimulator and is a major factor for the development occurring in the periphery.

In order to study the above factor more elaborately, data was collected from Property dealers and estate firms. Strikingly sharp difference was found in the land prices between different areas.

Following tables present the comparison of land prices in the Chandigarh city along with the municipal towns lying in the periphery along with the rest of the peripheral areas.

Residential areas

a) Independent Houses

S.No	Area	Plot Size	Price(approx.)
1.	Chandigarh	2250 Sq. ft	Rs 1.5 crore to 2 crore in phase I&II sec Rs. 1 crore in Phase III sectors
2.	Mohali	2250 Sq. ft	Rs 90 lakhs to1crore
3.	Panchkula	2250 Sq. ft	Rs. 1.5 crore
4.	Zirakpur/ Dera-Bassi	2250 Sq. ft	Rs. 6-8 lakhs depending upon distance from highway
5.	UT Area of Periphery	2250 Sq. ft	Rs. 5 lakh
6.	Punjab Portion	2250 Sq. ft	Rs. 3-4.5 lakh
7.	Haryana Portion	2250 Sq. ft	Rs. 4-5 lakh

Table 4.6: Price of independent houses
(Source: Primary data collected from different property dealers)

From the above table it is clear that the residential properties are very costly in the planned cities, whereas in the periphery the prices are about 1/3rd. The land prices vary according to the nearness of the land to the Chandigarh city. This explains the reason why the villages lying in the Chandigarh portion have a higher rate of land than their Punjab and Haryana counterpart. Also, those areas lying on the National and the state highways have more prices.

b) Residential Apartments

S.No	Area	Area	Land Value(approx.)
1.	Chandigarh	2250 Sq. ft	Rs 1.5 crore to 2 crore in phase I&II sec Rs. 1 crore in Phase III sectors
2.	Mohali	2250 Sq. ft	Rs 90 lakhs to1crore
3.	Panchkula	2250 Sq. ft	Rs. 1.5 crore
4.	Zirakpur/ Dera-Bassi	2250 Sq. ft	Rs. 6-8 lakhs depending upon distance from highway
5.	UT Area of Periphery	2250 Sq. ft	Rs. 5 lakh
6.	Punjab Portion	2250 Sq. ft	Rs. 3-4.5 lakh
7.	Haryana Portion	2250 Sq. ft	Rs. 4-5 lakh

Table 4.7: Cost of residential apartments in the periphery
(Source: Primary data collected from different property dealers)

Commercial Land Prices

Since 1988, average commercial land prices in Chandigarh have increased by 240% along the V4s and by 600% in the business district. Along, the V2s however, they have increased an astonishing 800%. [14]

S.No	Area	Land Value(approx.)
1.	Chandigarh	Rs.18000/Sq.ft-Rs.21000/sq ft in sec 17,22,35 etc Rs.12-15000/Sq.ft in rest of the city
2.	Mohali	Rs. 9000 /Sq. feet
3.	Panchkula	Rs. 11000-12000 / sq.ft
4.	Zirakpur/ Dera-Bassi	Rs. 7500 /Sq. feet-Rs 5000 /sq.ft
5.	UT Area of Periphery	Rs.4500-5000 / sq ft
6.	Punjab Portion	Rs. 4200-4500/ sq.ft
7.	Haryana Portion	Rs 4640/ sq.ft

Table 4.8: Land Value of Commercial Areas
(Source: Primary data collected from different property dealers)

There is a great difference between the commercial land prices. The commercial plots in the commercial sectors of Sector 17, 35 etc have very high land prices.

[14] 'Privatising the Public- a Strategy for transit oriented development in Chandigarh' , Agrawal, Vivek

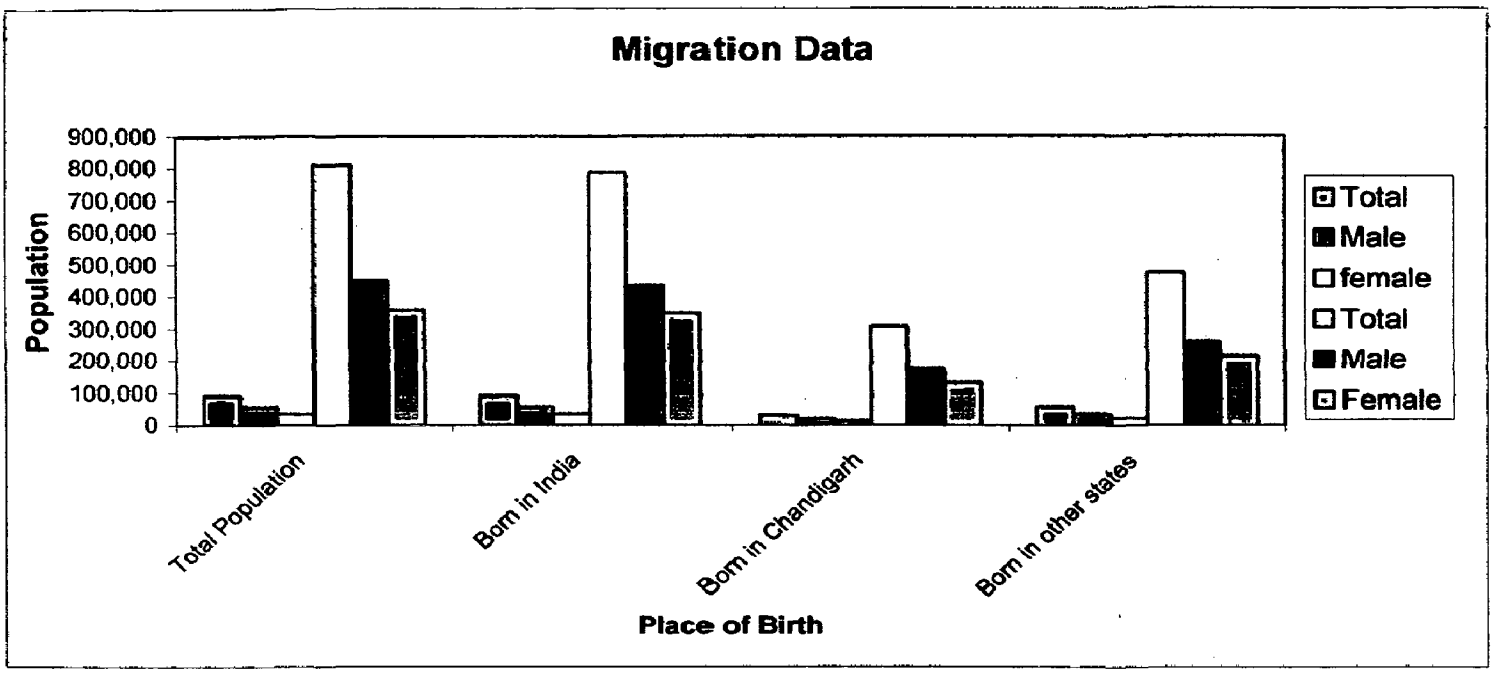


Figure 4.1 Graph showing the Migration data
(Source: Prepared by the author from the available data)

The above table shows that out of the 8 lakh urban population, only 38.08% of the population is Chandigarh born, while the rest of the 62% have migrated from to the city.

Interestingly, in the rural areas also, only 35.86% of the people are born in the Chandigarh district. It indicates that the migration to the city hasn't only occurred to the urban core, but the periphery has also witnessed a great deal of influx of people from different states. This high level of the migration explains why the city is witnessing a very high growth rate. Also, 96.69% of the people are Indian while there are about 3.31% of the people are foreigners.

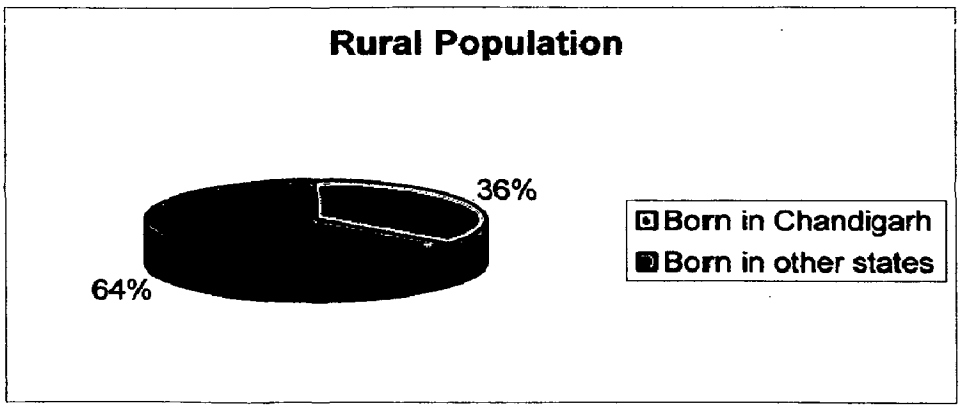


Figure 4.2 Graph showing the Percentage of Rural Population

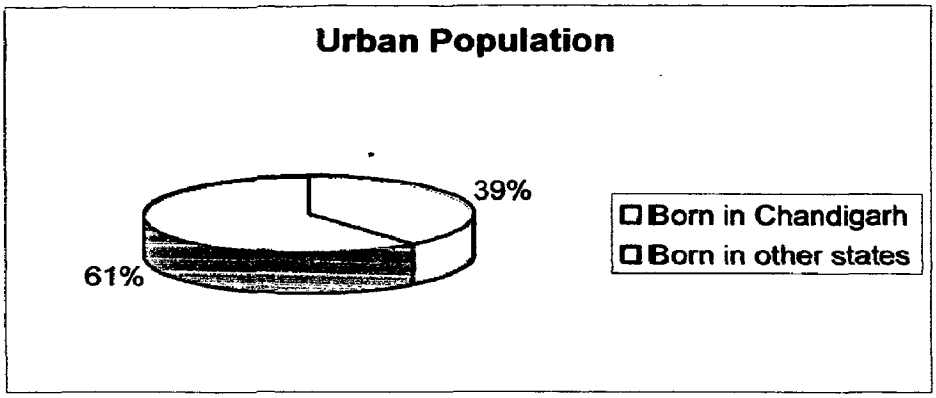


Figure 4.2 Graph showing the Percentage of Urban Population

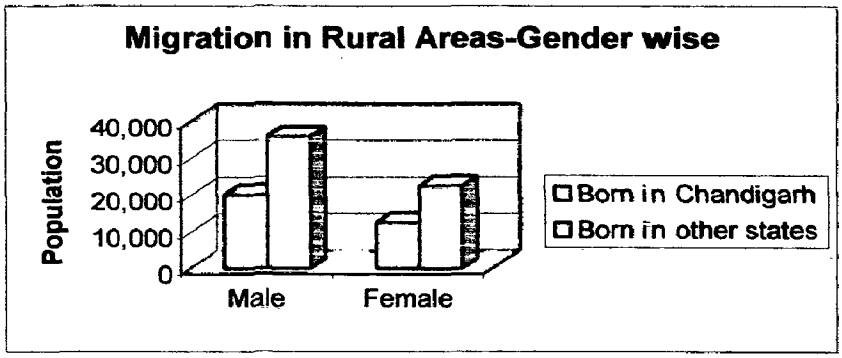


Figure 4.3 Graph showing the migration in rural areas-gender wise

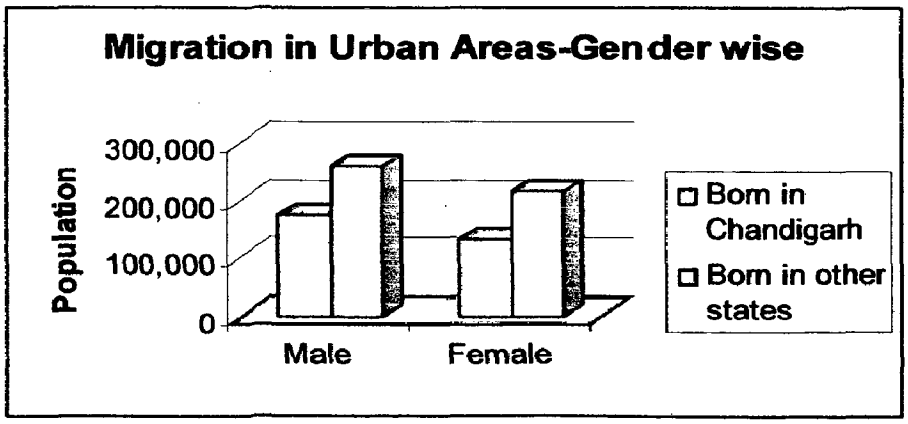


Figure 4.3 Graph showing the migration in urban areas-gender wise

The male migration has been particularly higher due to the fact that males come to Chandigarh in search of employment opportunities.

Migration from different states

The table shows that Punjab contributes most to the city's migrants (16%) with a total number of 14330. Next to Punjab is UP (15.09%) followed by Haryana (8.84%) and Bihar (3.54%). Though Chandigarh is also the capital of Haryana, but the lesser of migrants is due to the more proximity of Delhi to the state that has much more opportunities to offer. Rest of the states contributes marginally. The states of UP& Bihar pool to the labor force that is employed in the various industrial and agricultural activities taking place in the core and the periphery.

In the both the rural and the urban areas also, the trend of the contribution of the states remain the same.

State	Rural	Urban
Punjab	11,389	132,641
Himachal Pradesh	5,170	46,854
Haryana	7,814	71,873
Uttar Pradesh	16,285	119,672
Bihar	9,256	22,759
West Bengal	1,671	8,304
Jharkhand	623	2,265
Chhatisgargh	75	2,577

Table 4.10: Number of Migrants from different states to Chandigarh
(Source: Census of India-2001, Chandigarh)

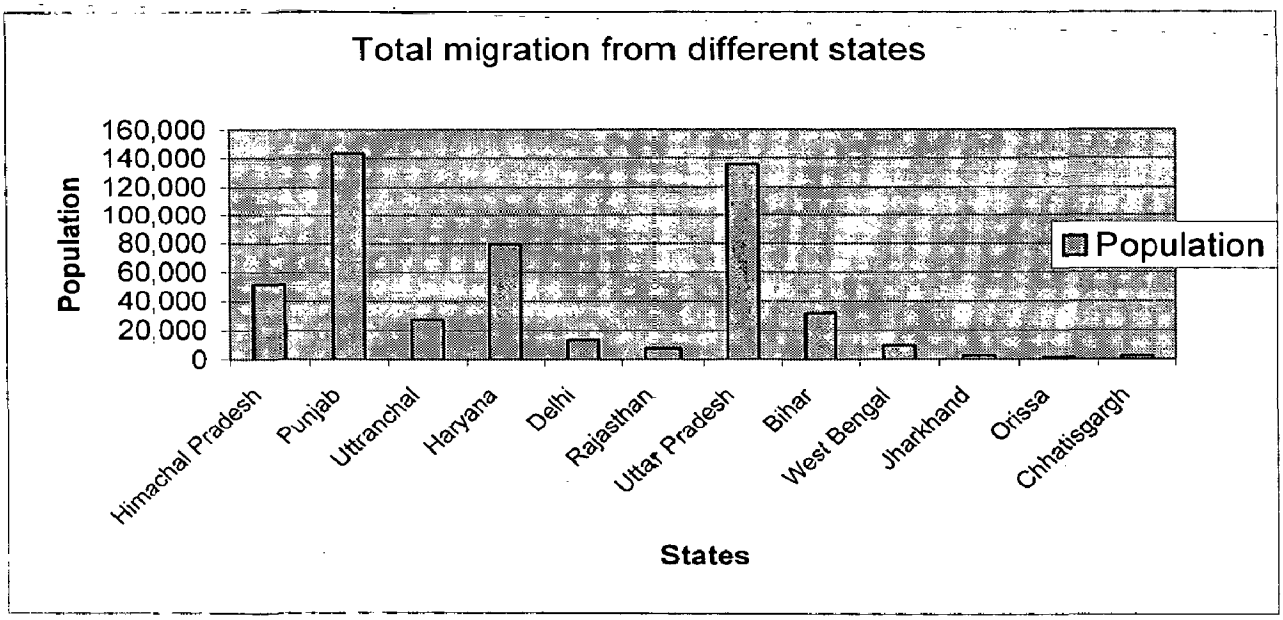


Figure 4.4 Graph showing total migration from different states

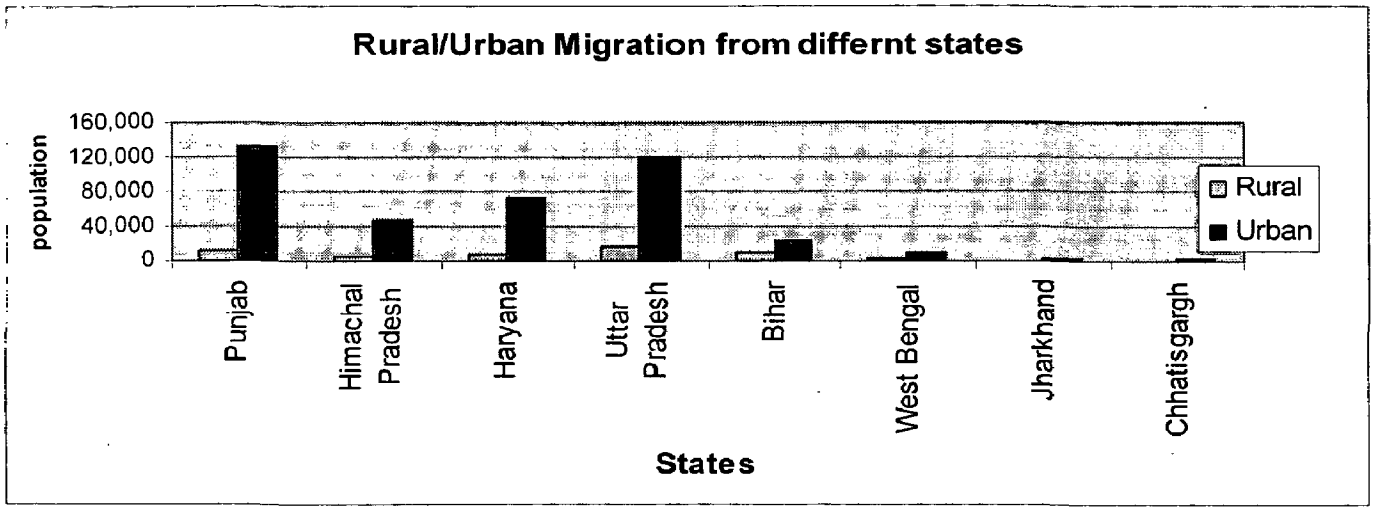


Figure 4.5 Graph showing migration from different states in Urban & Rural Areas
(Source: Prepared by the author form the census data)

Migration from different countries

Out of the total 25407 foreigners, 17285 (68.23%) are Pakistan born and 6585 (25.81%) are Nepalis. A very high percentage of Pakistan born persons is due to the fact that people who migrated to India during partition settled here. While migrants from Nepal come to seek here jobs especially in the domestic and service sector.

