PLANNING STRATEGIES FOR THE DEVELOPMENT OF URBAN FRINGE: PUNE CITY

A DISSERTATION

Submitted in partial fulfillment of the requirements for the award of the degree of

MASTER OF URBAN AND RURAL PLANNING

By

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CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the dissertation entitled **'PLANNING STRATEGIES FOR THE DEVELOPMENT OF URBAN FRINGE: PUNE CITY'** in partial fulfillment of the requirement for the award of the degree of **MASTER OF URBAN AND RURAL PLANNING** submitted in the Department of Architecture and Planning of the institute is an authentic record of own work carried out during the period from August 2005 to May 2006 under the supervision of Dr. Ashutosh Joshi & Dr. Nalini Singh.

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

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

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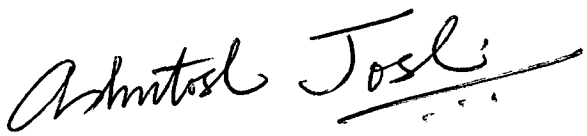

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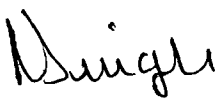

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GLOSSARY OF TERMS

1. *Kasaba* – A predominant historic residential area in the core of city having heritage and cultural values, used to be previously fortified
2. *Wada* – a term used for Maharashtrian traditional residential dwelling unit, central or *chowk* is the main feature of this unit
3. *Peth* – coherent to a ward, established during Peshwa rule, and envisaged certain specific economic activities
4. *Nala* – it is usually a small tributary of perennial nature, meeting a larger catchments area, comprised mainly of surface water drains
5. *Gaothan* – a boundary demarcated in the development plan for reference as established by British, predominantly forms the older parts of a city displaying a mixed land use
6. *Budruk* – a smaller village near a water body adjacent to the main village
7. *Khurd* – a bigger village away from river – the village actual
8. PMR – Pune metropolitan Region
9. PMC – Pune Municipal Corporation
10. PCMC – Pimpri-Chinchwad Municipal Corporation
11. TP and VD – Town Planning & Valuation Department
12. MRTP Act 1966- Maharashtra Regional and Town Planning Act, 1966
13. UA – Urban Agriculture
14. AMC – Ahmedabad Municipal Corporation
15. AUDA – Ahmedabad Urban Development Authority
16. AUA – Ahmedabad Urban Area

CHAPTER I

INTRODUCTION

1.1 Process of Urbanization

Many problems in today's world are basically associated with rapid urbanization. It is not urbanization alone that raises problems, but the question is how, where, and in what form the population can be housed. Urbanization is a many-faced phenomenon and being the cause of socio-economic developments has functional and spatial dimensions. This process is characterized by mass urban influx as a result of which cities are growing at a much faster rate than its surrounding. The generation of complex interplay of markets, interdependency of functions and need for proximity to one another result in concentration. An increasing proportion of growing population migrates from one place to another in search of better prospects. The demand for space increases and the need for larger urban centers is felt. Thus, we see that the world's population is urbanizing at an alarming rate. **With this process, the importance of urban land increases rapidly.**

1.1.1 Overview Of Urbanization In Developing Countries

The regions of the developing world differ markedly in the degree of urbanization achieved over the years. At one end nearly 3/4th of population of Latin America and the Caribbean live in urban areas. At the other end, 2/3rd or more of the population remain rural in China, India, Indonesia and sub-Saharan Africa.[1] (See Fig. 1.1)

[1] Article by Arabi U., 'THE PROCESS OF URBANIZATION AND CHALLENGES IN MANAGEMENT OF URBAN AREAS OF INDIA', ***NAGARLOK***, volume XXXVII, No. 2, April-June, 2005

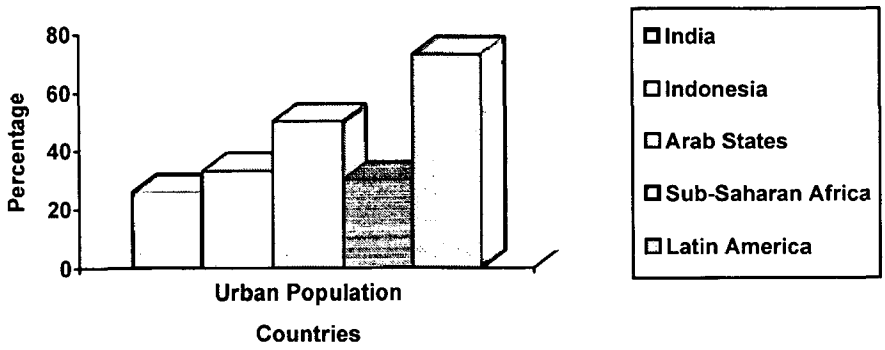

Fig 1.1: Graph showing percentage of urban population in developing countries

Country/Region	Annual Population Growth Rates (Per cent)		Urban Population (% Of total population)		Urban Population Annual (Growth Rates Per cent)	
	1960-92	1992-2000	1960	1992	1960-62	1992-2000
China	1.9	1.0	19	28	3.1	3.8
India	2.2	1.8	18	26	3.4	3.0
Indonesia	2.1	1.5	15	33	4.7	4.3
Arab States	2.6	2.9	30	50	4.5	3.5
Sub-Saharan Africa	2.8	2.9	15	30	5.0	4.5
Latin America and the Caribbean	2.4	1.8	50	73	3.6	2.4
Developing Countries	2.3	1.8	22	36	3.8	3.2
World	1.9	1.5	34	44	2.7	2.6