4.2.4 Well Connectivity

Road linkages

All the areas in the periphery are well connected with Chandigarh. The roads are well maintained and are metalled. Also, CTU (Chandigarh Transport Undertaking) has a fleet of 417 buses. Further in the month of January 2006, another 150 buses have been added. The rising demand from the people of the rural and peri-urban settlements in the periphery forced the CTU to run new buses. These buses now cover almost all the important villages and the municipalities lying in the periphery of the city. The fares have been reduced to a maximum of Rs.10 and the maximum time taken to reach destination being reduced to 45 minutes. This would further stimulate the growth in the peripheral areas, as people would be able to commute to their places of work or education with further ease.

Eg. The Chandigarh-Kharar highway (area of high urbanization), has a bus service every 5 minutes. About 10 buses are running on this route. Apart from this, people

commute on their private vehicles and also on the intra-state buses running on that route.

Rail linkages

An electrified double track broad gauge rail track connects it with the New Delhi. A rail link between Chandigarh and Ludhiana via Kharar is presently under construction and with it's becoming operational, the commuting time between Chandigarh and the peripheral areas would be reduced further. This would further stimulate the growth in the peripheral areas and increase in the residential and commercial activities.

4.3 Nature Of Developments Taking Place In The Periphery

4.3.1 Ribbon Development

Chandigarh is well connected to the main cities of the region mostly by road and few by rail and air linkages. The city is connected to the New Delhi by National highway NH-22. This continues to move north-eastwards up to Solan & Shimla. The state highway no. 10 connects it with the city of Patiala while the State highways connect Chandigarh with Ludhiana and Amritsar. All these national and state highways are seeing lots of development in the form of ribbon development. This is particularly visible in the NH-22 connecting Chandigarh with New Delhi though Ambala. Such has been the level of development on this highway that it has become a continuous urban stretch merging the cities of Chandigarh, Panchkula, Zirakpur and Dera Bassi.

4.3.2 Lal Lakir/ Abadi Deh Areas

In 1902, the first consolidation was done and a 'Lal Dora' or 'Lal Lakir' was made around the villages. The 'Abadi Deh' is defined in the revenue record are very old and presently with the increase in the population and households in the rural settlements these villages are expanding beyond the defined limits. The state government has declared controlled area under section 3 of the Punjab New Capital Periphery Control Act, 1952, and this controlled area includes large number of rural settlements. Any building constructed outside the 'Abadi Deh' within the controlled

area becomes illegal and unauthorized building and is liable for actions under provisions of Act. This has lead to the harassment of people who genuinely intend to construct the building for residential purposes.

Many rural organizations have filed cases against the government and are fighting for their due rights to construct the houses. In Civil Writ petition No. 7187 of 2003, the Hon'ble Punjab and Haryana High Court has also sought the views of the state of Punjab about extending the Abadi deh area/ Lal lakir/ Lal Dora of the villages in the periphery. Subsequently the Punjab government has agreed to increase the Lal dora to 60%, but this could invite grabbing of land by the private developers for residential and commercial purposes.

Farm Houses

There is a trend for rich people to acquire land for villas in the name of "farm houses" and for others to build small houses for rental purposes in the green belt area.

4.3.3 DEVELOPMENTS TAKING PLACE IN THE UT PORTION OF THE PERIPHERY

Authorized developments

Lots of educational institutions, IT park, Golf courses and other recreational facilities like the Fun Valley, Labor colonies and resettlement colonies have come up. In order to adjust the 1/3rd population of the city living in slums[15], the slums dwellers were authorized by the administration to erect their dwellings in these areas. This led to a phenomenon of labor colonies. Labor colonies owe its origins to the predominance of construction laborers among their inhabitants at that time.

Chandigarh housing board (CHB) has developed 8 major shelter colonies to improve the living environment of urban poor. These are:

- Bapu Dham resettlement colony near Chandigarh-Kalka highway

[15] Report by Sarin, Madhu 'planning of Chandigarh"

- Karsan Colony near industrial area on Chandigarh-Ambala highway
- Dadu Majra Colony near sec. 38
- Khuda Lahora colony near sec.12
- Dhanas Colony also called Milkman colony
- Maloya Colony

Resettlement colonies

Le-Corbusier did not give any importance to the LIG and the EWS people, who play a vital role in the efficient running of the city. As Chandigarh offered vital employment opportunities, it attracted lot of people. But they could not afford the costly housing in the planned sectors and thus resulting in the formulation of the slums in and around the vacant spaces near the city. In order to resettle these people, the administration constructed resettlement colonies in the periphery of the city. Some of such colonies came up at Dadu Majra, Karsan, and Maloya villages.

Unauthorized constructions in the Chandigarh portion

In the Chandigarh portion of the periphery also a large number of unauthorized developments have come up. An estimated number of 3000 developments have come up. But the Brick kilns are noted absentee from these areas. This is probably due to the strict laws of the Chandigarh administration that prohibit any such activity in the Chandigarh portion. Also, the marriage palaces have not been allowed to be constructed. But recently it was noted that people have started using their farmhouses as marriage palaces. Recently, the Chandigarh administration demolished 5 such farmhouses.

Another prominent type of development that is taking place particularly in the UT belt is the mushrooming up of slums. The land rates are very high in the Chandigarh and the EWS & LIG cannot afford houses. And with the easy availability of employment opportunities in the city, slums have come up. Some of the slums sites have been in the adjoining belt of Chandigarh-SAS Nagar, and the belt adjoining NW sectors of the city.

Markets catering to the different needs have come up such as marble stone market, furniture market near SAS Nagar, Grain market at Zeera etc. most of these markets do wholesale business and offer commodities at a cheaper rate. So the shopkeepers do not prefer to get their shops registered with the administration and thus save themselves from paying the sales tax and other charges.

4.3.4 PUNJAB PORTION OF THE PERIPHERY

Unauthorized construction:

Type of Case	1999-2000	During 2000-2001	Upto 2000-2001
Cases detected	25	134	159
Show Cause Issued	25	134	159
Cases filed after hearing	-	6	6
Demolition orders issued	25	67	92
Cases pending in court for regularization	2399	-	-

Table 4.11: No. of cases detected in the Punjab component of the periphery
(Source: Town & Country Planning department, SAS Nagar)

This table reflects the rising number of unauthorized developments taking place and the pressure of urbanization.

Private Colonies in Punjab Portion

At present there are 216 private unauthorized colonies in Punjab portion of Chandigarh periphery and only 25 authorized colonies as per PUDA in year 2004. Out of these 25 authorized colonies, 15 are in Kharar tehsil, 7 in Patiala tehsil, 1 in SAS Nagar tehsil and 2 in Derabassi. Out of the 216 unauthorized colonies 48 are within the M.C. limit of Kharar and 42 are in notified area committee of Zirakpur and the remaining 126 colonies are outside the M.C. limit of the towns in the Punjab portion of Chandigarh periphery

Authorized colonies as per area of colony

S.No.	Area of colony in acres	No. of colonies
1.	Less than 5 acres	8
2	5-10 acres	7
3	10-20 acres	5
4	20-50 acres	2
5	50-100 acres	3

Table 4.12: Authorized colonies as per area of colony

(Source: Records of Licensing Branch PUDA year 2005)

Authorized colonies as per type of development in the colony

Type of development	No. of colonies
Plotted development	9
Flatted development	1
Both	15

Table 4.13: Authorized colonies as per type of development

(Source: Records of Licensing Branch PUDA year 2005)

Even though the land prices have risen and there is land scarcity, but the people still have preference for plotted development. This is clearly illustrated by the number of flatted development colonies that has come up

Unauthorized colonies as per area of colony

Area of colony (in acres)	No. of colonies
Less than 1	48
1-5	99
5-10	37
10-20	23
20-50	6
50-100	3

Table 4.14: Unauthorized colonies as per area of colony

(Source: Survey Records of Estate Office (regulatory) Branch PUDA year 2004)

Unauthorized colonies as per year of initiation

Year	No. of colonies
Before 1995	14
Year 1995-2000	163
Year 2001	19
Year 2002	11
Year 2003	5
Year 2004	4

Table 4.15: Year of initiation *(Source: Survey Records of Estate Office PUDA -2004)*

These high figures indicate the extent of residential construction that has come up in this area and the housing demand. During the five-year period from 1995-2000 there was maximum construction of unauthorized colonies. This number was brought down to 39 during the next five years.

4.3.5 Haryana Portion Of The Periphery

Proposed Developments by the government

Not only the phenomenal growth of the Chandigarh has occurred and it failed to sustain the population, but the planned development of Panchkula also saw reaching its saturation point. To accommodate the ever-increasing population of the city, the Haryana government gave a proposal for the extension of the township across the Ghaggar River. So, in 1989, the periphery plan was amended and the government acquired an area of approx. 2000 acres.

The pocket under consideration for immediate urbanization is an area approximately 166.5 ha. This was notified under the section 4&5 of the land acquisition act lies between the Haryana state highway and the river Ghaggar extending from village Nangal Moginand to village Ramgarh. The total area has been divided into four residential sectors.

Since this area is only to take over-spill population of Panchkula, no use for industrial purposes has been proposed in this area. To cater to the needs of population of this area some commercial area in the form of district centre will be provided while preparing the detail layout plan of each sector. A green belt of 500mft

has been reserved along the river in order to safeguard the land from erosion due to floods in rainy season in river Ghaggar.

Unauthorized construction on the Haryana portion:

Unauthorized construction detected (from 1972 to Dec 2005):	8155
Construction exempted being inside M.C limits (where periphery Act not applicable)	3111
Kalka / Pinjore MC	2674
Panchkula	437
Panchkula Extension	310
Mansa devi Complex: 230	230
Construction on encroached government land (Forest deptt. In Bir Ghaggar Area to be removed by forest department):	800
Construction under litigation/stay in 49 cases	521
Within TBRL restricted belt	236
Within 30m national highway	336
Action to be taken by Town & Country planning department	2292

Table 4.16: Unauthorized constructions detected in the different areas of Haryana periphery.
(Source: Department of Town & Country Planning, Panchkula)

The proposed land use for the periphery (Haryana) is as below:

Land Use	Area(in acres)
Urbanisable Zone	20160
Agricultural Zone	22780
Reserve Forest Zone	11310
Restricted Zone	1060
Stone Crusher Zone	105
Special Project Zone	7775
Water Body	6700

Table 4.17: Land Use for the Periphery-Haryana
(Source: Department of Town & Country Planning, Haryana)

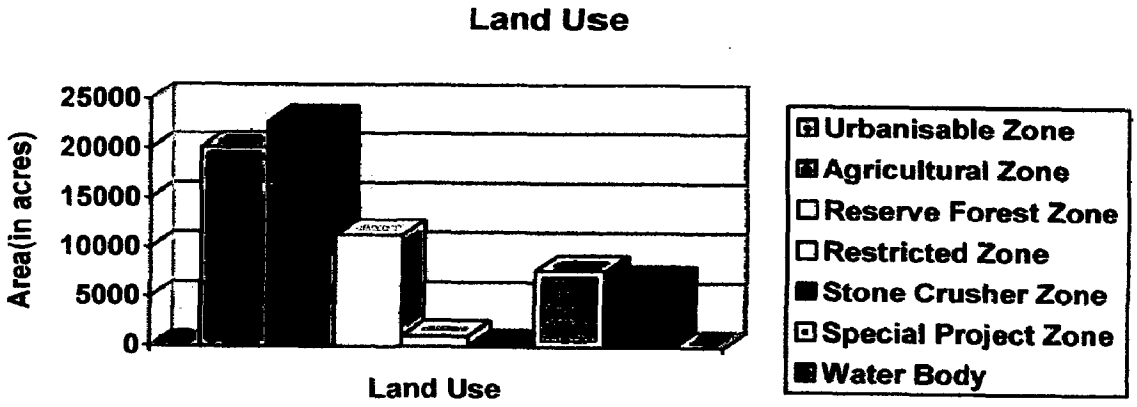


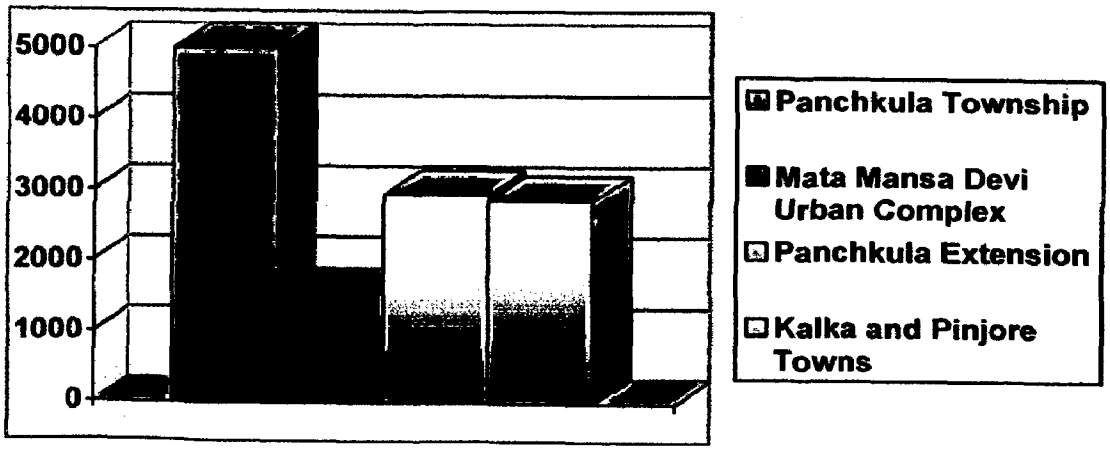
Figure 4.6: Land use of the periphery-Haryana
(Source: Prepared by the author rfom the data)

Urbanisable zone: Though an area of 20160 Acres was reserved for the urbanisable zone, already an area of 12365 acres has come up under the Panchkula, Panchkula extension, Mata Mansa Devi Complex and existing Kalka, Pinjore Towns. Remaining area has been kept for future urbanization.

The areas under these areas are:

Name of the Urban Area	Area (in acres)
Panchkula Township	5000
Mata Mansa Devi Urban Complex	1550
Panchkula Extension	2945
Kalka and Pinjore Towns	2870
Total	12365

Table 4.18: Division of Urbansizable zone
(Source: Department of Town & Country Planning, Haryana)



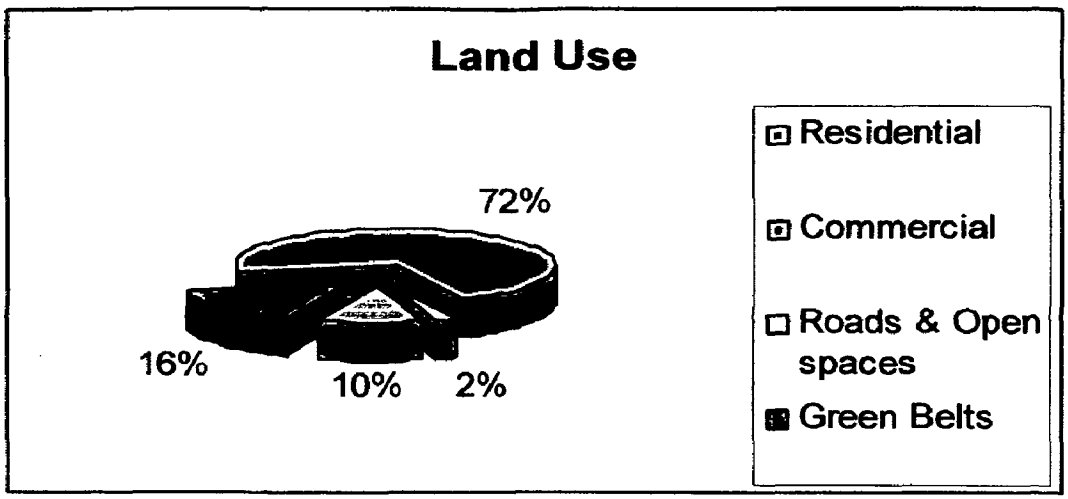


Figure 4.7: Land use in Haryana portion of periphery
(Source: Drawn by the author from the data)

Authorized Colonies by the Private sector

Though there is lot of housing shortage both in Chandigarh as well as Panchkula but even then only 6 authorized colonies have come up in this portion. This can be attributed to the high EDC (external development charges), license fee, and security charges etc payable to the HUDA by the private colonizers. These charges are higher than those prevalent in the Punjab section. Besides the cost factor, the lengthy and the tedious process of getting the plans approved from the HUDA authorities discourages the colonizers. Also this is fuelling the process of unauthorized construction of colonies. The six colonies that have come up are:

- Swastik Enclave
- Friends Colony
- Amravti Enclave
- Hemshika Enclave, Pinjore
- Tribune Corporation
- Housing Board Colony, Kalka

Unauthorized construction

Though there is lack of any concrete survey, an approximate number of about 8000 unauthorized constructions have been noted in the Haryana portion. The

unauthorized construction has not only been noted in the residential sector but also, the industrial and commercial sector. Chandigarh Kalka highway is specifically noting a high rate of ribbon development. Brick kilns, Marriage palaces and farmhouses are a common site. The spendthrift nature of the people of the region is testified by the mushrooming up of the palatial marriage palaces and banquet halls in the region.

Regularization of construction

Unlike the Punjab government which has authorized all the unauthorized construction in its portion, the Haryana government has not regularized neither has it come up with any concrete planning proposal for the periphery.

4.4 Physical and Social Infrastructure Overview of Rural Areas

4.4.1 Chandigarh villages

In the UT portion of the Chandigarh periphery, there are in total 24 villages. The study of various categories reveal that though these villages fare much better than the national average, even then these lack many physical and social infrastructure facilities.

S.No.	Description	Population
1.	Total Population	92120
2.	Total number of male	56816
3.	Total number of females	35303
4.	Total number of households	22580
5.	Sex Ratio	622

Table 4.21: Demographic statistics of villages in Chandigarh
(Source: Census office, Chandigarh)

Land characteristics

S.No.	Characteristics	Area(in hec)
1.	Total Area	3464.92
2.	Average size of the villages	144.37
3.	Average Density	25.86 persons/hec

Table 4.22: Land Characteristics of the Villages -Chandigarh
(Source: Village directory, Chandigarh-2005)

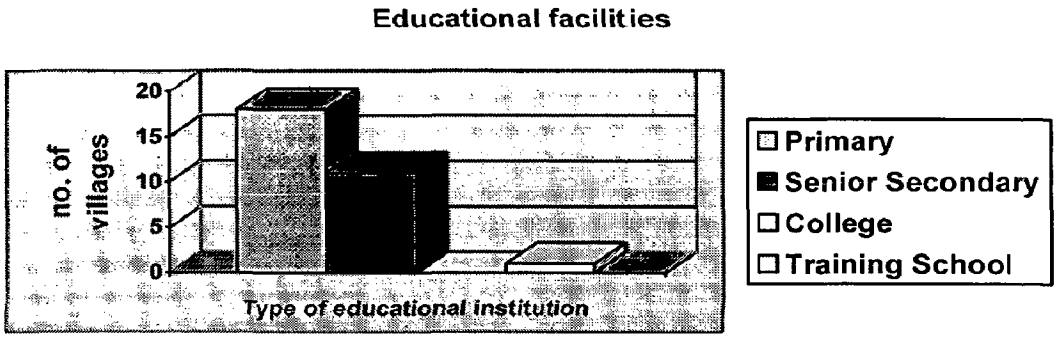


Table 4.24: Number of Educational institutions of different level-UT Portion.

(Source: Village directory, Chandigarh-2005)

S.No	Institution	Range	
		1	2
1.	Primary School	5	0
2.	Senior Secondary	11	3
3.	College	20	3
4.	Training School	18	4

Note: RANGE CODE 1 FOR < 5 Kms

RANGE CODE 2 FOR 5 TO 10 Kms

Table 4.25: Range of Educational institutions of different level-UT Portion

(Source: Village directory, Chandigarh)

There is a need to open atleast 1 senior secondary school at every village. Children have to daily cover a distance of upto 10 kms to reach their schools. This results in the early dropout from the schools. Also, there is not even a single college in all the UT villages. So, the students have to travel daily to the Chandigarh or other towns like SAS Nagar, Panchkula, Zirakpur, Dera Bassi, etc. As a result more rush to the city in the form of daily commuters.

Services

S.No	Type	No.
1.	Post offices	5
2.	Banks	14
3.	Police station	3
4.	Bus Service	21
5.	Telephone Exchange	0

Table 4.26: number of Facilities in villages-Chandigarh

(Source: Village Directory-2001, Chandigarh)

Out of the 14 banks, 11 are commercial banks while 3 are cooperative banks. The number of police stations is 3 while the number of post offices is only 5. a high number of villages are connected by the bus service. Most of these buses are run by the CTU. The fare charges of the CTU buses were high. Bowing to the public demand, CTU has reduced the prices from this January and also the travel time has been reduced.

Recreational/Social-Cultural Facilities

S.No	Type	Level	Range		
			1	2	3
1.	Cinema Hall	0	18	6	0
2.	Sports Club	4	15	9	0
3.	Stadium	2	16	4	1

Table 4.27: Number of recreational facilities and their range

(Source: Village Directory-2001, Chandigarh)

Not even a single cinema hall or video parlor is available in all the 24 villages. but for 18 villages, the range is less than 5 km. this is due to the closeness of the city of Chandigarh to these villages. While there are 2 stadiums and 4 sports club, Out of these 4 sports club, 2 are for golf course clubs, whose membership is beyond the affordability of the common villager.

Physical Infrastructure

S.No.	Type	No. of villages
1.	Drinking water	17
2.	Sewerage facilities	4

Table 4.28: Level of physical infrastructure

S.No.	Type	No. of villages
1.	Tap	17
2.	Tube well	10
3.	Hand Pump	11

Table 4.28: Type of water source

(Source: Village Directory-2001, Chandigarh)

Some villages that have tap water supply also use hand pump and Tube well for the water supply.

4.4.2 Punjab Villages

In the Punjab portion of the Chandigarh periphery, there are in total 332 villages. Out of the 332 villages, 18 are uninhabited. So the while analyzing the data, they have not been considered.

S.No.	Description	Population
1.	Total Population	350412
2.	Sex Ratio	798

Table 4.29: Demographic statistics of villages- Punjab Portion

(Source: Village directory of Punjab,2001)

The sex ratio is 798, which is higher than both the UT and the Punjab Portions of the periphery. The average household size in theses villages is 5.41

Land characteristics

S.No.	Characteristics	Area(in hec)
1.	Total Area	25508
2.	Average size of the villages	212
3.	Average Density	6.24 persons/hec

Table 4.30: Land characteristics of the villages

(Source: Village directory of Punjab,2001)

The total area under these villages is 25508 Hec and the average size of the villages is 212 Hec. The average density comes is 6.24 persons/ hec. The Average density is more than Haryana but lower than that of UT. It implies more population & its growth in Punjab portion.

Forestland

Out of the 332 villages, 303 have no area forests. Remaining 19 villages have forest cover. *Burana* and *Bir Dadralar* have more than 300 hec of land under forests.

Irrigation: All the villages are under irrigation. Irrigation is mainly by the tube wells but there are other sources of irrigation also. Wells, rivers, tanks are the other sources through which the lands are irrigated in these villages.

S.No.	Characteristics	Average area(in hec)
1.	Average Irrigated land per village	55.69
2.	Unirrigated land	42.75
3.	Cultivable waste land	7.53

Table 4.31: Level of irrigation in the villages

(Source: Village directory of Punjab,2001)

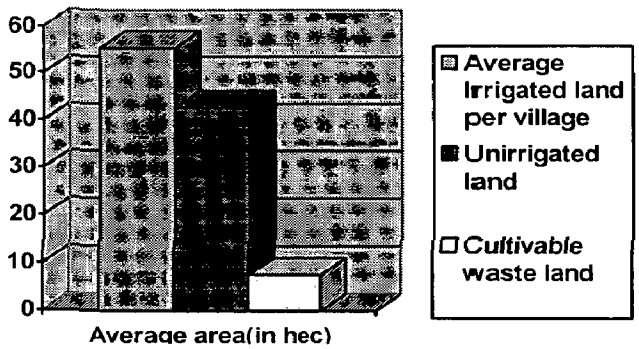


Figure 4.8: Average irrigated land per village

Village Bir Dadrala has the maximum waste (389 hec.) followed by Rauni (212.hec)

Educational facilities

S.no	Institution	No. of villages
1.	Primary School	289
2.	Senior Secondary	202
3.	College	13
4.	Training School	3

Table 4.32: Number of educational facilities in the villages- Punjab Portion

(Source: Village directory of Punjab,2001)

So, one observes that the number of educational institutions is very less. Every village doesn't have even a single primary school.

For those villages, which do not have the educational institutions in their villages, the range at which the nearest institution is there are:

S.No	Institution	Range		
		1	2	3
1.	Primary School	25	0	0
2.	Senior Secondary	64	28	20
3.	College	129	92	82
4.	Training School	115	95	93

Note: RANGE CODE 1 FOR < 5 Kms

RANGE CODE 2 FOR 5 TO 10 Kms

RANGE CODE 3 FOR >10 Kms.

Table 4.33:Range of educational facilities in the villages- Punjab Portion

(Source: Village directory of Punjab, 2001)

14 villages do not have a single primary school. And 203 villages have senior secondary schools. The number of schools is in higher proportion to the population than that in the Haryana counterpart. The number of colleges is very less being only 13.There are 3 training centers. Dera-Bassi block has one and the Kharar block

villages have two Training centers. So, the people of the peripheral areas have to rely on the colleges located in the core area, thereby causing more traffic inflow.

Services

S.No	Type	No. of villages
1.	Post offices	168
2.	Banks	37
3.	Police station	14
4.	Bus Service	215
5.	Telephone Exchange	2

Table 4.34 : Number of different services available in the villages- Punjab Portion
(Source: Village directory of Punjab, 2001)

The level of services is also very low. There are two telephone exchanges. Neither the Haryana nor the UT portions have any telephone exchange office.

Recreational/Social-Cultural Facilities

S.No	Type	Level	Range		
			1	2	3
1.	Cinema Hall	23	105	90	85
2.	Sports Club	10	122	95	84
3.	Stadium	8	115	95	93

Table 4.35: Level &Range of recreational facilities in the villages- Punjab Portion
(Source: Village directory of Punjab, 2001)

There is also a serious dearth of socio-cultural facilities in al these villages. There is only 10 Sports club and 8 stadiums.

Physical Infrastructure

S.No.	Type	No. of villages
1.	Drinking water	267
2.	Sewerage facilities	58

Table 4.36: Physical infrastructure-Punjab

S.No.	Source of water supply	No. of villages
1.	Tap	267
2.	Tube well	196
3.	Hand Pump	75
4.	Well	63
5.	Tank	0
6.	River	3

Table 4.37: Type of water source

(Source: Punjab statistical Abstract, 2001)

Even for drinking purposes, 33% of the households depend upon tube well and10 % are dependent upon wells.

Occupational Structure

S.No	Main Production	No. of villages
1.	Bricks	68
2.	Wooden Furniture	30
3.	Iron Tool	18
4.	Desi Ghee	45
5.	Jaggery	57
6.	Pharmaceuticals	5
7.	Tea	1

Table 4.38: Main production activities-Punjab Portion

(Source: Punjab statistical Abstract, 2001)

In the Punjab Portion, the major production taking place is the Brick production (31%) and the Jaggery(26%) manufacturing. Iron tools are manufactured in the

villages falling near the Kharar and Dera-Bassi while the furniture manufacturing is taking place in the villages falling near the SAS Nagar.

4.4.3 Haryana Villages

In the Haryana portion of the Chandigarh periphery, there are in total 136 villages. Out of the 136 villages, 9 are uninhabited. So the while analyzing the data, they have not been considered.

S.No.	Description	Population
1.	Total Population	154882
2.	Total number of males	87609
3.	Total number of females	67273
4.	Total number of households	28703
5.	Sex Ratio	768

Table 4.39: Demographic statistics-Haryana Portion

(Source: Village directory-2001, Panchkula)

The sex ratio is 768 which is lower than the national average but higher than the UT portion of the periphery.

The average household size in theses villages is 5.39

Land characteristics

S.No.	Characteristics	Area(in hec)
1.	Total Area	25508
2.	Average size of the villages	189
3.	Average Density	6.08 persons/hec

Table 4.40: Land characteristics-Haryana Portion

(Source: Village directory-2001, Panchkula)

The total area under these villages is 25508 Hec and the average size of the villages is 189 Hec. The average density comes is 6.09 persons/ hec. This is much lower than the UT villages, which show that those villages are more under the urbanization stress.

Irrigation: All the villages are under irrigation. Irrigation is mainly by the tube wells but there are other sources of irrigation also. Wells, rivers, tanks are the other sources through which the lands are irrigated in these villages.

S.No.	Characteristics	Average area(in hec)
1.	Average Irrigated land per village	34.08
2.	Unirrigated land	50.07
3.	Cultivable waste land	9.89
4.	Area not available for cultivation	78.08

Table 4.41: Demographic statistics-Haryana Portion

(Source: Village directory-2001, Panchkula)

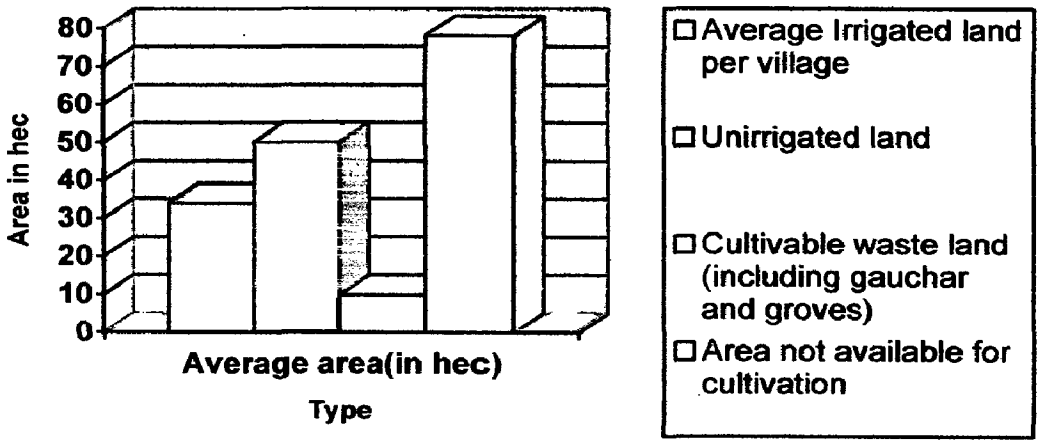


Figure 4.9: Different land types-Haryana

(Source: Village directory-2001, Panchkula)

The total cultivable waste land is 1276.0 hec and the total are not available for cultivation comes out to be 10151.0 hec. Some of the villages have a very high proportion of waste lands. Village Asrewali has the maximum waste (677 hec.) followed by Nadian (564.0hec) and Nagal Moginand(182.0 hec).

Forest land

Out of the 136 villages, 119 have no area forests. Remaining 17 villages have 1585.0 hec of forest cover. *Asrewali* and *Bir Ghaggar* have more than 500 hec of

land under forests. The villagers depend upon these forests for the fuel and fodder supply. While planning for the periphery; this area under forest cover has to be preserved.

Educational facilities

S.no	Institution	No. of villages
1.	Primary School	89
2.	Senior Secondary	32
3.	College	0
4.	Training School	0

S.No	Institution	Range		
		1	2	3
1.	Primary School	20	0	0
2.	Senior Secondary	63	20	12
3.	College	20	59	46
4.	Training School	25	50	55

Note: RANGE CODE 1 FOR < 5 Kms

RANGE CODE 2 FOR 5 TO 10 Kms

RANGE CODE 3 FOR >10 Kms.

Table 4.42: Educational Facilities-Haryana Portion

(Source: Village directory-2001, Panchkula)

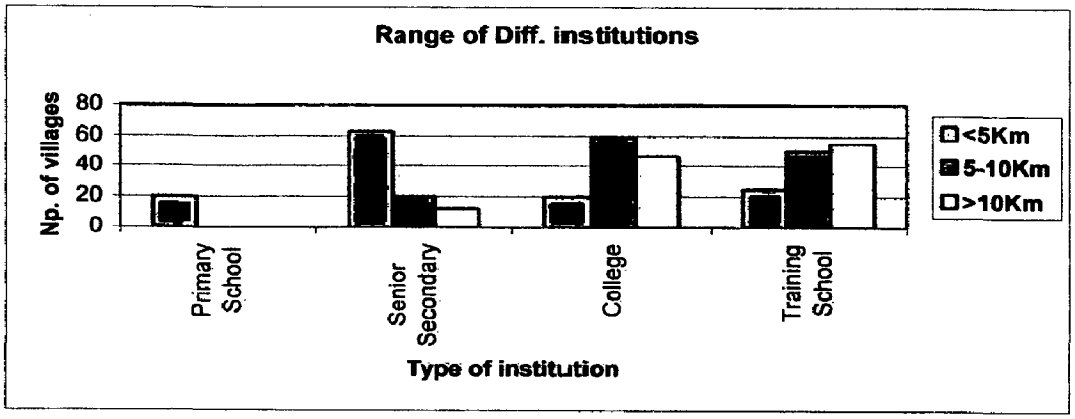


Figure 4.10: Educational facilities & their range-Haryana

(Source: Village directory-2001, Panchkula)

The education scenario is worse than in the UT portion. 38 villages even do not have a single primary school. And only 63 villages have senior secondary schools. There is not even a single college in the entire 127 villages and children of 46 villages have to travel more than 10 kms to reach the nearest college.

There is a serious need to open more educational especially vocational colleges in this otherwise educationally backward area. This opening up of more educational institutions would help in the decentralization of the core areas.

Nearest town: There are many towns in the vicinity to the villages. The average distance from any village to the nearest township is 6.5 kms. Pinjore and Panchkula cover maximum of the villages.

Town	No. of villages
Baddi	11
Panchkula	29
Pinjore	49
Chandigarh	2

Table 4.43: Nearest town to the villages-Haryana

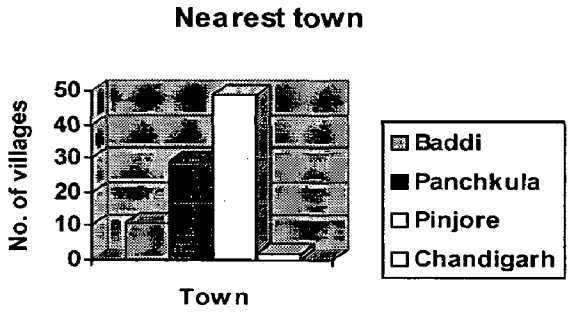


Figure 4.11: Nearest town to the villages-Haryana

(Source: Village directory-2001, Panchkula)

Villages depend upon the town nearest to them for their needs. And here, almost 49 villages have Pinjore as their nearest town, so Pinjore must be developed as the growth center, so that it is able to cater to the needs of its catchments area.

Services

S.No	Type	No. of villages
1.	Post offices	24
2.	Banks	11
3.	Police station	6
4.	Bus Service	88

Table 4.44: Nearest town to the villages-Haryana *(Source: Village Directory-2001, Panchkula)*

The level of services is also very low. The number of banks is considerably low. Not even a single telephone exchange is there.

Recreational/Social-Cultural Facilities

S.No	Type	Level	Range		
			1	2	3
1.	Cinema Hall	14	8	30	85
2.	Sports Club	1	4	32	89
3.	Stadium	2	14	14	96

Table 4.45 Level& range of recreational facilities

(Source: Village Directory-2001, Panchkula)

There is also a serious dearth of socio-cultural facilities in al these villages. There is only 1 Sports club and 2 stadiums. This region has lots of sports potential that can be cashed upon and further boosted by providing infrastructural facilities.

Physical Infrastructure

S.No.	Type	No. of villages
1.	Drinking water	136
2.	Sewerage facilities	49

Table 4.46 Villages having Physical Infrastructure

(Source: Village Directory-2001, Panchkula)

S.No.	Source of water supply	No. of villages
1.	Tap	117
2.	Tube well	57
3.	Hand Pump	9
4.	Well	48
5.	Tank	7
6.	River	3

Table 4.47:Sources of water supply

(Source: Village Directory-2001, Panchkula)

Even for drinking purposes, 24% of the households depend upon tube well and 20 % are dependent upon wells. This shows the exploitation of the ground water sources that are already depleting.