Table 1.1: Scenario of urbanization in developing countries

*Source: Article by Arabi U., 'THE PROCESS OF URBANIZATION AND CHALLENGES IN MANAGEMENT OF URBAN AREAS OF INDIA', **NAGARLOK**, volume XXXVII, No. 2, April-June, 2005*

1.1.2 Overview Of Urbanization In India

Contrary to popular concepts of a predominantly rural India, an increasingly larger percentage of Indian population lives in the urban areas. Today, India's urban population is second largest in the world after China, and is higher than the total urban population of all countries put together barring China, USA and Russia. Over the last fifty years, while the country's population has grown by 2.5 times, in the urban areas it has grown by five times. It is estimated that by the turn of the millennium 305 million Indians shall be living in nearly 3,700 towns and cities spread across the length and breadth of the country. This would be nearly 30 per cent of country's total population. The total population in India

increase from 361 million in 1951 to 1027 million in 2001, the urban population increased from 62 million to 285 million during period indicating 17.3% in 1951 to 27.8% in 2001. (Census of India 2001). (See Fig. 1.2)

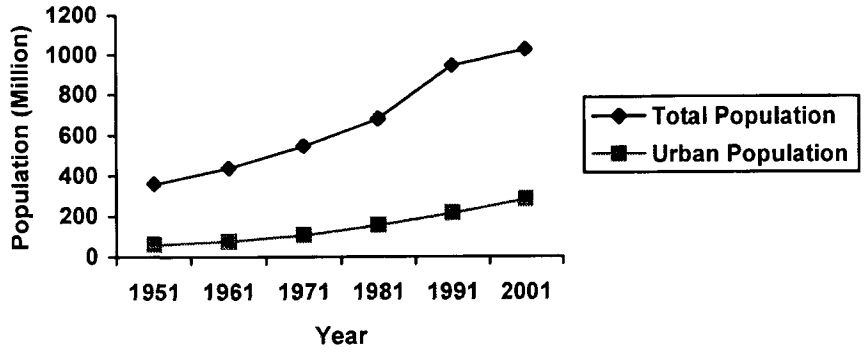

Fig 1.2: Scenario of urbanization in India
Source: Census of India 2001

Year	Total Population (Million)	Urban Population (Million)	Percentage of Urban to total Population
1951	361.1	62.4	17.3
1961	439.2	78.9	18.0
1971	548.2	109.1	19.9
1981	683.3	159.5	23.3
1991	946.3	217.9	25.7
2001	1027.0	285.4	27.8

Table 1.2: Scenario of urbanization in India
Source: Census of India 2001

It is interesting to note that the population growth is more in cities that are big i.e. metropolitan cities. About one-third of Urban India (71 million) lives in metropolitan cities (million plus). The number of such cities in India has increased from 1 in 1901 to 5 in 1951 to 23 in 1991. Out of the total increase in the country's urban population of 58 million between 1981 and 1991, 44 million were added to Class I cities alone. 28 million persons were added in metropolitan cities.

One of the most important aspects associated with continuous urban sprawl is rural – urban interaction. In the process of urban expansion the adjoining areas are being

constantly engulfed into urban landscape. Villages lying in the immediate vicinity of cities gradually acquire urban characters. This peripheral area potential for urban growth, known as rural-urban fringe have grown around all Indian cities and has assumed a vital significance for the planning of cities in future. The villages of the fringe today are likely to become an integral part of the city tomorrow. However, the rural-urban fringe area of cities express certain typical characteristics pertaining to economic base and social set up, increase in commuting population and conversion from agricultural to non-agricultural land uses.

1.2 Need Of The Study

With the process of mass urban influx, urban population increases rapidly. This population requires space, facilities and services to satisfy the basic needs. In the absence of any land use policy, fringe areas grow haphazardly. Urban fringe is always considered as planner's last frontier. Generally in urban areas land transformations are highlighted within the city only, but what is actually happening is the alarming rate at which land is getting transformed in rural areas due to unregulated urban sprawl. So this haphazard development at the peripheries of metropolitan cities has become new problem for planners to tackle.

An important characteristic of fringe area is that they are neither purely rural nor purely urban. Urban influences change their outlook, way of living, occupational structure but it does not shed their rural character completely as there is lack of services and facilities. An unplanned fringe eventually submits to population and land pressure.

Though there has been an increasing awareness about the protective measures as against reactive means for the achievements of regulated fringe growth, there has not been a satisfactory concrete solution achieved in this direction. In the absence of any urban planning policy, the city grows in an unregulated and haphazard manner. As a result the fringe agricultural land gets converted into urban uses. This is a natural economic response to increasing demand for the land in the growing urban economy. So forming land use policies become quite necessary in order to allocate and distribute resources.

The city of Pune and its fringe areas are no exception from the above-discussed phenomenon. A statistics as per Census 2001 shows that Pune lies in third position in the

state by level of Urbanization (58.07%) after Mumbai. This city is thus also going rapidly under urbanization, expanding its boundaries from urban areas to rural lands, besides it is located in the second most urbanized states in India. In such a situation it is quite predictable that the city shall face the problems stated above over the period of time due to spatial spread of the city, if steps are not taken at the initial stages of fringe development. Till date any Policy, Act or guidelines for the planning of the fringe area of city have not yet been formulated by any of the administrative bodies in Pune. With due consideration to the above stated facts it is absolutely essential to study the existing situation in the urban fringe of Pune.

1.3 Aim, Objectives, Scope And Limitations

1.3.1 Aim

To evolve a planning strategy for development and management of fringe areas of Pune City

1.3.2 Objectives

1. To study the concept of fringe and its development in Indian and Western context
2. To study the stage wise fringe development of Pune City
3. Analyze the fringe of Pune City with respect to land use changes, institutional setup and infrastructure facilities.
4. Evolve a strategy for fringe management of Pune City.

1.3.3 Scope and Limitations

The study will be limited to only key variables of change like land use change, institutional set up, infrastructure facilities, affecting selected case study villages enabling conclusions to be drawn for diagnosing the interactions and impact.

Out of total 36 villages in fringe area of Pune approximately 4 will be selected for detail study.

1.3.4 Data Collection

1. Secondary data will be collected from the various departments related to the administration at local level in Pune, such as Pune Municipal Corporation-PMC, Town Planning and Valuation Department-TP&VD, various government offices and libraries.

2. Primary survey will be done in the form of

- Household surveys in selected villages out of 36 villages in the urban fringe of Pune.
- Interviews with officials, architects, developers, planners etc.
- Observations, on site notes, photographs etc.

1.4 Methodology

1. To study the available literature on urban fringe, concept of urban fringe and various case studies in the western context.
2. To identify fringe characteristics through visual surveys, primary surveys and studying the data available from town planning department, GIS plans etc.
3. To analyze the data and subsequently represent it in plan preparation.
4. Finally to conclude by evolving a policy framework for management of fringe areas of Pune City.

(Refer Figure 1.3)

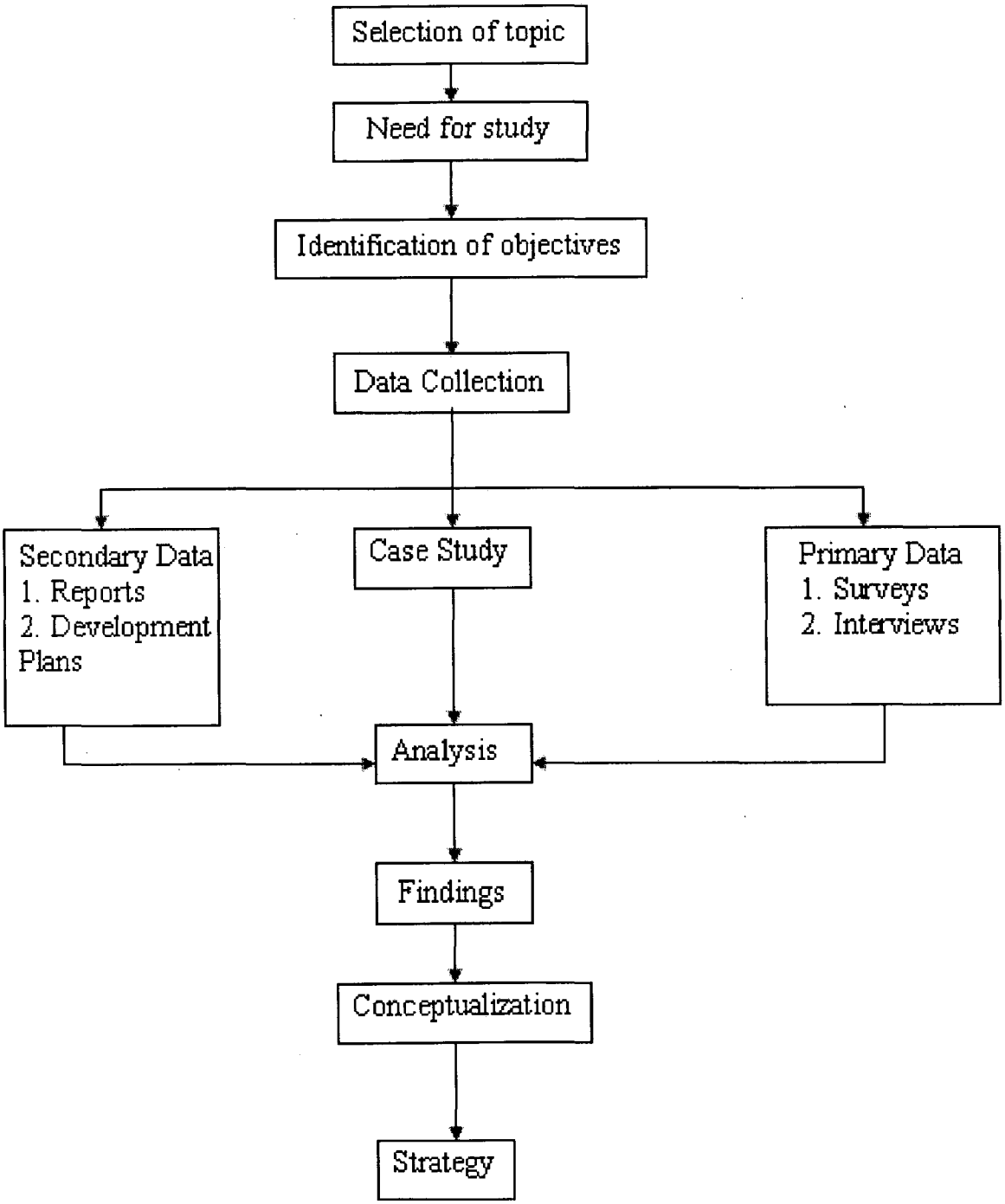

Fig 1.3: Methodology

CHAPTER II

UNDERSTANDING URBAN FRINGE

2.1 Dynamics of Urban Growth and Urban Fringe

The urban fringe is defined as the land surrounding the town which is not considered as a part of it but whose use is influenced directly by the town. The fringe is characterized by the "extension of housing estates, of buildings along the main arterial roads, and by the location of new factories...water works, cemeteries... and the like".[2] (See Fig. 2.1, 2.2)

Historically the trend of fringe development has been characterized by different secondary causes or impulses. The main cause or impulse however has been the same, viz., and rapid growth of the core city. In the U.S. for example motor transportation, more than anything else seems to have induced the expansion of cities to the outlying rural areas. The private automobile and the insatiable thirst of the city for space resulted in the development of residential areas along highways in the fringe area. In other instances the cheapness of land, absence of land use restrictions, etc. set a trend to shift city-based industries to the fringe. Besides, legal and institutional factors have invariably led to the location of certain land uses like slaughter houses, oil-storage depots, noxious industries, etc. in the fringe areas. At times, the recreational needs of the city such as parks and playgrounds, and city utilities such as water works, sewage plants, airports and cemeteries have led to fringe development.