Occupational Structure

S.No	Main Production	No. of villages
1.	Agricultural Tools	10
2.	Bamboo Baskets	25
3.	Bricks	2
4.	Ropes	27
5.	Jaggery	11
6.	Earthen Pots	25
7.	Electronic	1

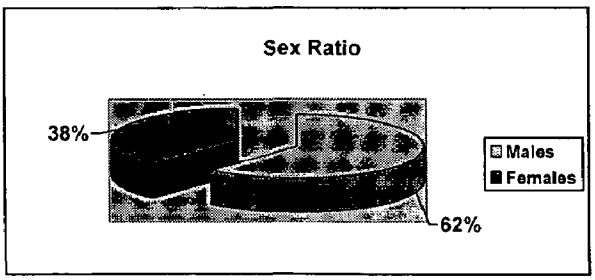
Table 4.48: Occupational Structure-Haryana villages

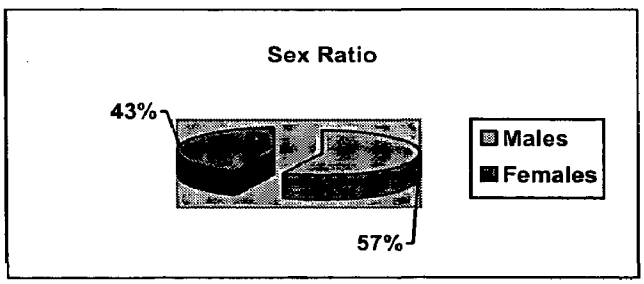
Source: Village Directory-2001, Panchkula

Making earthen pots (25%), ropes (26%), and Bamboo baskets (255) are the main production activities taking place in these villages. Jaggery and agricultural tools manufacturing are the next main production activities. There is one electronic goods production factory and one wrist watches factory which is the HMT and it has even a small township for its staff.

4.4.4 Comparative Analysis of Villages of the three states/UT

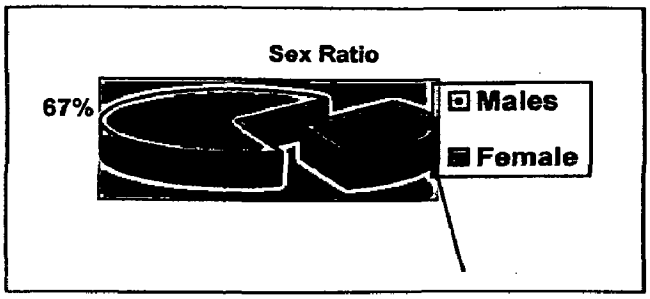
Sex ratio





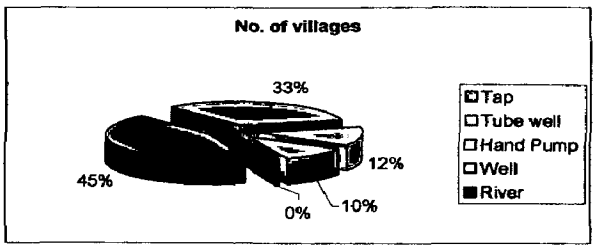
Chandigarh Haryana

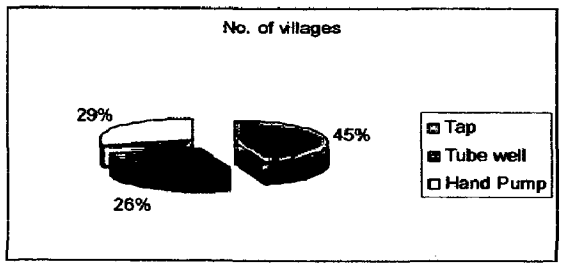
The sex ratio is lowest in Chandigarh. This may be due to the migration factor. While Haryana fares best out of the three.



Punjab

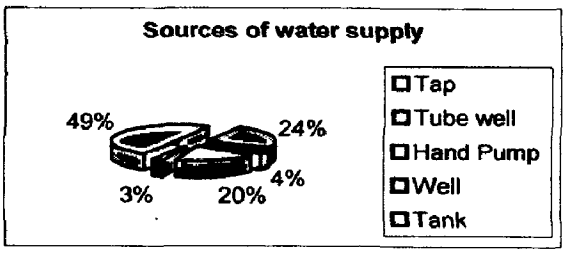
Sources of water supply





Haryana

Chandigarh



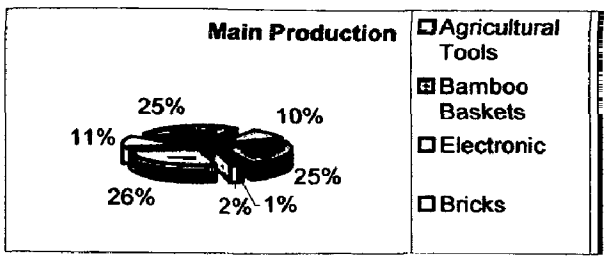
Punjab

Both Punjab& Haryana villages have other sources of water supply. Only about 50% of the villages in the three administrations have tap water supply.

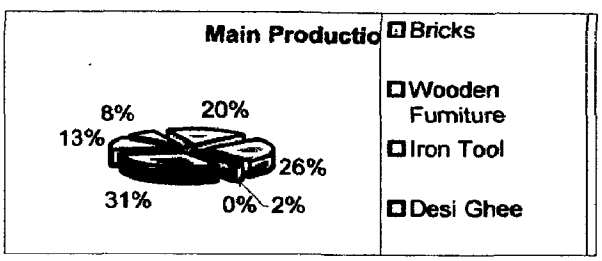
Figure 4.11: Sources of water supply

(Source: Comparative Graph Prepared by author)

Occupational Structure



Haryana



Punjab

In the Haryana portion, main production activity is agricultural tools while in Punjab, manufacturing of bricks and wooden furniture is the most prominent activity. The data for Chandigarh's villages was not available.

4.5 Demographic Statistics of the Urban centers in the Periphery:

4.5.1Growth of urban settlements (1971-2001)

Settlement	Population (in lakhs)				%Increase 1991-2001	Status of town
	1971	1981	1991	2001		
Chandigarh	2.54	4.51	6.42	9.2	26.17	I
SAS Nagar	0.01	0.32	0.78	1.35	73.1	I
Panchkula	0.00	0.11	0.70	2.34	234.3	I
Kharar	0.11	0.21	0.27	0.32	50.0	III
Dera Bassi	0.06	0.07	0.10	0.15	50.0	IV
Banur	0.05	0.07	0.10	0.11	57.1	IV
Pinjore	0.03	0.07	0.14	0.17	21.4	IV
Zirakpur	-	-	-	0.25	-	IV

Table 4.49: Growth of Urban centers
(Source: Census of India, Municipalities)

Panchkula has registered more population growth than SAS Nagar and has grown more rapidly registering an increase of 234.3% during the decadal period of 1991-2001 while SAS Nagar has grown at a rate of 73.1% only. Kharar, Banur and Dera-Bassi have too witnessed a high rate of above 50%. The growth rate of the urban centers in Punjab state has been only 37.58%. This shows that these areas are developing that fast because of their proximity to Chandigarh and are absorbing the spillover population of Chandigarh.

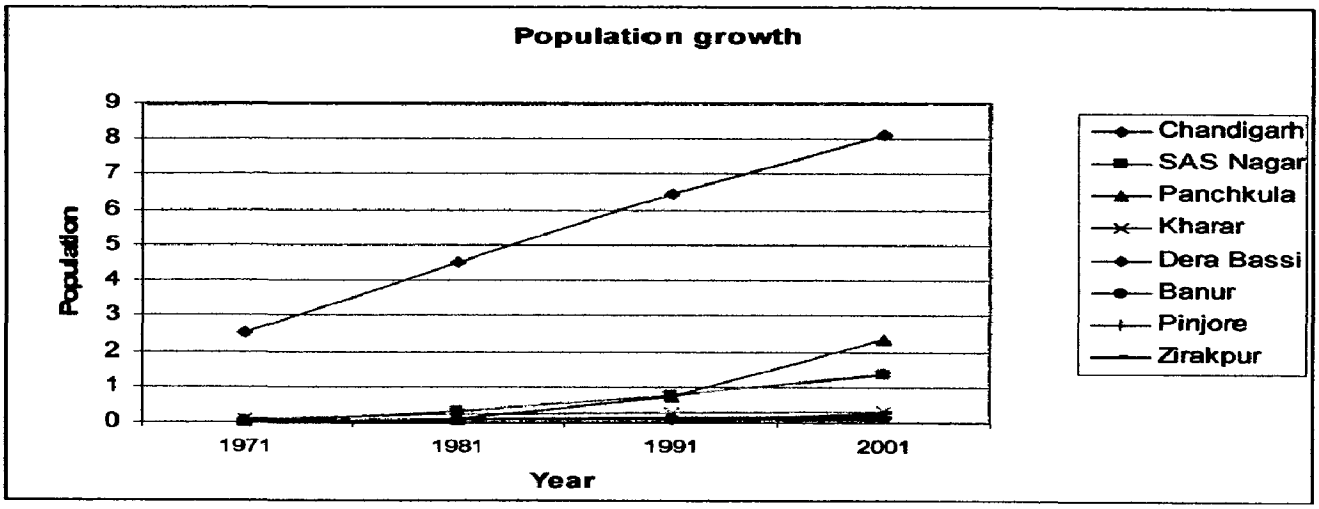
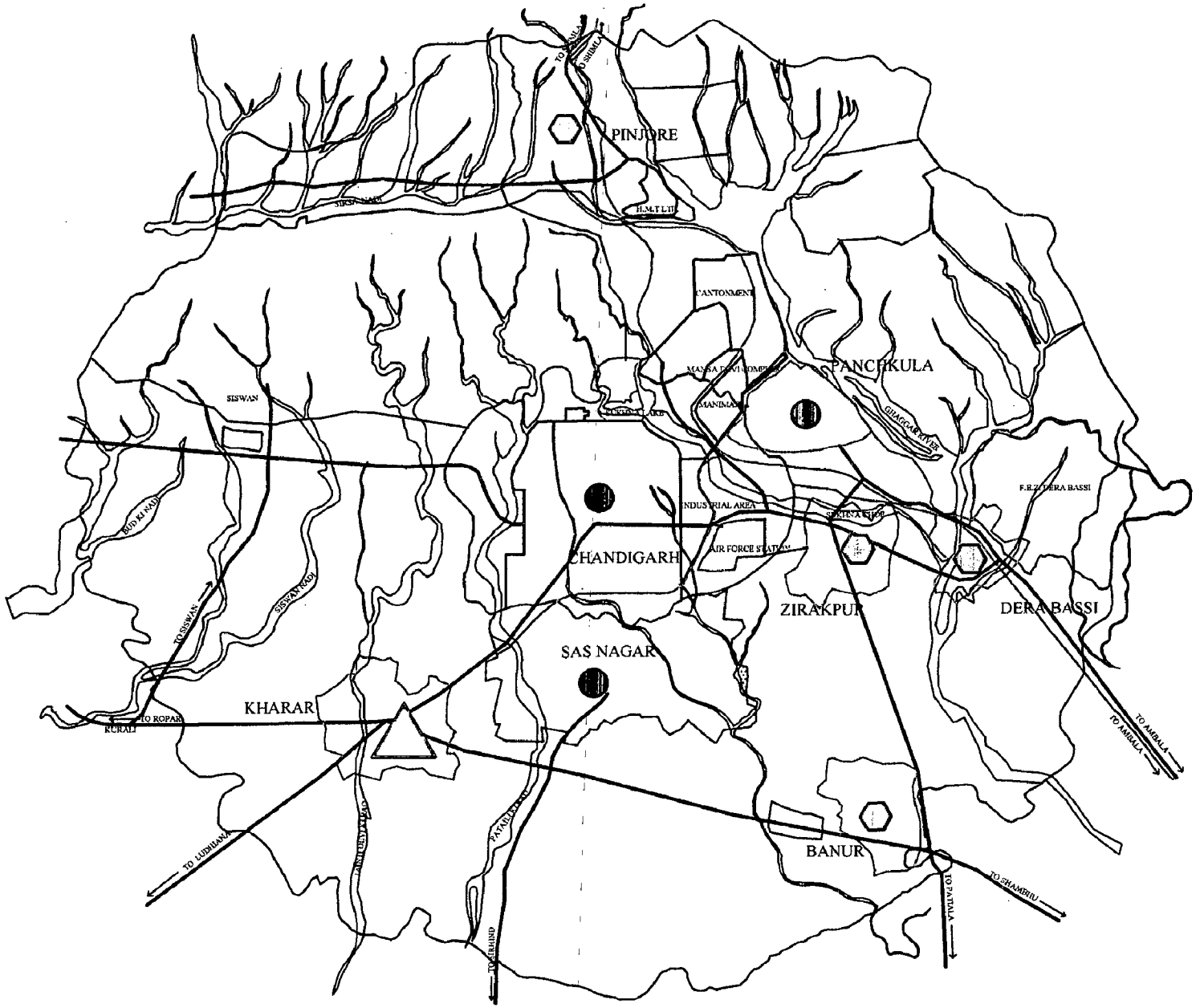


Figure 4.12: Graph showing the population growth rate over the decades.
(Source: Prepared by the author from the data)

From the above table it is clear that the Chandigarh city is mostly based on tertiary sector with the services being the predominant employment generator. In the early years of its establishment, the city mostly had public sector employees. But with the coming up of IT sector and industries in the CUC area, the city's employment provider is changing from Public to Private sector. Not only Chandigarh, but both the SAS Nagar and Panchkula are also performing the main functions of being Service centers. While the towns of Kharar, Zirakpur, Dera Bassi, and Pinjore serve as industrial centers. Banur is the Agrarian centre.

The towns of Kharar and Dera Bassi are mutli-functional. In Pinjore, HMT Township causes the number of industrial employees to go up to 49%. Similarly Dera-Bassi has high percentage of industrial workers of 34% because of the FEZ (Free Economic Zone) set up by the government of Punjab.

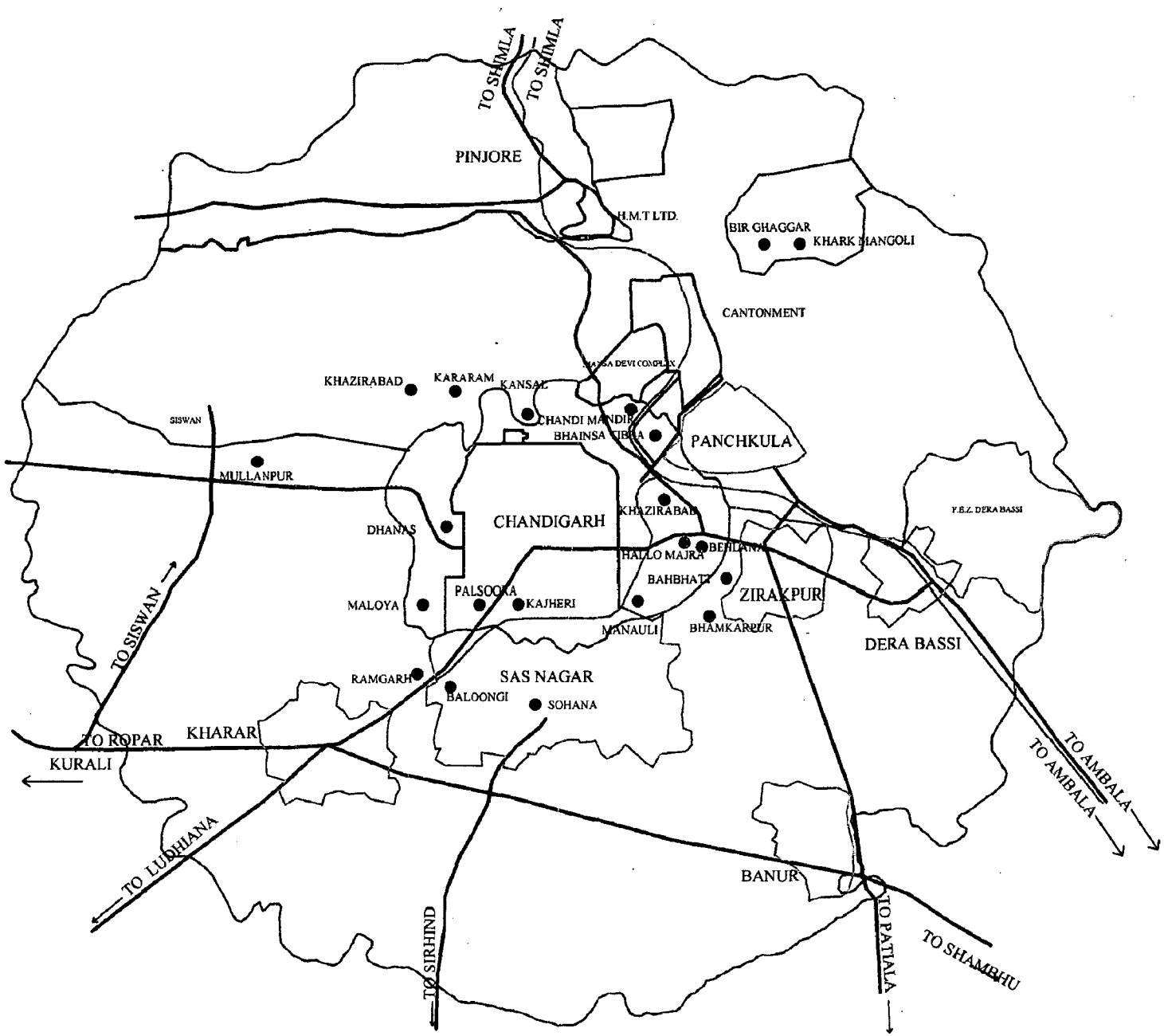
Thus the core area is service oriented while the peripheral areas are the industrial centers. So, it is observed that there are already a lot of diversified activities taking place in the periphery. Therefore, there is a need to strengthen these activities in such places, so that they can effectively help to divert the migrants from the core to the periphery.



LEGEND

- CLASS I TOWN
- CLASS III TOWN
- CLASS IV TOWN

MAP NO. 4.1	CLASSIFAICATION OF URBAN SETTLEMENTS - PERIPHERYOF CHANDIGARH	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II



LEGEND

- VILLAGES WITH 10000+
- PERIPHERY BOUNDARY
- TOWN BOUNDARY

MAP NO. 4.2	VILLAGES WITH POPULATION MORE THAN 10000	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II

4.5.2 Classification of settlements in Periphery

Census Category	No.	Settlements
Class I(> 1 lakh)	3	Chandigarh, SAS Nagar, Panchkula
Class II(0.50-0.99)	0	-
Class III(0.20-0.49)	1	Kharar,
Class IV(0.10-0.19)	3	Dera Bassi, Banur, Pinjore, Zirakpur
Class V(0.05-0.09)	0	-

Table 4.50: Classification of the various settlements

(Source: CISMeR- 2021 Plan Report)

Total Population of the Periphery

Settlement	Population (2001) In lakhs
Chandigarh	9.2
Panchkula	2.34
SAS Nagar	1.35
Zirakpur	0.25
Dera Bassi	0.15
Banur	0.11
Kharar	0.32
Pinjore	0.17
Villages-UT	0.92
Villages-Punjab	3.54
Villages-Haryana	1.54
Total Population	19.98

Table 4.51: Total population of the periphery

(Source: Calculated by the author from the data collected from Census-2001)

4.5.3 Functional status of urban settlements

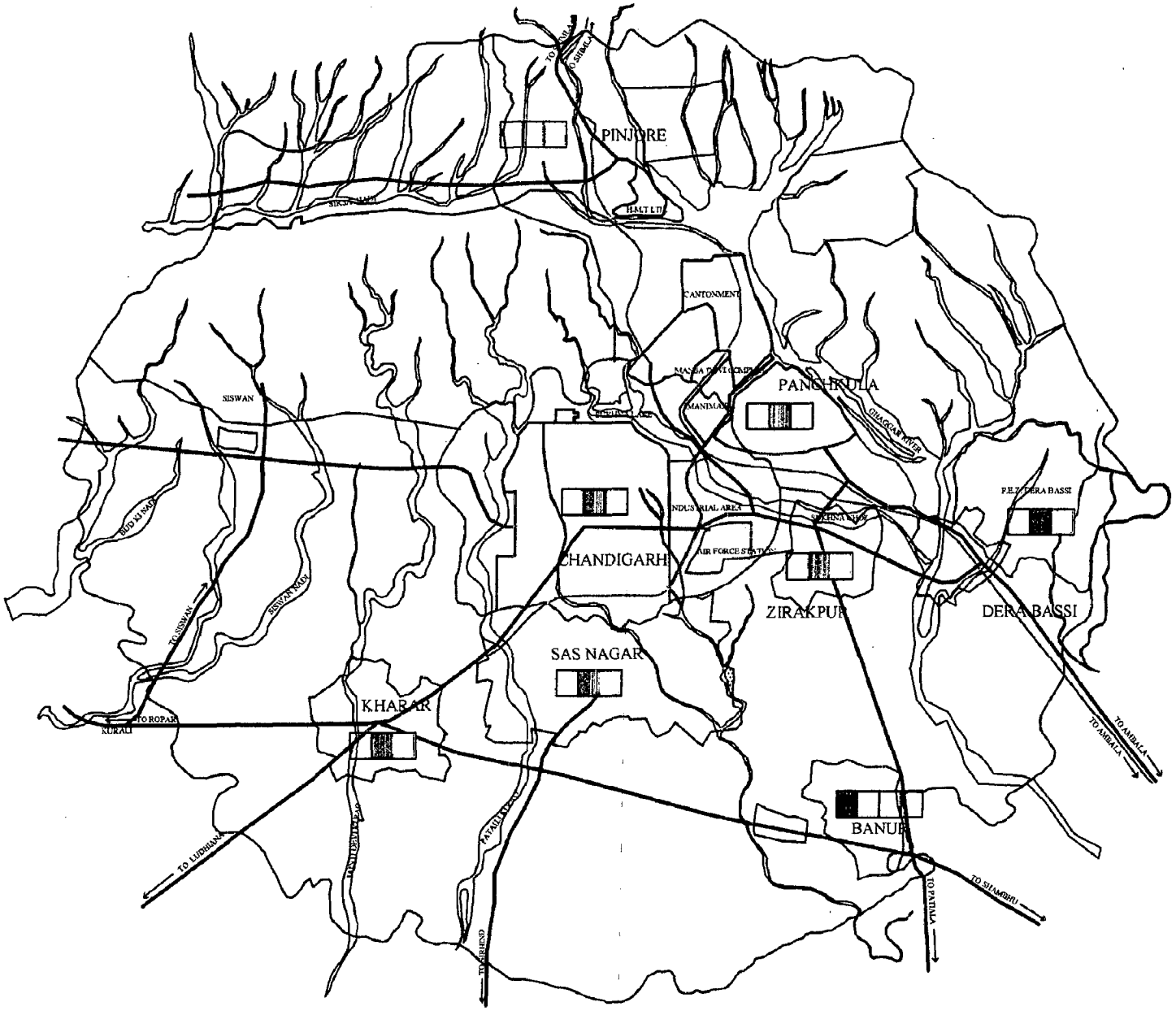
Settlements	% of workers					Main Functions
	Agri.	Industry	Trade& Comm.	Services	Trans& Commu.	
Chandigarh	1.00	26.00	23.00	43.00	7.00	Services
SAS Nagar	3.00	31.00	16.00	46.00	4.00	Services/Industry
Panchkula	2.00	26.00	17.00	53.00	2.00	Services
Kharar	12.00	30.00	19.00	33.00	6.00	Industry/ Services
Dera Bassi	12.00	34.00	22.00	27.00	4.00	Industry/ Services
Zirakpur	10.00	30.00	26.00	29.00	5.00	Services/Industries
Banur	48.00	15.00	14.00	20.00	5.00	Agriculture
Pinjore	4.00	49.00	16.00	27.00	4.00	Industry

Table 4.51: Functional Status of the various settlements
(Source: CISMeR- 2021 Plan Report)

From the above table it is clear that the Chandigarh city is mostly based on tertiary sector with the services being the predominant employment generator. In the early years of its establishment, the city mostly had public sector employees. But with the coming up of IT sector and industries in the CUC area, the city's employment provider is changing from Public to Private sector. Not only Chandigarh, but both the SAS Nagar and Panchkula are also performing the main functions of being Service centers. While the towns of Kharar, Zirakpur, Dera Bassi, and Pinjore serve as industrial centers. Banur is the Agrarian centre.

The towns of Kharar and Dera Bassi are mutli-functional. In Pinjore, HMT Township causes the number of industrial employees to go up to 49%. Similarly Dera-Bassi has high percentage of industrial workers of 34% because of the FEZ (Free Economic Zone) set up by the government of Punjab.

Also, the forest covers are widely infested with weeds. About 50% of the area of the Sukhna wildlife has been reported to be engulfed with Latuana weed. There is immediate need to regenerate indigenously found species of Bansa, Ratti, Karipatta, Giloe, Karaunda, Ber, Dhak, Palas.



LEGEND

- SERVICES
- INDUSTRY
- AGRICULTURE

MAP NO. 4.3	FUNCTIONAL STATUS OF URBAN SETTLEMENTS - PERIPHERYOF CHANDIGARH	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II

MAP NO. 4.4	GENERALISED LAND USE PLAN - PERIPHERYOF CHANDIGARH	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II

CHAPTER- V: SURVEY ANALYSIS

A household survey was conducted and 30 samples were collected by personal interview.

Since in the periphery one observes, both authorized and unauthorized development taking place in the form of planned townships and colonies and unauthorized colonies therefore, the survey was conducted in different places.

The study was conducted in the following places:

1. New Garden Colony (Unauthorized colony)
2. Silver City Extension-1 (Authorized colony)
3. Panchkula (Planned township)
4. Bapu Dham Resettlement colony on Chandigarh-Kalka highway (Government led development)

These four represent all the major types of developments taking place in the periphery. So their study would bring into fore the kind of activities going on.

5.1 NEW GARDEN COLONY

Site Characteristics

Location and surroundings

New garden colony is located on the western side of Kharar on the Ludhiana – Kharar road. It is in the village Bhago Majra. It has an area of 3.08 acres.

New Garden Colony is 3 kms. from Kharar railway station, 2.5 kms from Kharar bus stand and 15 kms from Chandigarh city center. Also Chandigarh bus station is 15 kms. Hence the site is easily accessible. But it is away from main development because of cheap land available to the colonizer resulting into leapfrog development.

Shape

The shape of colony is irregular and the boundary of colony is zig zag. This is because of problem during purchase of land. Because of different ownership and unwillingness of some farmers to sell their land to the promoter, the shape is like that.

Topography

New Garden Colony has a plain topography with a gentle slope towards southeast to northwest. It is in the low-lying area as the choe i.e Jainti Rao ki Choe flows adjacent to the colony. It becomes problematic during rainy season and condition of colony becomes poor due to it.

New Garden Colony - Land use

S. No	Land use	Area in acres	% age of total area	Standard as per PUDA
1.	Residential	2.26	73.5 %	55%
2.	Commercial	0.13	4.31 %	5%
3.	Circulation	0.62	20 %	32%
4.	Parks/open spaces	0.07	2.27 %	5%
5.	Public/semipublic	-	-	3%
	Total	3.08	100%	100%

Table 5.1: Land use- New Garden Colony

(Source: Land use plan New Garden Colony)

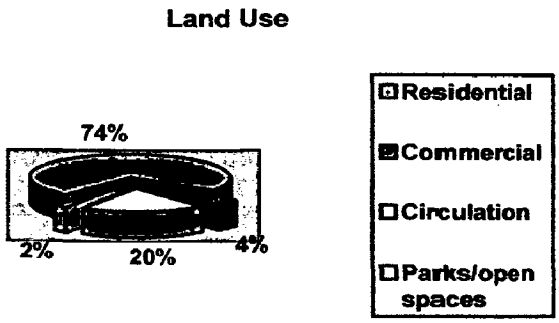


Figure 5.1: land Use of the New Garden Colony

The developer has used higher percentage of area for the residential purposes. As per the PUDA standards, very less space has been earmarked for the circulation and no space has been allocated for public/semi-public buildings.

Utilities

Water supply

In New Garden Colony the colonizer does not provide the water supply. Individual plot holders by means of hand pumps or motors installed in each house are drawing water. The quality of water is poor as there is choe in the surrounding and wastewater is disposed by various industries in that. The bore done by individuals for drawing water is just 60' resulting in poor quality of water.

Sewerage

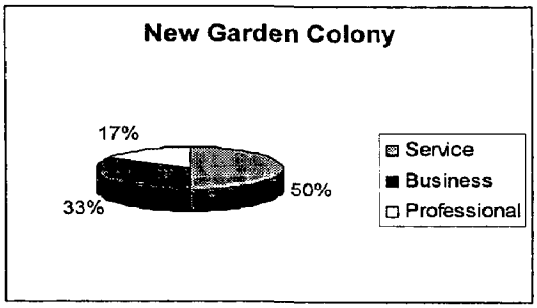
No sewer line has been laid with in the colony. Every plot holder has a provision of septic tank. The wastewater from kitchen and bathrooms are disposed off in the streets.

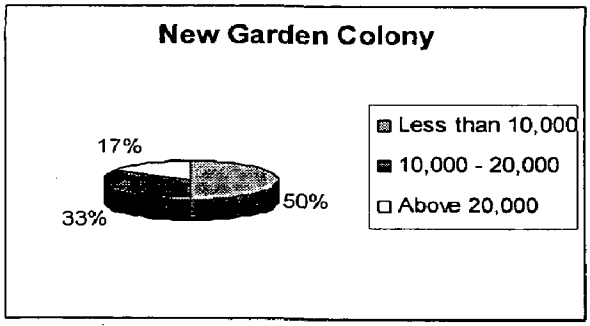
Land Cost

The Cost of a 135 square yard plot is Rs.1, 48,500 which is very less than the rates prevalent in Chandigarh.

Ownership

80% of the owners are first owners of the houses i.e. they purchased the plots directly from the developers. Remaining 20% are second owners.





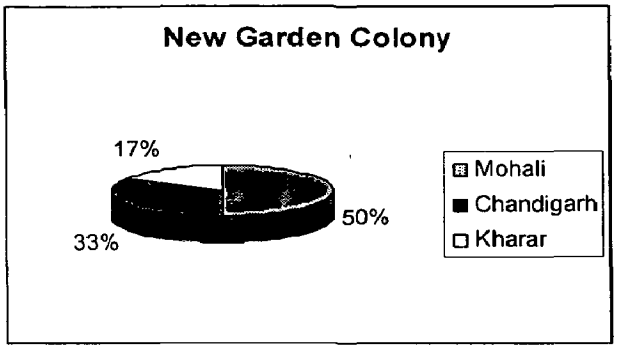
Occupation: 50% of the working population in the colony is in the service sector, while 33% are in business and only 17% are professionals. Figure 5.2: Occupation structure

Income group: Similar to the occupation pattern, 50% of the residents earn less than Rs 10,000 pm. And only 17% earn more than Rs.20, 000.

Figure 5.3: Income structure

Place of Work: Half of the people are working in SAS nagar and only 33% are working in Chandigarh. Also, 17% are working in Kharar.

Figure 5.4: Work Place

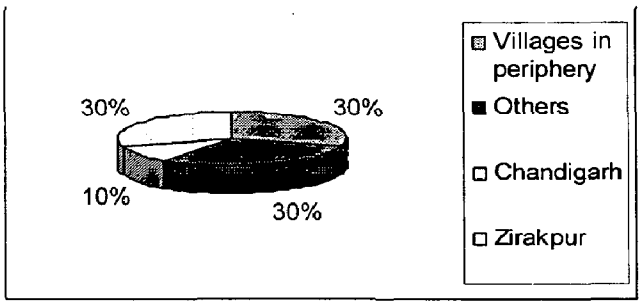


Choice of site: 75% of the residents said that cheaper land was the main reason for their choice of site here while 20% gave nearness to work place as their reason to own house here. Remaining 5% gave varied reasons as Friend's recommendation, family bondings etc.

Place from where shifted:

Only 10% people have shifted from Chandigarh, while 30% have migrated from the periphery villages and remaining 30% have migrated from other places of Punjab and other states.

Figure 5.5: Place from where migrated



Vehicle ownership: All the owners own a two-wheeler and about 35% own four-wheeler.75%Inter-city work trips are made by scooters, 10% of the work-trips are made by local buses.

5.2 SILVER CITY EXTENSION-1

Location and surroundings

Silver City Ext-1 is located on the western side of Zirakpur on the Chandigarh-Ambala (National highway No- 22). It is in the village Bishanpura and Bishangarh. Silver City Ext-1 is 5 kms. from Zirakpur railway station, 3 kms. from Zirakpur bus stand and 2.5 kms. from city center. Also Chandigarh railway station is 5 kms. and from Chandigarh bus stand it is 11 kms. Hence the site is easily accessible.

The site is away from main development because of cheap land available to the colonizer resulting into leapfrog development.

Shape

The shape of colony is irregular and the boundary of colony is zig zag .this is because of problem during purchase of land. Because of different ownership and unwillingness of some farmers to sell their land to the promoter the shape is like that.

Topography

Silver City has a plain topography with a gentle slope towards south to north. The soil bearing capacity is good for 10-12 storeyed structure as well as fertile land providing a good opportunity for the proper landscaping of the area.

Population and density

The total proposed population of Silver City Ext-1 is 2055 persons. The proposed gross density is 190 persons per acre.

Land use

The following table and map of the colony gives the comparative picture of land use pattern in Silver City Ext-1 as per the approved plan.

Silver City Ext-1 Landuse (approved plan)

S. No.	Use	Area in Acre	%age of total area
1.	Residential	5.97	55.35%
2.	Commercial	0.48	4.45%
3.	Circulation	3.37	31.3%
4.	Parks/open spaces	0.50	4.6%
5.	Public/semi-public	0.47	4.3%
	Total	!0.78	100%

Table 5.2: Land Use- Silver city *(Source: Silver City Ext-1, PUDA)*

Utilities

Water supply

In Silver City Ext-1 the water at present is taken from underground source 450' deep but external linkage will be provided by PUDA in future as external development

charges have already been taken by it. One overhead reservoir of capacity 20,000 gallon and one tube well is provided in the park.

Sewerage

The slope of the colony is towards south to north. Thus slope is kept into consideration while laying down sewer lines. The sewer lines of 8 ", 12" and 16" diameter have been laid. No external linkage of main sewer. So sewage treatment plant is provided near the main entrance of the colony so that it can be linked to external mains in the future. Wastewater from sewage treatment plant is disposed in the agricultural fields nearby and now tankers to the choe nearby are carrying it.

Electricity

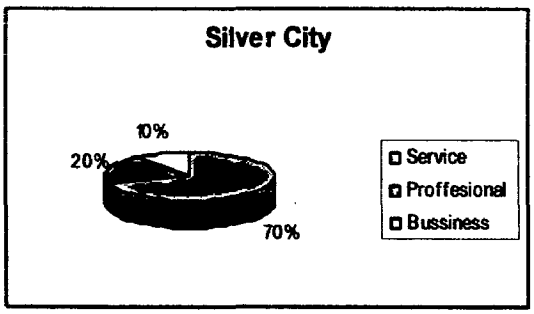
Electric grid station of 11 kw is provided near the main entrance which is handed over to PSEB. Also underground electricity and phone cable in the colony are provided

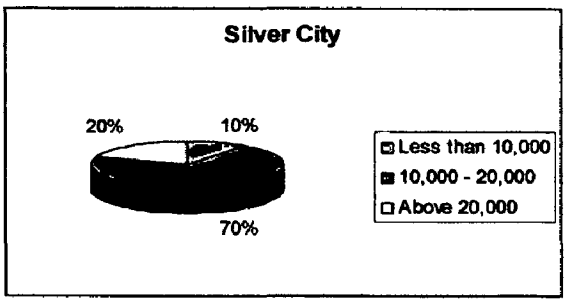
Land Cost: The market value is Rs. 4500 per square yard.

Ownership: 76% of the owners are first owners of the houses i.e. they purchased the plots directly from the developers. Remaining 24% are second owners.

Occupation: 70% of the people are employees in the service sector and 20% are in the professional sector. Only 10% businessmen are there.

Figure 5.6: Occupation Structure



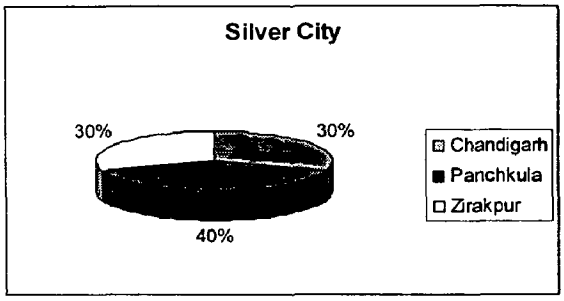


Income Group: 70% of the people living in the Silver City earn between Rs10000-20000 pm and 20% earn more than Rs20,000.

Figure 5.7: Income Structure

Work Place: 40% of the people work in Panchkula and 30% work in Zirakpur and Chandigarh.