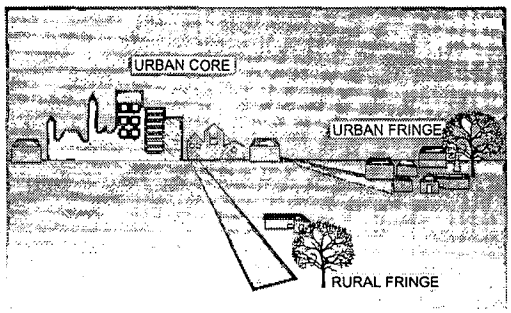

Fig 2.1: Concept of Fringe

[2] K.N.Gopi, Process ***Of Urban Fringe Development: A Model published*** in 1978

2.2 The Concept of Urban Fringe and Related Terminologies

Following are the terms related to urban fringe:

a. Urban Area

In India the standard urban areas were first defined by the Census in 1971, which defines an urban area or town as,

All places with a municipality, municipal corporation, cantonment board, or notified town area committee, etc. irrespective of their population, size, density of population or livelihood pattern.

All other places which satisfy the following criteria-

- A minimum population of 5000 persons
- At least 75% of male working population engaged in non-agricultural pursuits and,
- A density of population of at least 400 persons per sq.km.

The same criteria for urban area are followed till date in India

b. Rural Area

In India major part of population lives in rural areas. As per Census 2001, 72% of population is rural. The population in rural areas is more or less stable in terms of its growth. The word commonly denotes countryside or villages. The Oxford dictionary defines "rural' as living in country having standing qualities or measures of peasants or country folk engaged in agriculture, etc. Rural settlements denote the economic condition of the region – the smallest administrative countryside unit.

Census of India defines village or the rural settlement synonymous to *mouza* i.e. parcel of land mostly a cultivated land whose boundaries are delineated by revenue survey. All areas, which are not urban, are rural areas by definition as per Census of India. The basic unit for rural area is revenue village, which has definite surveyed boundaries.

c. Fringe

The term fringe suggests a border, which lies at periphery of urban areas. It is the annular belt- physically undefined, adjoining the city or town, which is mostly a mix of urban and rural characteristics. It is therefore an area of transition between well recognized urban land uses i.e. the main city and the area devoted to agriculture.

These areas may be defined as transitional zones where a city or town is expected to expand in future and which generally share some rural as well as urban characteristics. In

other words, these areas lie formally outside the legal limits of the city on one hand and have strong functional, social and economic linkages with the main urban settlements on the other hand. The important phenomenon in the fringe area is the conversion of land from rural agricultural to urban residential and industrial uses.

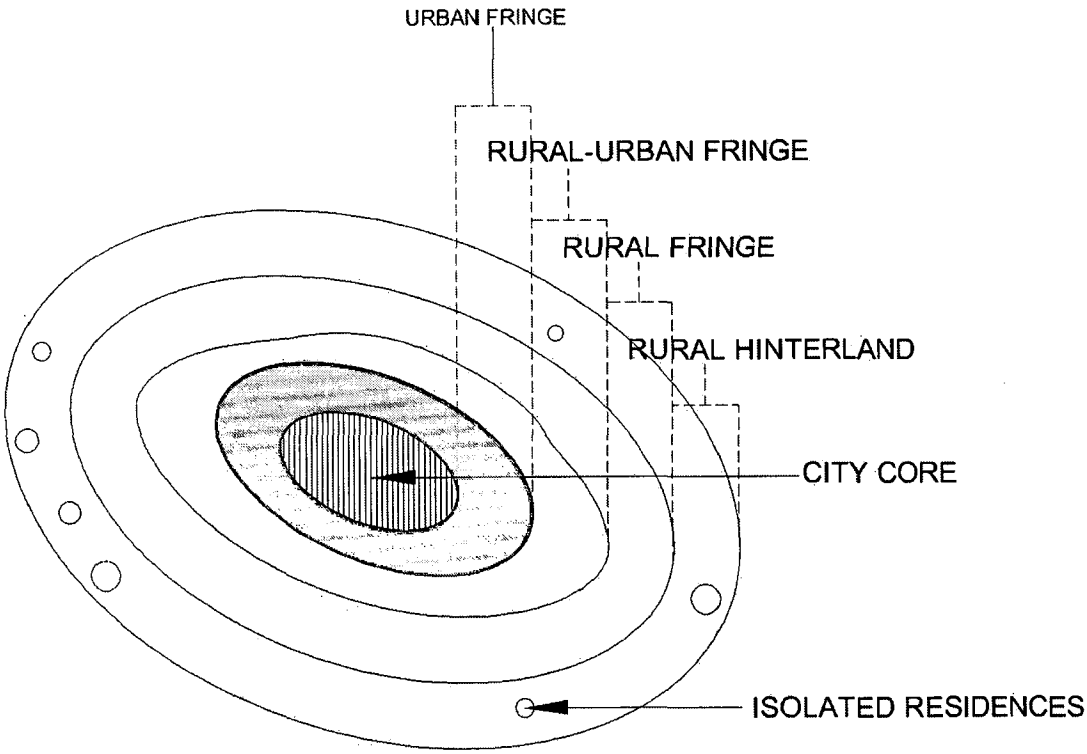

Fig 2.2: Concept of Fringe
Source: Redrawn by author from article by, Sandeep Parkhee, Spacio Economic Development Record

According to Encyclopedia Dictionary of Urban Terms definition of urban fringe is "The term fringe suggests a borderline case between the rural and the urban, and actually lies on the periphery of urban areas, surrounding it and distinguishing it from the truly rural countryside. Fringe is also described as the rural land with urban phenomena."