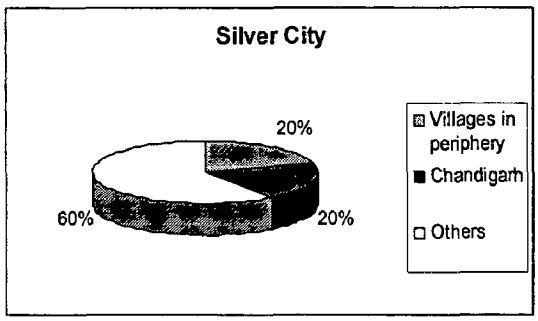
Figure 5.8: Place of work



Choice of site: Here, interestingly, 25% of the residents gave better facilities as the main reason to reside there while nearness to work place was the factor for more than 50% people and 20% gave cheap land costs as their choice.

Place from where shifted: 60% of the people have migrated from other places while, periphery villages have contributed 20 %.

Figure 5.9: Place from where migrated



Vehicle Ownership: All the owners own a two-wheeler and about 41% own four-wheeler.65%Inter-city work trips are made by scooters, 15%of the work trips are made by four wheelers& 18% of the work-trips are made by local buses.

5.3 PANCHKULA

Location: located at a distance of about 10 km from the Chandigarh. Since it is a big township, therefore the samples were taken randomly from different sectors.

Water supply

The municipal council of Panchkula provides water supply to the whole township.

Sewerage

All the sectors have proper drainage system.

Land Cost: Land cost varies from Rs90 Lakhs to1.5 Crore for 1 kanal house.

Ownership: about 60% of the residents are tenants and remaining are owners. Also, nearly 45% are second owners. The higher strata and the business class is replacing the lower income group people.

Income group: 60% of the people living in the Panchkula earn between Rs10000-20000 pm and 30% earn more than Rs20,000 and 10% earn less than Rs.10,000 pm.

Place of work:
58% of the working population is working in Chandigarh. 12% of the population is working in other places like Baddi, Parwanoo and Pinjore. 30% work in Panchkula itself.

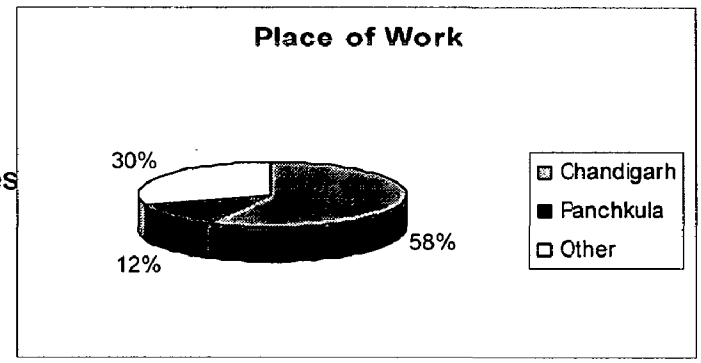


Figure 5.10: Place of work

Choice of Site: 45% of the residents gave better facilities as the main reason to reside there while nearness to work place was the factor for more than 35% people and 20% gave miscellaneous reasons such as allotment of plots by government, ancestral house etc.

Place from where shifted: 65 % of the households have shifted from rented accommodation to own house, after retirement from government service or due to terrorism in Chandigarh and nearby places. 25%of the households have come from other areas like army people after retirement or from different states due to more employment opportunities and 10% from nearby areas like Pinjore, etc.

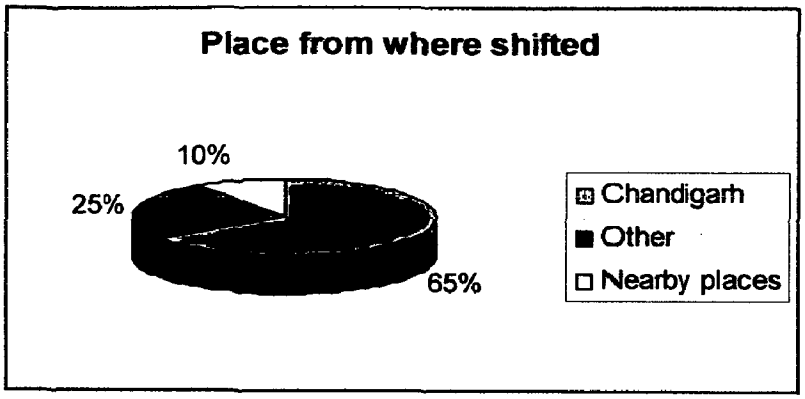


Figure 5.11: Place from where migrated

Vehicle ownership: 41% of the intercity work trips are made by the two-wheelers, 37% are made by the buses and 26% are made by cars. Only about 3% of the trips are made by cycles.

5.4 Bapu Dham Resettlement colony:

Location: Constructed by the Chandigarh Housing Board near Sector26 on the Chandigarh-Kalka Highway in the UT portion of the periphery.

Population: The colony consists of three transit camps spread over an area of 25.22 acres and with a population density of 352 persons per acre. About 9000 people live in this colony.

Utilities

Water supply: The houses are served with individual water supply connection although it is served with 10 common taps.

Sewerage: 1399 houses of the colony are provided with individual lavorities with 5 common lavorities in the area.

Land cost: Since, it is a government sponsored rehabilitation scheme for the slum dwellers; therefore, the slum dwellers were provided housing free of cost.

Ownership: 85% of the residents are the first owners, with remaining being second owners.

Income group: All the residents earn less than Rs.10000 pm. 15% earn between Rs5000-10000 and remaining earn less than Rs.5000 pm.

Occupation: 80 % of the work force acts as laborers in different places while 20% do own work like plying rickshaws or running barbers shop.

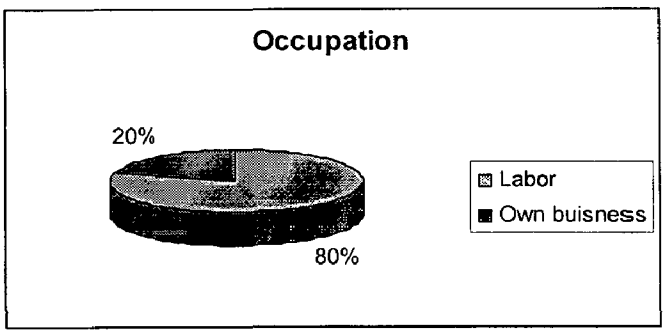


Figure 5.12: Occupation Structure

Place of work: 75% work in Chandigarh, while remaining work in places like Dera-Bassi and Zirakpur.

Place from where shifted: Bapu Dham colony residents have been shifted from the labor colonies of Sector-14, 16 &30.

5.5 Conclusions

The chart shows that in the periphery, the planned township of Panchkula scores highly on all fronts but is undesirable due to the high land costs. While the authorized colony is a better living place than the unauthorized colony, an interesting feature is that the resettlement colony has better infrastructural facilities than these colonies.

Comparison of Different settlements

Category	New Garden Colony	Silver city Enclave	Panchkula	Bapu Dham Colony
Nearness to Highway	B	B	A	B
Sewerage	C	A	A	B
Water supply	C	B	B	B
Land cost	B	C	D	A
Nearness to main highway	B	A	A	B
Education Facilities	C	C	B	C
Income level	B	A	A	D
Medical Facilities	C	B	A	B
Place of work	C	B	A	B

A: Very Good/ Highly Favorable **C:** Fair

B: Good/Favorable **D:** Poor

Figure 5.13: Table showing the Comparative level of Facilities in all the four different types of settlements

(Source: Based on the primary survey conducted by the author)

5.4 CONCLUSIONS

- The study reveals that Chandigarh is under tremendous strain from the process of urbanization. The city has already reached its saturation point and the infrastructural facilities are becoming scarce.
- Most of the people living in the periphery have their work places in Chandigarh only.
- The Periphery control Act has never been implemented in its true sense and the enforcement has been patchy and inconsistent.

- There is a serious lack of amenities in the rural settlements/ villages of the region.
- The UT portion of the periphery has better infrastructural facilities than their Punjab and Haryana counterpart.
- All the major transport corridors are witnessing ribbon development and unauthorized construction.
- The belt of 16 km has reserved forest zone and protected forest zone besides the Sukhna wildlife sanctuary. There is a serious need to prevent their depletion.
- The periphery will have to absorb the spill over population of the city if the growth is not directed to other growth centers and rural centers.
- The towns in the periphery are serving the purpose of industrial and service towns. There is a need to further enhance those activities by giving incentives.

In order to have a balanced and coordinated growth, there is a need to prepare a development plan understanding the ground realities

CHAPTER –VI: PLANNING MECHANISM & INSTITUTIONAL FRAMEWORK

6.1 ADMINISTRATION OF THE PERIPHERY

PUNJAB PORTION

The Punjab portion of the periphery is looked after by the department of Town & Country Planning at SAS Nagar and PUDA (Punjab Urban development Authority). PUDA came into being after the merger of directorate of Housing and Urban development with Punjab Housing Development Board. It was constituted under the Punjab regional And Town Planning and development Act, 1995 notified by the government. It has its own town and country-planning department. The authority has been empowered to acquire, hold and dispose off property, both movable and immovable and to contract. For the monitoring of the periphery, only 2 junior Engineers and 2 Area investigators are there.

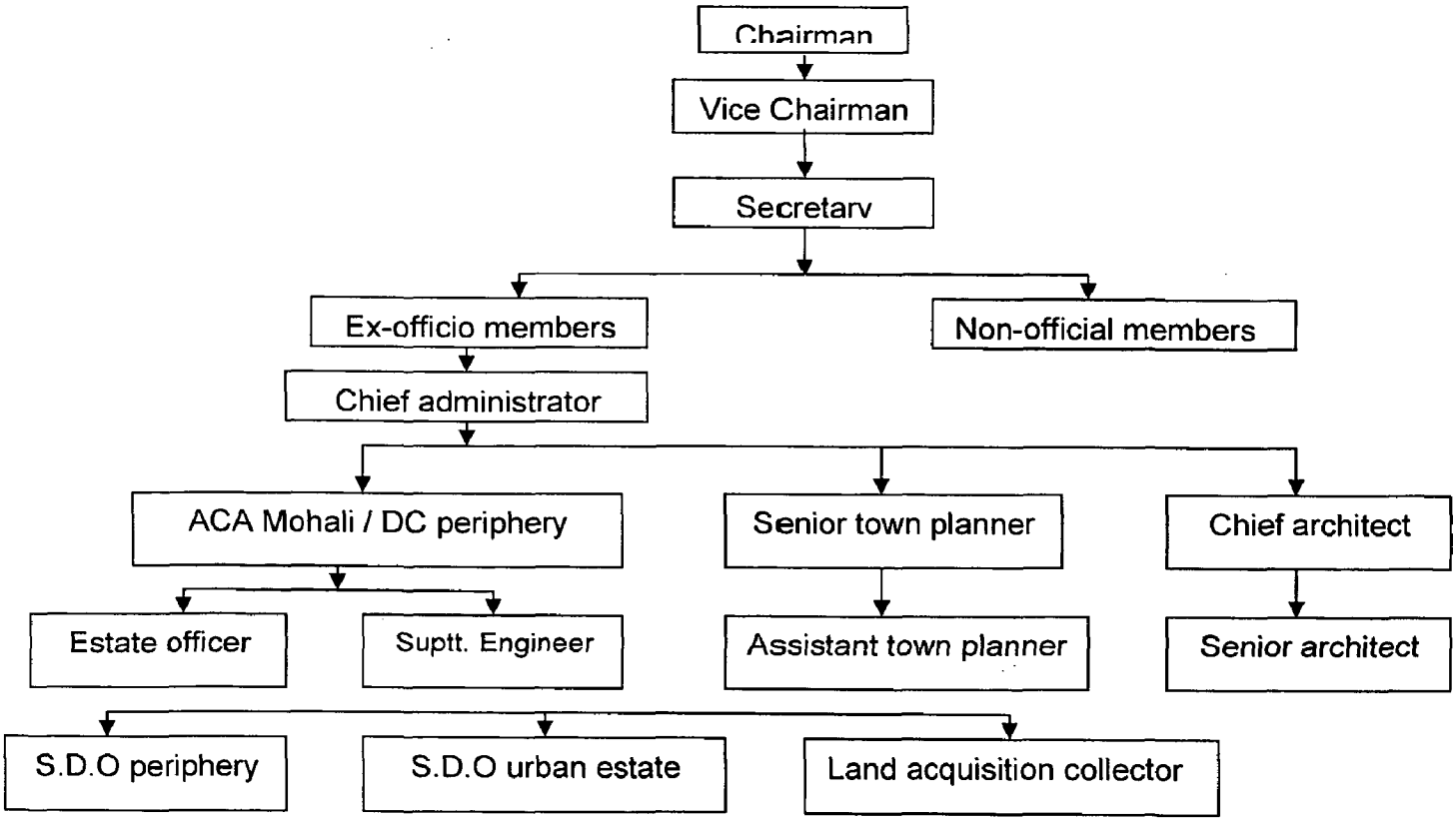


Figure 6.1: Administrative Setup of PUDA

(Source: Prepared by the author)

The flow chart shows the administrative setup of the PUDA, where all the policy making decisions and enforcement for the Periphery area is done but the planning for Periphery is done in the Office of District Town Planner, Town & Country Planning Office, SAS Nagar.

Following chart shows the administrative set up of the Town& Country Planning Department, Punjab

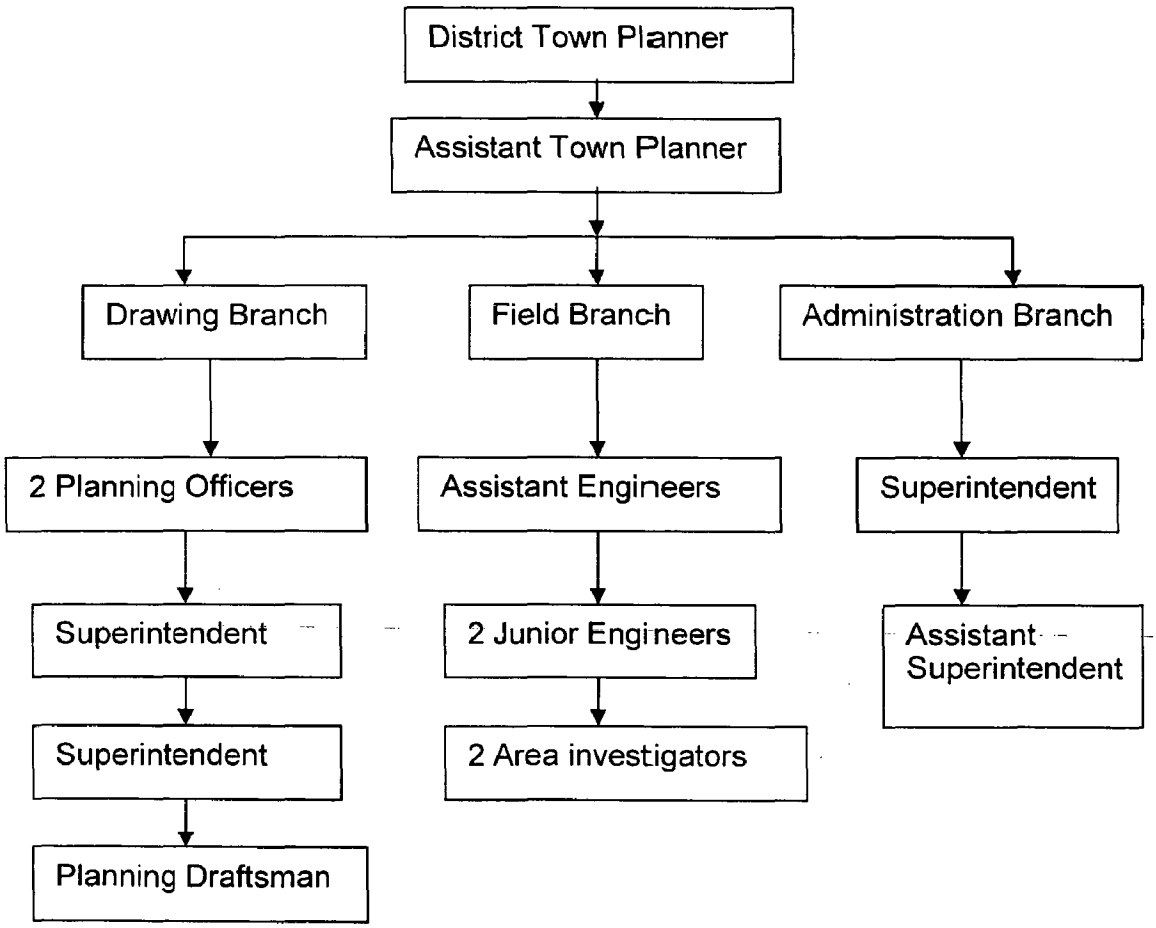


Figure 6.2: Administrative set up of the Town & Country Planning Department, Punjab.

(Source: Prepared by the author)

6.2 PLANNING MECHANISM

Punjab Portion

The plans prepared for the Punjab portion are done in tune to the policies of the Punjab government and the Administration doesn't consult the other two governments of Haryana and Chandigarh.

The town planning schemes prepared by the assistant town planners are sent to the District town planner for approval. These are then further sent to the Chief town planner for approval.

Whenever any major periphery policy decision has to be taken, other departments like the Department of Revenue, Industries, and Housing and Urban Development are also consulted. The views of Public at large are also sought through Placement of advertisements in newspapers. But this seldom has been done. Infact, when the Punjab government made an amendment in its periphery policy in last November, it was kept under tight wraps as the government feared opposition from Haryana and Chandigarh governments and public.

Any amendment to the New Punjab Capital Periphery Control Area Act has to be approved by the Punjab state assembly and approved with 2/3rd majority in the same manner as other laws are approved.

Haryana Portion

Mechanism is almost same as that of the Punjab. The planning and the execution of the plans and programs under Haryana are too done under the Haryana Urban Development Authority Act, 1977. HUDA has a town and country-planning department that prepares all the planning schemes. Unlike Punjab, which has separate TCPO office for the periphery, Haryana doesn't have any separate office. The TCPO office at Panchkula looks after the whole district that includes most of the areas like Alipur, Morni, and the urban areas. The office is headed by 2 DTPs (District Town Planners), one for the development work and the other for

enforcement, assisted by the ATP (Assistant Town Planner), followed by Planning officers, draftsmen and Junior engineers.

The total number of JEs in the office is 5.

Chandigarh Portion

The Chandigarh portion is taken care of by the TCPo office and there is no urban development authority. It comprises of 1 CTP, 2 DTPs, 2 ATPs. The total number of JEs in the office is 5. All the planning schemes are prepared and evaluated here only.

CHAPTER –VII: ISSUES AND RECOMMENDATIONS

After the analysis of the primary and the secondary data, and the population projections, following critical issues are identified that have to be kept in mind before planning for the periphery. These issues are:

7.1 Population Projections

Settlement	Projected Population	
	2011	2021
Chandigarh	12.90	18.00
Panchkula	4.05	7.00
SAS Nagar	2.38	3.75
Kharar	0.59	0.90
Dera-Bassi	0.21	0.30
Banur	0.19	0.27
Zirakpur	0.31	0.40
Pinjore	0.24	0.32
UT villages	1.5	2.24
Punjab villages	4.12	4.97
Haryana villages	2.1	2.9
Total Population	28.59	41.05

Table 7.1: Population Projections for the periphery[16].

(Source: Computed By the Author)

The projections were carried out using the formula

Pn= P(1+r/100)n

The projected population of Chandigarh upto 2021= 18 lakhs

Spill over population of Chandigarh= Projected population of Chandigarh upto 2021- Envisaged population of Chandigarh upto 2021

= 18 lakhs-16 lakhs= 2 lakhs

This 2 lakhs population has to settle down somewhere. F this population is not directed to any other growth center, then the periphery will have to absorb it coupled with the periphery's own population will cause unplanned growth.

[16] For growth rate and Population figures ref. Table 4.49

7.2 ISSUES

Unauthorized construction: the unauthorized construction is going on unabated and resulting in the unplanned development. The regularization of the unauthorized construction after few years by bowing to the demand of the public won't serve any purpose. In spite of letting the development go in its way, the government must prepare a comprehensive development plan. Though the Haryana government hasn't regularized unauthorized construction lately, Punjab government has been regularizing all unauthorized construction from time to time.

Enforcement: Though there is law acting in the area prohibiting construction throughout, the enforcement of the act has been patchy. Major violations have come from the government only. Stricter enforcement could mean dealing with the politicians, who do not want to annoy their vote banks prohibit the government from taking strict actions.

Coordinated development: Since the whole area is under different administrations, therefore, it is very difficult to have effective implementation of any plan/proposal. Thus it is necessary to have any single governing body looking after the development of the periphery; drawing representatives from all three governments. But, bringing under one administration could trigger unrest, as it is a sensitive issue.

Maintaining ecological balance: Any future development should take place in such a way so as it doesn't disturbs the ecological balance. Ecologically sensitive areas like reserved forest zones etc should not be used for development.

More investment in SAS Nagar and Panchkula and the townships of Kharar and Dera Bassi will lead to the failure of proposals of economic decentralization. As a result, the pattern has already become of Chandigarh urban Complex with Kharar and Dera Bassi as extended continuous urban agglomeration with the CUC serving as the core and the links to these towns attracting ribbon development.

The underground water sources of the region are reported to be fast depleting. Scarcity of water poses a serious problem and limitations in the development of the region. Though the region has a lot of rivulets flowing through it, but the subsequent decrease in the amount of rainfall over the years has dried them up. The city draws water from the Bhakra Canal and the rural areas depend upon tubewell water for both the irrigation as well as drinking purposes. Excessive exploitation of underground water for the crops of Basmati rice is also depleting the water table.
The industries are being set up without going into the details of its impact on Chandigarh and its periphery particularly in the case of number of paper mills in Barotiwala, a proposed chemical complex at Lalru, some industries in the Free Economic Zone at Dera Bassi.

Unauthorized development of stone crushers has also increased the problem of atmospheric pollution in the region along with the acid fumes and chemical discharge from the industries.

Absence of sewerage treatment facilities in all the villages and the towns is causing water pollution because of the discharge of sewerage and disposal of waste from factories into the choes and rivers.

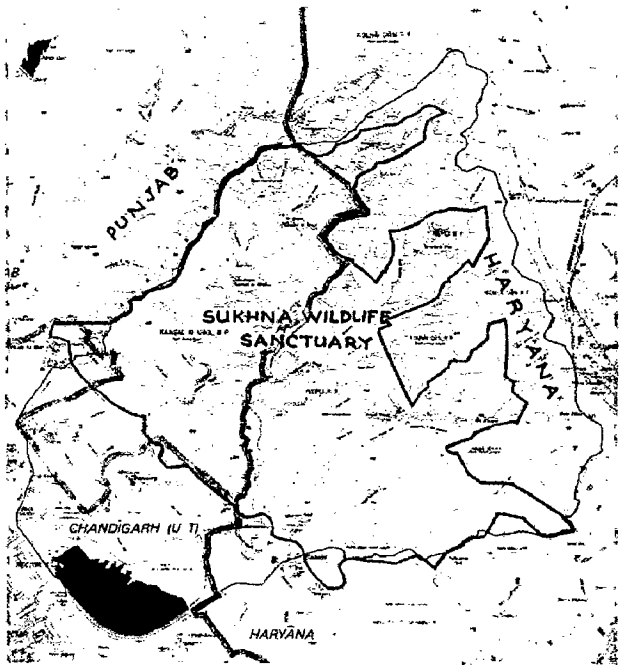
The Shivalliks are made up of sand stone, grit, conglomerates and clay. The rocks are young, soft and loose and highly susceptible to erosion. The people of the rural areas depend upon forest for fuel and fodder. This is leading to denudation of the hills. Area along the river Ghaggar, Jayanti-Devi-ki-Rao and Siswan are reported to be affected by erosion by rivulets. Seasonal floods are caused by these rivers during the heavy rainfall season.The forest area lying near the Shivallik range is coming under urbanization. The species found in these areas are on the verge of becoming extinct. They are loosing their natural habitat.

In recent times, lots of cases have been reported in Chandigarh where monkeys have strayed into the houses of people. The ecologists of the city have attributed this to decreasing forest cover.

Sr.No	Name of the forests	Area in hec
1	Sukhna Wildlife Sanctuary	2610.99
2	Lake forests	105.57
3	Sukhna choe forests	387.12
4	Patiali-ki-Rao forests	136.19
5	Forest area at Brick kiln Manimajra	5.53
	Total	3245.30 Ha.

Table 7.1: Area under different forests
(Source: Dept. of Forests- Chandigarh)

CATCHMENT AREA OF SUKHNA LAKE



Identification of growth centers: There is a need to identify growth centers, growth points from both the rural areas and the urban centers. Zirakpur, Dera-Bassi,Banur, Pinjore, Kalka, could serve as growth centers.

7.3 SWOT ANALYSIS

Seven different options have been evaluated to prepare guidelines for the growth of the city.

Option 1: Minimum Growth

Here, the periphery is maintained according to the original concept. No development is permitted in the green belt and the city is also not allowed to grow into a regional center.

Strength	Weakness	Opportunity	Threat
• Original concept of green city is maintained. • Lesser levels of pollution in the city.	• Great stress on the infrastructure of the city. • Replacement of LIG & Lower strata by the higher income groups. • Restriction on the growth of the city. • Land prices to shoot up in the city. • Acceleration in the process of formation of slums in and around the city. • City would loose its status of regional centre.	• If implemented successfully, would provide role model for the whole country.	• Weak enforcement policy. • Intensive urban uses. • High population growth pressure on periphery.

Option 2: Green Swap

Here, the Periphery Control Act is abolished and the Green belt is utilized for the development process. Replacement/ renewal of buildings allowed within the city. The transport in the city remains the same but the areas designated for development in the green areas are to be connected with public transport.

Strength	Weakness	Opportunity	Threat
• Pressure taken off from the mother city. • Density is lower • Higher economic returns. • Market oriented development. • Less segregated city due to the availability of housing for all sections of the society.	• Original concept of green city is lost. • The development would not be integrated. • Reduction in the green areas and thus pollution levels to rise.	• Chandigarh to gain further importance as an important regional centre. • Rise in the opening of more IT & export oriented firms due to more availability of land	• Stiff resistance from local authorities and ecologists. • Intensive urban uses. • State governments will develop areas only for higher economic returns.

Option 3: Densification of the Chandigarh

Similar to option 1, here the main idea is to utilize the vacant spaces in and around the city and to redensify the sectors especially the sectors which were developed in the earlier phases. The city has a density which is quite less as compared to the Indian towns. Moreover, there are vacant spaces within the Chandigarh municipal limits. No additional buildings beyond existing planning boundaries.

Strength	Weakness	Opportunity	Threat
• Original concept of green city and isolated is maintained. • Lesser levels of pollution in the city.	• Great stress on the infrastructure of the city. • Traffic chaos and jams. • Replacement of LIG & Lower strata by the higher income groups. • Restriction on the growth of the city. • Land prices to shoot up in the city. • Acceleration in the process of formation of slums in and around the city.	• Public Transport system can be run effectively. • Higher FSI to be allowed.	• Intensive urban uses. • High population growth pressure.

Option 4: New Towns

Periphery stimulating method. Growth centers and other potential areas are selected and the development is directed to those areas. Preparation of plans for those growth centers and towns keeping in view the development of the whole region.

Strength	Weakness	Opportunity	Threat
• Migration to Chandigarh is reduced. • Load on infrastructure of city is reduced.	• No immediate economic returns. • The plan would involve all governments, acceptance & implementation might be a problem.	• Introduction of Rapid Mass Transit System. • Development potential for all the three governments. • Integrated regional development to take place.	• Co-ordination between different authorities might be a problem.

Option 5: Transport Corridors

The development is allowed along the main transport corridors. Partial green belt in the form of green wedges is maintained. The Periphery Control Act is amended and development charges are levied from industrialists and land developers.

Strength	Weakness	Opportunity	Threat
• High economic returns. • Pressure on infrastructure of city is reduced. • Development guided by market forces. • Land Prices to witness a rise near the highways.	• Ribbon development is enhanced. • Irregular development. • The city would further gain the industrial city character. • Social segregation of the city to increase.	• Higher potential for the establishment of industrial units. • Development potential for all the three governments.	• Some areas will be completely neglected in this process. • Problem of encroachment could occur. • Traffic congestion could occur on the traffic corridors and could thus increase the trip time to city.

Option 6: Single Administrative unit

The main idea is to bring the whole of the periphery under one governing body and chalk out a comprehensive plan for the whole area.

Strength	Weakness	Opportunity	Threat
• One administrative unit. • Integrated planning. • Easy enforcement.	• Political pressures both from centre and state governments.	• The process of development and establishment of various institutions would become less cumbersome and time consuming.	• Could have serious political consequences as it is a sensitive issue. • Could result in confusion of the work distribution and official records.

Option 7: Extending the limits of green belt

The 16 km belt is extended further and the municipal limits of the city are extended at least till the Chandigarh Urban Complex. This would ensure the development of all the satellite towns also in an integrated manner and also, the green belt is also maintained around the city. Amendment in the Periphery Control Act

Strength	Weakness	Opportunity	Threat
• Green belt around the city. • Market forces and natural growth patterns guide the development. • Reduce development pressure on the core areas.	• After few years, this would become redundant. • Encroachment in the green belt to start again. • Economic loss to areas coming under the new green belt.	• Integrated development of the urban areas	• Resistance from areas coming under restricted development. • Political pressures could come in the way of implementation of such schemes.

7.4 Recommendations

The whole area has been thoroughly studied and also various options have been analyzed. After assessing all viable options, it is observed that urbanization is bound to take place and maintaining strict green belt around the city without stricter regulations and future development plans would not be possible. But the complete repeal of the Periphery control Act is also not recommended.

Keeping in mind the ground realities and existing status of the periphery, emerging problems of unregulated and unauthorized development, need for promoting planned development and eliminating unauthorized and illegal constructions, following proposals to address the various issues have been proposed

Chandigarh Metropolitan Development Authority (CMDA)

- The Chandigarh Urban complex (CUC) comprising Chandigarh, SAS Nagar, Panchkula, Mani- Majra should be treated as one urban core and the whole periphery be brought under one development organization.
- This organization to have representation drawn from all three governments.
- The earnings made from this to be distributed among the three governments in a ration fixed by certain criteria. These criteria to consider the % of the area under each government and the economic contributions made by each area.

A. At Regional Level

1. Developemt of smaller towns

- To take the development load off the Chandigarh, there is a need to direct the development to smaller towns.
- Identification of major activities taking place in those areas and then further enhancing those activities. In Banur, which has predominantly agrarian economy, food-processing industries can be enhanced and also, grain market can be established.

- Uniform tax structure must be applicable to the whole area to promote the decentralization of trade and commerce activity in the region that is at the moment getting concentrated in Chandigarh because of the lower tax structure.
- A policy statement on the location of the industries and their distribution in the whole area. Also, the sites for the location of the industries must be judiciously selected, as the area is rather agriculturally fertile. It is essential that only non-polluting type of industries is allowed. Also, the industrial development should go hand in hand with a policy for housing the workers within the industrial complexes along with the provision of necessary infrastructure. This would attract the workers and help to reduce the population pressure on Chandigarh.
- All the development in the future should be guided by their respective master plans to be prepared under Punjab Regional and Town Planning Act, 1995 and Haryana development Act, 1977.
- It is proposed to set up a dry port on the National Highway –22 near the Zirakpur- Dera Bassi. This dry port would have an airport with world-class facilities. The setting up of dry port would ensure faster and better export of the agricultural and industrial products. Lot of industrial activity is going on in the area, but lack of market facilities hinder in the export of the goods.
- At present forest based industry hasn't grown much in the region. But since the region around Pinjore has lot of forests, therefore, forest based industry such as agricultural implements, wood based, manufacturing of resins; cedar wood oil etc can be promoted.
- All the industries that are to come up in the periphery should be non-polluting.

2. Identification of growth Centers and Growth Points

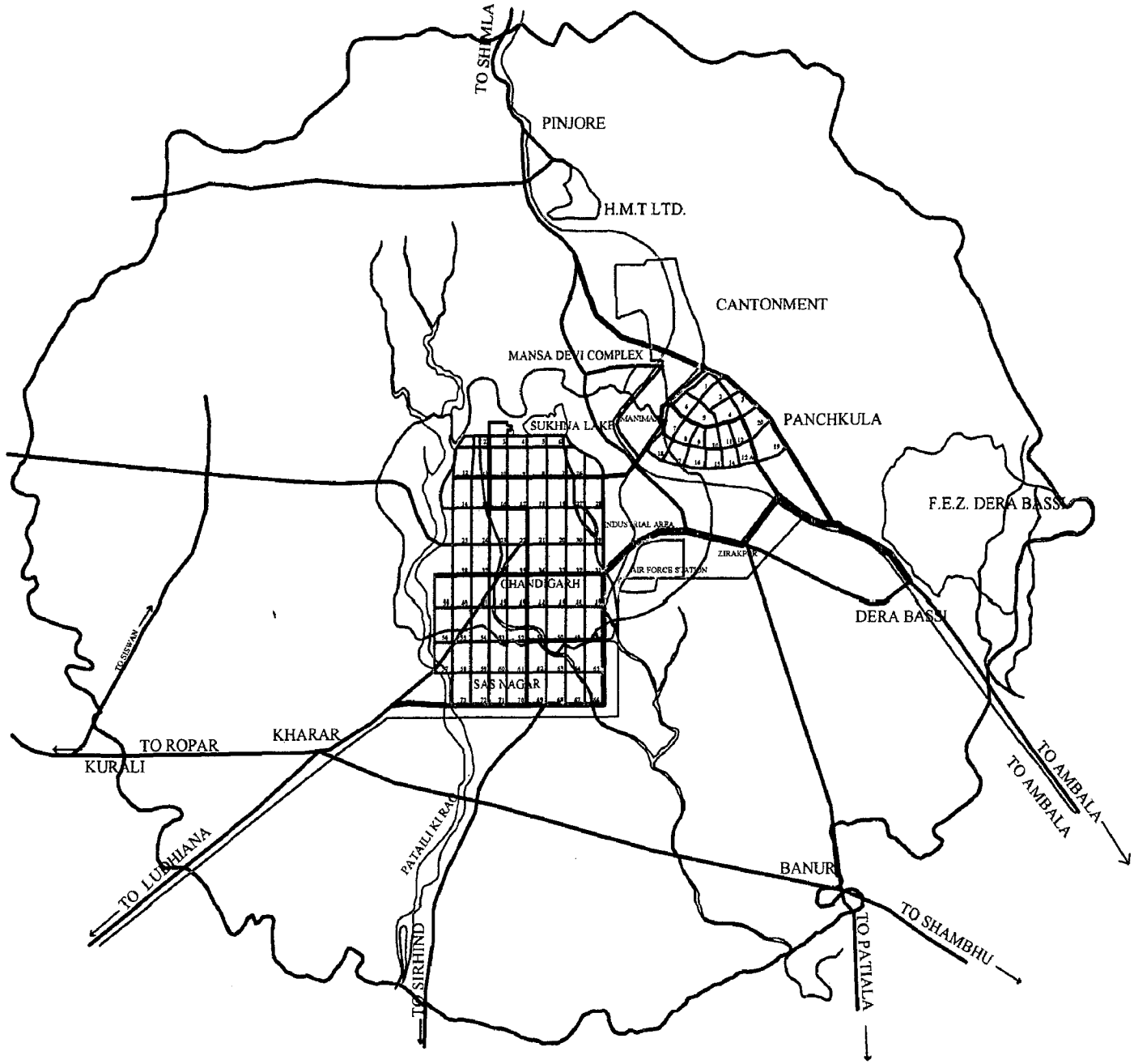
- In order to shift the pressure from the core areas, it is necessary to growth centers and growth points.
- Zirakpur, Dera-Bassi, Kharar, Pinjore and Banur should be promoted and developed as growth centers. It was found that these areas towns are mainly serving the services and industrial sectors only. So, these activities should

be further enhanced there. Banur can serve as a market to the agricultural products and can be developed as a dry port.

- There are some 20 odd villages with population more than 10000 and most of these lie near transport corridors. So, Sohana, Mullanpur Garib Das, Kansal, Manauli, Kharak Mangoli, Ramgarh, Chandi Mandir should be developed as growth points. Here private housing schemes should be encouraged.
- The town-planning department of the city should develop the villages lying in the UT portion. The areas outside the gridiron pattern should be brought under integrated planning.

3. Regional transport system

- NH-21 joining Kurali with Chandigarh is of four lanes up to Kharar from where it is of six lanes up to SAS Nagar that creates bottleneck at Kharar. This bottleneck should be avoided by increasing the road width from four lanes to six lanes from Kurali to mother city.
- Realignment of the NH-22. The highway would run beyond Panchkula. At present, the NH-22 runs through Panchkula that creates traffic problems in the city. There is heavy tourist flow through this route to Shimla and other areas of Himachal Pradesh especially in the summers.(ref. Map)
- Early completion of the rail link between Ludhiana and Chandigarh via Kharar-Morinda, so that the commutation time to Chandigarh is further shortened and the interaction is further enhanced.
- Feasibility of Rapid Mass Transit System can be analyzed for the long term planning. But as a short term planning measure, enhancement of Public transport system is recommended. This includes plying of more buses on the routes of Kalka, SAS Nagar, Kharar, Dera-bassi and the villages that are witnessing higher levels of growth eg. Saketri, Maloya, Nalagarh etc.
- The study had revealed that a large percentage of people living in the periphery travel to the towns of Kharar, Dera-Bassi etc for their work. So, a Public transport Plan has been prepared keeping in mind the main transport corridors covering major areas.