Spiro Kostof has described urban fringe as the extramural zone containing a collection of heterogeneous land uses, and displaying a large scale low density building pattern that contrasts with the thickly woven fabric of the core. Over the period of time, the city may incorporate and leapfrog over its first fringe belt, alter some of its characters with as overlay of residential development, and give rise to a new fringe belt further outwards.

Smith T.L., (1937) introduced this term as the built up area outside municipal limits as urban fringe. Andrews R. (1942) defined urban fringe as adjacent peripheral zone of characteristically agricultural land use. It is the actively expanding sector of the compactly growing city.

Dickson R.E. (1967) understands it as a rural area into which residential development is intruding and new industrial site and other urban uses are in process of development along main lines of communication. Urban fringe is the space into which the town extends as process of dispersion operates.

Pryor R.J. (1968), defined fringe as an area of transition where rural land uses are giving way to urban land uses. Further he described that urban fringe exhibits a density of occupied dwelling higher than medium density of total fringe area, having a higher rate of increase in population density, land use conversion and commuting.

2.3 Urban Fringe as per Various Legislations in India

In India, the Urban Land Ceiling and Regulation Act, 1976 has given a concept of peripheral areas specified around a city. It applies to the whole of the Andhra Pradesh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Orissa, Punjab, Tripura, Uttar Pradesh and West Bengal and to all the Union Territories.

In this act the term 'urban agglomeration' is used, which has included the peripheral area of the urban centers as a part of the total urban agglomeration. In this case the peripheral area notified either by State or Central Government as part of urban agglomeration with population more than one lakh is stipulated as one kilometer around a city. This peripheral area is co-terminus with the term urban fringe.

The Census of India 1961 gave the concept of urban agglomeration, which includes a continuous urban spread and normally consists of a town and its adjoining urban outgrowths. The term outgrowth is used to describe those areas, which are around a city

core, fairly urbanized, and lying within the revenue limits. This term is co-terminus with the term urban fringe and is still continued in the country till date.

2.4 Stages In The Evolution Of A Metropolitan Fringe

Stage	Economic Activity	Morphology	Social System
III Suburb	Agriculture is not an important economic activity	Urban morphological features are dominant and settlement loses its rural character	Becomes part of the larger urban society
	Tertiary and Secondary activities important for employment		
	Distinct urban land use pattern		
	Complete economic integration with the city		
II Urbanised Village	Capital intensive and market oriented agriculture, part time farming	Modern R.C.C. structures like factory and residential buildings and business premises etc.	Rapid increase in population for rented dwelling
	Increasing non-agricultural jobs and establishment of industrial units	Better transport and communication facilities with the city	Heterogenous population due to in migration
	Commuting to & from the city		Social change due to increased contacts with the city and migrants
			Literacy rate increases, and social seggregation loses its strength
I Urbanising Village	Agriculture-dominant economic activity with products like vegetables, flowers etc.	Buildings with indegenous mud-walls and brick walls and clustered huts together	Hierarchically organised caste based social system
	Negligible non-agricultural jobs within the village	Segregation of residential areas by caste	Conservative social values and social segregation
	Villagers take up unskilled jobs in the city	No laid-out drainage	Culturally homogenous population with extremely low literacy

Table 2.1: stages in the evolution of a metropolitan fringe
Source: K.N.Gopi, Process Of Urban Fringe Development: A Model published in 1978

2.5 Characteristics of urban fringe

Characteristics of urban fringe can be described as

1. The peri urban belt or the rural-urban fringe is the area of mixed land use and diverse economic activities immediately adjacent to the city, with the characteristics of both the rural and the urban.
2. It has strong interactions with the city in terms of daily commuting and exchange of goods and services
3. Peri urban areas display a strong metropolitan/urban influence on its physical, occupational and demographic structure.

4. Usually located outside the municipal corporation limits, it is a zone of transition at the edge of the city where because of urban growth pressures from the city there is a continuous intrusion of urban development in rural areas (both in the agricultural lands, as well as the habitats).
5. The uncertainties in the peri urban areas caused mainly by the lack of urban services, a not so well developed landuse and an indefinite employment pattern.
6. However, these areas are highly dynamic and if monitored well, can grow into efficient and attractive suburban zone.

The uncertainties in the peri urban areas caused mainly by the lack of urban services, a not so well developed landuse and an indefinite employment pattern. However, these areas are highly dynamic and if monitored well, can grow into efficient and attractive suburban zone. Unfortunately, the peri urban areas of Indian cities are often chaotic, as agricultural land is not systematically converted into urban land. Frequently, agricultural land along the city limits is left fallow for speculation. Experience shows that when agricultural land is not cultivated for a long time, it contracts all the ills of urban pollution. To add to it, the misuse of landuse like setting up of brick kilns for construction and more development, or the motor repair centers, or siting small-scale industries using toxic chemicals along the city's periphery, makes it unfit for agriculture. Subsequently, as population increases and land values rise because of greater demands, this land is drawn into the city limits as "urbanisable", so that the city can expand beyond its physical limits to accommodate more people and activities. It has been observed that farmers hold on to peripheral agricultural land until the price of the land becomes more than the income from agricultural productivity, after which it is sold for urban use.