INDEX

EXISTING HIGHWAYS

PROPOSED HIGHWAY

PUBLIC TRANSPORT ROADS

MAP NO. 7.1	PUBLIC TRANSPORT PLAN FOR CHANDIGARH URBAN COMPLEX	NOT TO SCALE	N	PREPARED BY: JASKIRAT KAUR M.U.R.P. II

B. At Periphery Controlled Plan Area

1. Land Use

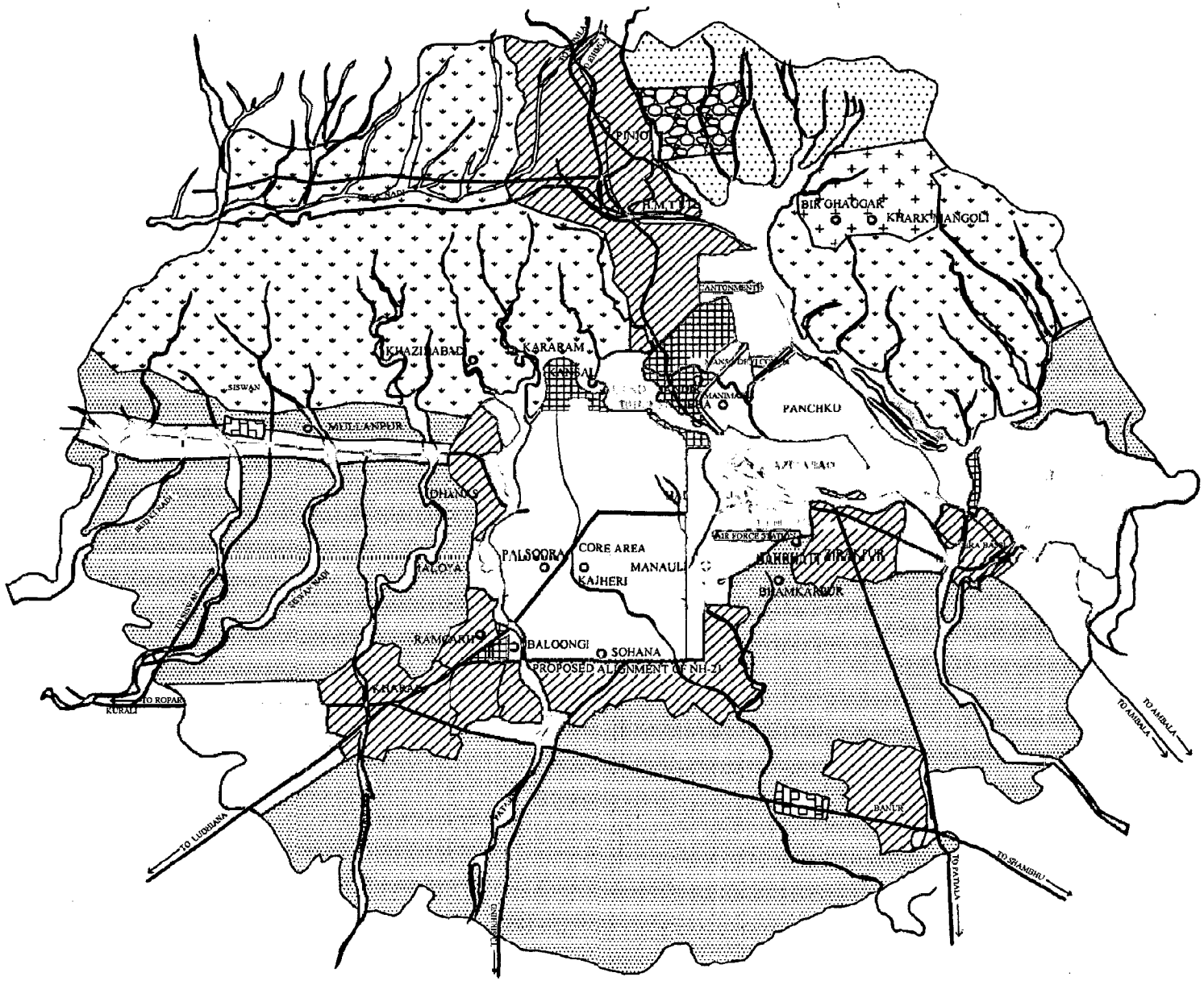
- Preparation of comprehensive Land Use Plan for the entire Periphery Controlled Area.
- Such a broad land use plan could provide for urbanisable zones, industrial parks, institutional and residential areas where such development could be taken up while highlighting the trunk services and infrastructure to support such development.
- On highways, within a certain distance on both sides, the establishment of brick kilns, stone crushers, limekilns and other allied activities should not be permitted. Also, special zones should be earmarked for the establishment of brick kilns and stone crushers etc.
- At present, farmhouses of 5 acres are only allowed. This size should be brought down to 2.5 acres in lieu of the high urbanization pressure.

2. Unauthorized construction

- All the unauthorized construction that has taken place should be regularized for once and all. Compensation charges should be levied. After regularization, strict control measures should be taken to ensure no further illegal construction takes place.
- Land-Use conversion charges can be charged on a pre-defined scale.
- No regularization should be permitted in the areas prohibited in areas prohibited for development by virtue of being covered under the Indian Forest Act,1927, The Forest Conservation Act,1980, or the Punjab Land Preservation Act, 1900.

3. Existing Rural Settlements

- Considering the existing as well as future development needs of the villages falling within the Periphery as well as with a view to cater to their increasing population, it would be prudent to provide to provide a sufficiently compact and contiguous belt of land around the village "phirni" for ensuring the organic growth of these villages.
- Allow village 'Abadi' areas to increase by 60%, subject to a minimum of 50m and a maximum of 100m in a radial length of the 'phirni'.
- Preparation of Rural Master Plan for these villages on the pattern of Rural master plan prepared for Delhi.



LEGEND

- CORE AREA
- BULK MARKET
- DRY PORT
- MIXED LAND USE
- LIG HOUSING
- CANTONMENT
- ECONOMIC ZONE
- URBANISABLE ZONE
- STONE CRSHERS ZONE
- PROTECTED FOREST
- RECREATIONAL ZONE
- RESERVED FOREST
- AGRICULTURAL BELT
- BRICK KILNS

MAP NO. 7.2

PROPOSED LAND USE PLAN - PERIPHERYOF CHANDIGARH

NOT TO SCALE

N

PREPARED BY:

JASKIRAT KAUR
M.U.R.P. II

4. Housing Schemes in the periphery

- Private housing schemes to be allowed. Off-site infrastructure by the public authorities and on-site infrastructure to be provided by the private developers.
- Incentives to be given to encourage amalgamation of plots by individual plot owners in the form of higher FSI.
- Independent townships on a minimum land parcel of 500 acres to be permitted. The private developers would be required to provide on-site infrastructure while the CMDA would provide the on-site infrastructure.
- 10% of the net developable area to be earmarked for the low -income housing which can either be predetermined by developer and sold at predetermined price or transferred to the development authority for the same.
- At present there is a shortage of 0.02 million housing stock in the Chandigarh. This number will increase to 0.03 million by the year 2011. Urbanisable zones have been demarcated in the proposed plan.

Minimum Area and development Norms

Building Type	**Minimum Size(acres)**	**Floor area**	**Ground coverage**	**No. of stories**	**Height. (ft)**
Farm Houses	2.5	4%	2%	2	Single: 18 Double: 28
Institutions	5	30%	15%	3	38
Recreational Facilities	10	5%	3%	2	28
Sports activities	10	2%	1%	2	28

CHAPTER- VIII: BIBLIOGRAPHY

BOOKS

1. Hall, Peter, **Cities of Tomorrow** – third edition, Blackwell Publishing.
2. Lal, H. , **City And Urban Fringe (A case study of Bareily),** Concept Publishing Company, New Delhi.
3. Yadav, C.S. , **Rural Urban Fringe, Perspectives In Urban Geography**, vol. 9, concept publishing, New Delhi.
4. Kalia, Ravi, **Chandigarh- The Making of an Indian City**, Oxford Universitry Press, Delhi.
5. Bagha, Surendra, **Le Corbusier And Perrie Jeanerette** ,
6. Macfadyen, Dugald, Hists, F.S. , **Sir Ebenezer Howard And The Town Planning Movement,** the M.I.T. Press, Cambridge, Massachusetts.
7. Thakkar, Jaspreet, **Celebrating Chandigarh,** Oxford university Press

JOURNALS

8. Tayal, Shobhit. , Sharma, Utpal., **Peri-Urban Development : Alternative Models For Ahmedabad**, cover theme article, Spatio-Economic Development Record, 9.5 Sep-Oct 2002.
9. Parkhi, Sandeep, ***The Concept Of Urban Fringe And The Basis For Delineation: Case Study Pune City***, Spatio-Economic Development Record, vol. 10 No.5 Sept- Oct 2003.
10. Mahesh, T.M. , **Social Change In An Urban Village: Case Study Of Kumbarakoppal In Mysore City**, Spatio-Economic Development Record, vol. 6 No.4 July-August, 1999.
11. Singh, **National Capital Region**, Spatio-Economic Development Record, 9.3 May-June, 2003.
12. Whitehand, J.W.R., Morton, N.J., **Urban Morphology And Planning: The Case Of Fringe Belts**, Cities,vol.21, 2004.
13. Hara, Y., Takeuchi K., Okubo, S., **Urbanization Linked With Past Agricultural Landuse Patterns In The Urban Fringe Of A Deltaic Asian**

Mega-City: A Case Study In Bangkok, Landscape and urban planning 73 (2005) 16-28.

14. Aguilar, A.G., Ward, P.M. , **Globalization, Regional Development, And Mega-City Expansion In Latin America: Analyzing Mexico City's Peri-Urban Hinterland**, Cities, vol.20, No.1, 2003.
15. Ryan, R.L. , **Comparing The Attitudes Of Local Residents, Planners, And Developers About Preserving Rural Character In New England**, landscape and Urban Planning, Oct 2005.
16. Mubarak, Faisal A., **Urban Growth Boundary Policy And Residential Suburbanization: Riyadh, Saudi Arabia,** Habitat International, vol. 28, Oct 2004.
17. Hudson, John, **Boundaries And Conservation**, structural survey, vol. 18. no. 5, 2000, MCB University Press.
18. Portnov, B.A. , Pearlmutter David, **Sustainable Urban Growth In Peripheral Areas**, Progress in planning, vol. 52, 1999.
19. Crruthers J.I , **Growth At The Fringe: The Influence Of Political Fragmentation In The United States Metropolitan Areas**, Regional Science,82, 2003.
20. William C. Sullivan, Olin M. Anderson, Sarah Taylor Lovell, **Agricultural buffers at the rural–urban fringe: an examination of approval by farmers, residents, and academics in the Midwestern United States,** Landscape and Urban Planning 69 (2004) 299–313.
21. H. Romero*, M. Ihl, A. Rivera, P. Zalazar, P. Azocar, **Rapid urban growth, land-use changes and air pollution in Santiago, Chile,** Atmospheric Environment 33 (1999) 40394047.
22. **Punjab New Capital (periphery) Control Act, 1952**, Government of Punjab.
23. Singh, Sarup, **The Punjab Regional And Town Planning and Development Act, 1995- A critical review**, Institute of town Planners, India, vol.14 no.1&2, sept-dec1995.

UNPUBLISHED THESIS

24. Sikka, Anu, **Planning Strategies for the Private colonies in the Punjab portion of Chandigarh Periphery**, GNDU,Amritsar
25. **Planning for the urban fringe of Pune**, School of Planning and Architecture, New Delhi.
26. Kashyap, Divya, **Growth Strategy for Chandigarh Complex**, School of Planning and Architecture, New Delhi.
27. Gupta, Suman, **The Punjab New Capital (Periphery) Control Act, 1952- Myth and Reality**, GNDU, Amirtsar.
28. Kaushal, Mona, **Changing pattern in interstate Chandigarh**, Deptt of regional Planning, School of Planning and Architecture, New Delhi.
29. Bedi, Prabh, **Changing Land use and development implications in rural settlements along Ambala-Chandigarh highway, Case study: Dera Bassi block**, School of Planning and Architecture, New Delhi.

WEBSITES

30. www.chandigarh.nic.in/
31. www.chandigarhcity.com
32. www.tribuneindia.com
33. www.chandigarh.org/
34. www.mapsofindia.com/maps/chandigarh
35. www.citcochandigarh.com
36. www.lovechandigarh.com
37. www.cperspectives.org/
38. www.cca.nic.in/
39. www.googleearth.com
40. www.cambridgecity.com
41. www.welywn.com

ANNEXURE I

SURVEY FORMAT

This survey was conducted in lieu of the requirements for the dissertation 'Planning strategies for the Periphery of Chandigarh', Department of Architecture & Planning, Indian Institute of Technology, Roorkee, Roorkee.

Survey Performa

Household Information

1. Name: .....
2. Age :.....
3. Address: .....
4. Age:..... 5. Gender: .....
6. Number of Family members: .....
7. **Occupation**:

a) Service b) Buisness

c) Professional d) Other

8. **Family Income:**

a) Less than Rs. 10000/month

b) Rs.10000-Rs. 20000/month

c) <ore than Rs. 20000/month

9. Area of Plot: .....
10. Cost of Plot when purchased.....
11. Present cost:.....

Migration Information:

12. **Place from where migrated**

a) Chandigarh b) Villages in the Periphery

c) SAS Nagar/ Panchkula d) Other places

13.**Reason for migration:**

a) Higher Amenities b) Lower land Prices

c) Nearness to work Place d) Other reasons

14. Time since residing here.....

15. Work Place

a) Chandigarh b) Kharar/ Zirakpur

c)Panchkula/SAS Nagar d) Other areas in Periphery

16.Mode of transport: Public transport/ 2W/ Cycle/ Car

a) Cycle b) Two-wheeler c) Car

d) Public transport Buses e) Other modes

Physical Infrastructure

17. Source of Water Supply

a) Municipal Council –tap b) Submersible Pump

c) Well/Tube well d) Other

18. Sewerage

a) Municipal b) Septic tank c) Other

Social Infrastructure

19. Places of Recreation:.....

20. Shopping: .....

21. Level of satisfaction .....

22.Suggestions, if any .....

ANNEXURE II

THE PUNJAB NEW CAPITAL (PERIPHERY) CONTROL ACT, 1952.

The Punjab New Capital (periphery) Control Act, 1952 was enacted to achieve the following objectives:

- To control and regulate the periphery of the new capital.
- To ensure healthy and planned development of the new city.
- To prevent the growth of slums and to eliminate the chance of any haphazard and unplanned development in the periphery.
- To freeze the land use in the peripheral area and to retain its basic character.
- To stop conversion of land use into uses other than agriculture or subservient to agriculture.
- To provide ample area free from all encumbrances for further growth, development and expansion of the new city.
- To identify the area which will cater to the basic and day to day needs of agriculture, dairy, poultry and other products of the capital city.
- To clearly demarcate the functions of the capital city and its periphery for evolving harmonious relationship between the two.

The main provisions of the Act for controlling and regulating the periphery of city are as follows:

- A plan showing area declared to be controlled area along with the nature of restrictions applicable in the area is to be prepared and published under section 4.
- Subject to the provisions and restrictions provided in the controlled area plan, every person would require prior approval of the Deputy Commissioner under section 5 for the following:
    - To erect or re-erect a building.
    - To make or extend any excavation.
    - To layout any means of access to a road.
- One would have to approach Deputy Commissioner under section 6 for permission who may or may not grant permission subject to certain

conditions. Conditions imposed should be reasonable and in the interest of general public.

- The govt. has given power and authority under section 10 to acquire land or to impose restrictions upon the use and development of land falling in the controlled area under any other law operative in the state.
- Section 12 lays down the penalties for offenses committed by any person who unauthorizedly constructs buildings, changes its use, violates the provisions of controlled area plan, or conditions imposed while granting sanctions, the penalty may be imprisonment for 2 years and a maximum fine of Rs. 5,000.
- However, following operations have been exempted from the provisions of the act under section 15.
    - Construction of any building for residential purpose or for *purposes subservient to agriculture in the abadi area of the* village as defined in the revenue records.
    - Erection or re-erection of a place of worship or a wall enclosing a graveyard on a land which existed as such on the date of notification.
    - Digging of wells made in the ordinary course of agricultural operations
    - The construction of unmetalled road for providing access to the land exclusively agricultural purpose.
- Section 16 vests the powers with the state govt. to make rules for effectively carrying out the provisions of the Act.

1.6 THE PUNJAB REGULATION OF COLONIES ACT, 1975

With the increasing pressure of development, the rampant growth of unauthorized colonies had become inevitable. The legal solution of this problem has been found out in a different approach wherein the role of private sector is duly identified. The private developers or colonizers, under this Act, may obtain a license from the competent authority (Director Housing and Urban Estates) for the development of colonies according to the approved plans.

However this approach could not be practiced successfully due to the cumbersome procedures and restrictions laid out for obtaining license for setting up of colonies in a planned manner. Rather setting up of unauthorized colonies has continued unabated to accentuate the problems in municipal areas.

1.7 PUNJAB APARTMENT AND PROPERTY REGULATION ACT, 1995

There exists necessary legislation under which the private colonies are coming up i.e. Punjab Apartment and Property Regulation Act, 1995. This Act comes as a replacement of Punjab Regulation of Colonies Act, 1975. It enlarges its scope to cover regulation of apartment buildings and certain changes in the provision of older Act of 1975.

It is an Act to regulate the promotion of construction, sale, transfer, and management of apartments on ownership basis, to regulate colonies and property transactions and to provide for registration of promoters and estate agents and enforcement of obligations on promoters and estate agents and for matters concerned therewith.

1.8 THE PUNJAB REGIONAL AND TOWN PLANNING AND DEVELOPMENT ACT, 1995

An Act to make provisions for better planning and regulating the development and use of land in planning areas delineated for the purpose for preparation of regional plan, master plan and their implementation thereof. Under this act the constitution of state urban planning and development board and authority is there for effective and planned development.

In keeping with the current economic thinking Punjab Urban Development Authority has taken major steps to promote private participation in urban development.