The growth and extent of peri urban areas depend on the rate of urban growth and the size of the city. The more the pressure of population, the greater is the need for city expansion and infrastructure development, and the faster is the fringe area formation. Conversion of rural land to urban is usually influenced by scarcity of serviced land, high land values within the city limits, speculative land and/or the housing market, lower land values on the fringes, and the absence of building regulations outside the city limits of which people take advantage. Being outside the city's administrative area, physical planning is not extended to the peri urban zone. Therefore, the growth of any peri urban

area is haphazard, until such time till it is drawn into city's jurisdiction and provided the support of planned development, giving way to new peri urban formations. However, in Development plans, peri urban areas are often designated for special activities.

The rural-urban fringe is a concept that has emerged with the advent of the motor vehicles. In the olden times, city limits were clearly defined by walls, moats or other protective structures. The fringe areas in those days were outside the city walls. Today not only have these physical barriers been removed, the invention of the motor vehicle and the rapid transit system have made the rural-urban fringe a common feature of urban growth. The transformation, however, is gradual, with a distance decay function, displaying more urban developments closer to the city than farther away. As a demand on the land by a large population is more than those by a small population, metropolitan cities not only have larger peri urban belts around them, but these belts also have diverse activities therein. The range of activities depends on two factors – the increase in the communication facilities/skills and the size of the population. For, the larger the population, the more varied are the activities; and the more efficient the communication facilities, the farther can urban activities travel.

The pre-dominant features of the rural-urban fringe are the presence of industries, landfill sites for solid wastes that pollute the city, cremation grounds, cemetery and/or activities that are socially morbid, activities that require plenty of space such as the airports, railway sidings/yards, warehouses, suburban high income housing and/or resettlement colonies of the low income population of the city. Along with all such urban features can be found plots of agricultural land and clusters of farmhouses of the agriculture labour that ultimately deteriorate into slums.

In a developing country like India, housing on the peri urban areas focuses on the two extreme requirements: the shelter needs of the priced-out population of the city, and/or expensive farmhouses that take advantage of the cheap land available in the city's periphery, along with an efficient commuting system in order to interact with the city centre. In city fringes, where the landuse pattern is systematically laid out, industrial townships to house workers close to their place of work can also be found adjacent to the industries located in the city's periphery.

2.6 Driving forces behind urban fringe development

Although the development of urban fringe goes with urban growth, but the driving forces underlying its development are different from those of urban growth.

In general the forces are summarized in two traditional terms:

A. Centrifugal forces

B. Centripetal forces

A. Centrifugal forces

Two main types of centrifugal forces are there

1. The withdrawal of agricultural land uses and the entry of urban ones
2. On the other hand, there are also many urban land users who are not able to operate in more central locations. Such centrifugal land uses include lorry-oriented factories, noisy, smelly or dangerous industries, but also recreation facilities and home seekers.

B. Centripetal forces

This type referred to that types of rural land use that are attracted most to the urban fringe include market gardening and intensive horticulture, but also horse-ridding schools, dog kennels and piggeries. The pressure from such types of rural land use constitutes what could be called centripetal forces in the urban fringe.

CHAPTER III

CASE STUDIES

3.1 Urban Fringe In Asian Countries

A particular example of China is taken, as the increasing population of the country makes the urban fringe scenario interesting.

3.1.1 Chinese Urban Fringe

In the past 20 years, China has experienced a tremendous economic growth. This growth does not only express in terms of increase in urban population but also in terms of physical expansion of urban areas. This expansion indicates transformation of agricultural land to urban uses including residential, industrial and infrastructure development. This process of change is most obvious in the vicinity of urban areas. Urban zones are not only attracting rural population because of employment opportunities, but also influence socio-economic activities in the zone surrounding them. Because of these influences not only change in occupation structure occurs, but shift in land use takes place. Thus urban fringe, transitional area, with diverse land uses comes forth.

Unfortunately coinciding with the rapid development of this transition area, a lot of socio-economic problems emerge (e.g. land use fractal, infrastructure services lagging, unauthorized buildings, environment deteriorating....). In this sense, urban fringe is a so-called "problem area".

3.1.2 Characteristics of Chinese urban fringe

Chinese urban fringe is a more complicated area comparing with western countries. It has its own characteristics. According to some Chinese researchers' results, the characteristics of Chinese urban fringe are often classified as below.

Sr. No.	Characteristic	Description
1.	Population	a. Population density of fringe area is intervenient between urban's and rural's. b. Composition of population is complex. Different cultural and

		professional backgrounds flow into this area. c. Fringe area is mainly populated by low income residents, recently arrived from other rural areas, engaged in informal activities. d. Rural population has higher percentage. e. Rapid growth of population is remarkable in fringe area.
2.	Administration	a. Development of urban fringe covers several administrative boundaries. b. Management is poor
3.	Social	a. Socio-economic class distinctions and conflicts over land and labour are found b. Most of villages have dual occupation: peasants and workers c. Average literacy level in these areas is not lower, even higher in some cases than urban areas d. As management in these areas is far from effective, it becomes a vacuum area or breeding ground for crime ridden activities.
4.	Economic	a. Cropping vegetables and feeding cattle contribute more to fringe's agriculture b. For most large cities urban fringes are their main food supply zones c. The form of economic structure evolves very quickly in these areas and brings along development of rural areas d. Knowledge concentrated industries and labour concentrated industries coexist in fringe areas
5.	Ecology landscape	a. Fringe landscape is composite of urban and rural landscape. b. Large cities prefer to deposit their garbage on the fringe area c. Pollution is more and environment is deteriorating rapidly
6.	Land use	a. Many land uses can be seen and also there are transitional forms of land uses b. Land use pattern is complex and dynamic in nature

		c. Agricultural land parcels are usually intersected by the infrastructure nets with the rapid construction of facilities in fringe areas

Table 3.1: Characteristics of Chinese Urban Fringe

Source: Prepared by author from unpublished thesis 'Modelling the Spatial Pattern Of Urban Fringe – Case Study Hongshan, Wuhan' by Xu Feng

3.1.2 Problems of urban fringe in China

In China, the development of urban fringe makes the different way from that of other countries. It has the characteristic that urban expansion and rural-urbanization promote simultaneously. But suburbanization still doesn't become the trend in Chinese urban fringe; in this sense urban fringe relies on the urban.

In 1989 the main problems of Chinese urban fringe were summarized as:

1 The construction of urban fringe is very disordered because of the lack of effective planning polices and theoretical guidance, so there are a lot of problems in achieving an appropriate balance between urban development and resources and environmental protection.

2 Since urban fringe is situated in city-country combinative area that is no longer rural but is not yet urban, its planning is not only different from that of rural, various built-up area, but also different from that of rural, various index of planning is uncertain.

3 Urban fringe is also a dynamic zone that is undergoing because of it contact with the city, the contradictory of city's expansion and farmland is very prominent; city's expansion caused the heavy loss of prime farmland of fringe.

4 The social and industrial structure of fringe is not stable, economic system is very complex and economic activities and resources tend to focus on the short-term benefits.

More than 10 years have passed, but the above problems still exit. Moreover, some followed new problems emerge.[3]

1. 1 The construction of infrastructures lags the development of urban fringe
2. 2 Illegal land use tenure becomes the common phenomenon
3. 3 The environments of urban fringe are deteriorated seriously

[3] from unpublished thesis 'Modelling the Spatial Pattern Of Urban Fringe – Case Study Hongshan, Wuhan' by Xu Feng

3.2 Urban Fringe In Indian Context

3.2.1 Characteristics of rural-urban fringe in Indian cities

One of the most intricate aspects associated with the spontaneous urban expansion is the rural-urban interaction which is increasing with the fast urbanization in India. In the process of urban sprawl, the adjoining areas are being constantly engulfed into urban landscape. As such the villages lying in the immediate vicinity of cities and towns are gradually acquiring urban character. This peripheral area potential for urban growth, known as urban-rural fringe have grown around all Indian cities and has assumed vital significance for the planning of cities in future. The fringe areas represent certain characteristics. These characteristics are:

1. The fringe is a transitional zone between the city area and the peripheral rural area.
2. Land use pattern is partly under change from rural to semi-urban or urban
3. Several villages of the fringe zone, having been deprived of their agricultural land are in the state of flux and remain waiting for their amalgamation within the city
4. A continuous shifting from the agricultural to non-agricultural pursuits is obvious among the inhabitants of the area
5. Occupational character has also been changing from traditional to modern and
6. Infrastructure is frail and inadequate to cope with the trend of population growth and new development.

3.2.2 Case Study
Study of Peri Urban Areas of Ahmedabad (Literature Based Case Study)

3.2.2.1 Introduction
The city of Ahmedabad was founded in 1411 AD as a walled city on the eastern bank of the river Sabarmati, now the seventh largest metropolis in India and the largest in the state. The urban agglomeration (UA) population has increased from 3.31 Million in 1991 to 4.5 million in 2001. Today, Ahmedabad's limits have grown to cover an area 33 times larger than that of the old city limits. A rapid appraisal of peri-urban areas of Ahmedabad city shows that much of the development is around a cluster of villages on western side. The city of Ahmedabad is typical radiocentric city. However a number of historical constraints have pushed the formal center (CBD) towards the western side of Sabarmati River while industry and low income housing have been developing in the eastern suburbs.

3.2.2.2 Demographic Trends
The population in the AMC limits increased to 35.15 lakh in 2001 from 28.77 lakh in 1991 (Refer Table 3.2). The population in AUDA area in 1991 was 38.75 lakh. The Ahmedabad Urban Agglomeration (AUA) housed 23.25 % of the State's urban population in 1991, which has gone up to about 25% in 2001. Compared to other metropolises in India Ahmedabad has a lesser degree of primacy and urban population is spread evenly across other metropolitan and class I cities in the State. The AMC area is spread over 190.84 sq km, the AUA area is about 350 sq km and AUDA area is 1330.08 sq km. Spatial distribution of this population within the city over the decades shows that up to 1981 most of the new population added to the city was concentrated within the old AMC limits itself, especially in the eastern part. Expansion of the peripheral areas began in the 1980s and has continued. Earlier only the eastern parts and particularly the eastern periphery registered faster growth rate, but since the 1980s even the western periphery has grown rapidly. (Refer Figure 3.1, 3.2)

Spatial Unit	Population		
	1981	1991	2001
1. Ahmedabad Municipal Corporation (AMC)	**2159127**	**2876710** (2.9)	**3520085** (2.0)
1.a Walled City	476138	398410 -1.8	372633 -0.7
1.b. East AMC	1122073	1902868 5.4	2521013 2.9
1.c West AMC	463922	575433 2.2	675362 1.6
2. A.U.D.A.	**2721925**	**3756246** 3.3	**4709180** 2.3
2.1.a East AUDA	101144	128999 2.5	202494 4.6
2.1.b West AUDA	204923	457271 8.4	701424 4.4
2.c AUDA (Rural)	209826	246560 1.6	274391 1.1
3. Kalol	78407	92550 1.7	112013 1.9
4. Mehemdabad	22309	26103 1.6	30768 1.7
5. Dehgam	24868	31378 2.4	38082 2.0
6. Sanand	22465	25674 1.3	32417 2.4
7. Other areas outside AUDA	**264555**	**309871** 1.6	**334531** 0.8
8. Gandhinagar	**199353**	**280234** 3.5	**373663** 2.9
8.a. Gandhinagar (GNA)	62443	123359 7.0	195926 4.7
8.b. Rest of Gandhinagar	136910	156875 1.4	177737 1.3
GREATER AHMEDABAD	**3185833**	**4346351** 3.2	**5417374** 2.2

Table 3.2: Demographic trends in Ahmedabad

Source: www.egovamc.com

As stated above the population growth in the peripheral areas is more rapid than the areas within the city limits. This is partly due to the saturation of population within the city area and the consequent large-scale housing development in the peripheral areas. The contrasting spatial patterns observed in the eastern and western areas of AMC have extended into the peripheral areas in the same manner (See Figure 3.1). The western part is experiencing more rapid growth than the eastern part. Rapid growth in the form of ribbon development along the Sarkhej - Gandhinagar highway is being witnessed during the 1990's (Refer Map 2-2). These trends are likely to intensify further in the coming

decades. It is also a note worthy feature that the spatial expansion of Ahmedabad is largely contiguous and relatively compact.

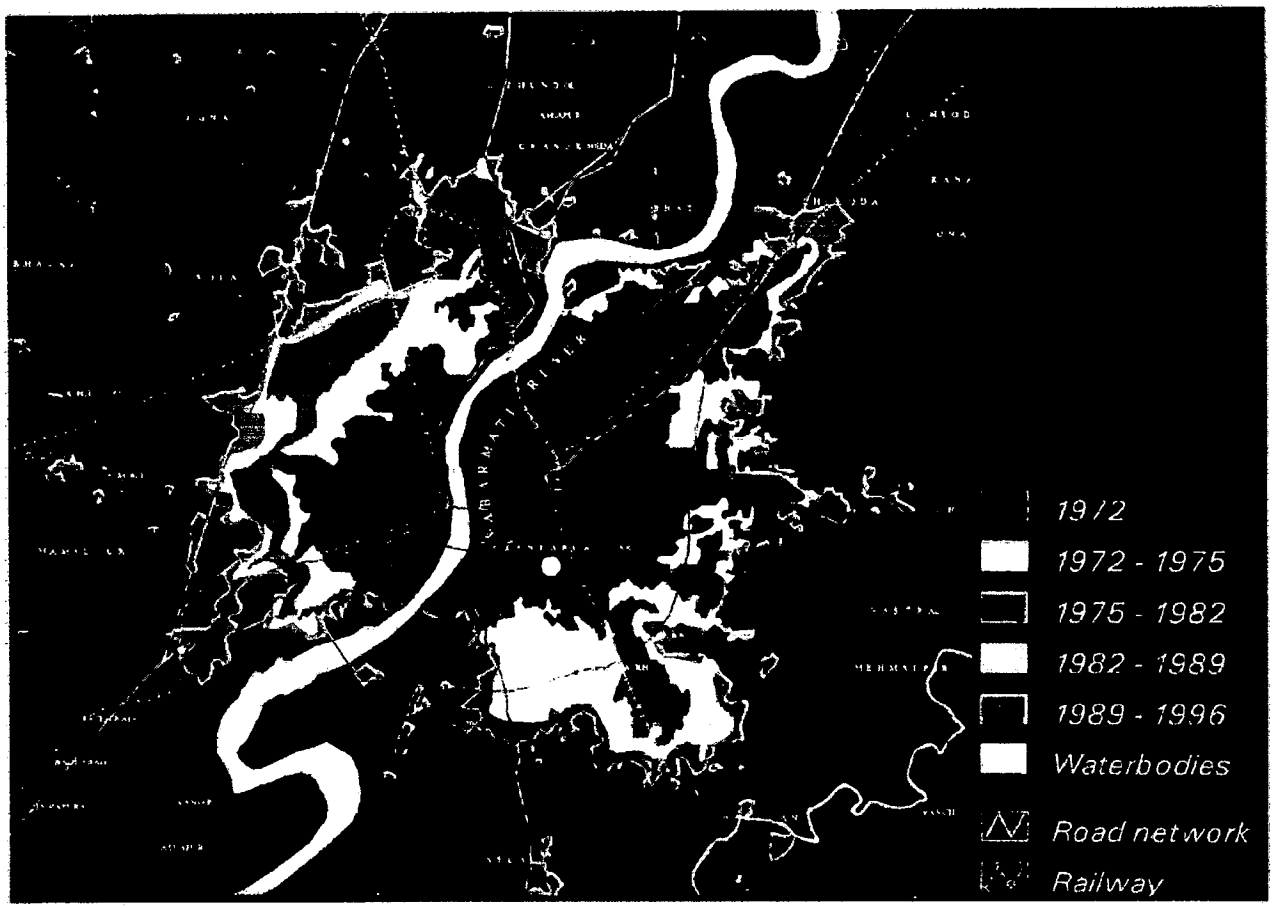

Fig 3.1: Growth pattern of Ahmedabad
Source: www.egovamc.com

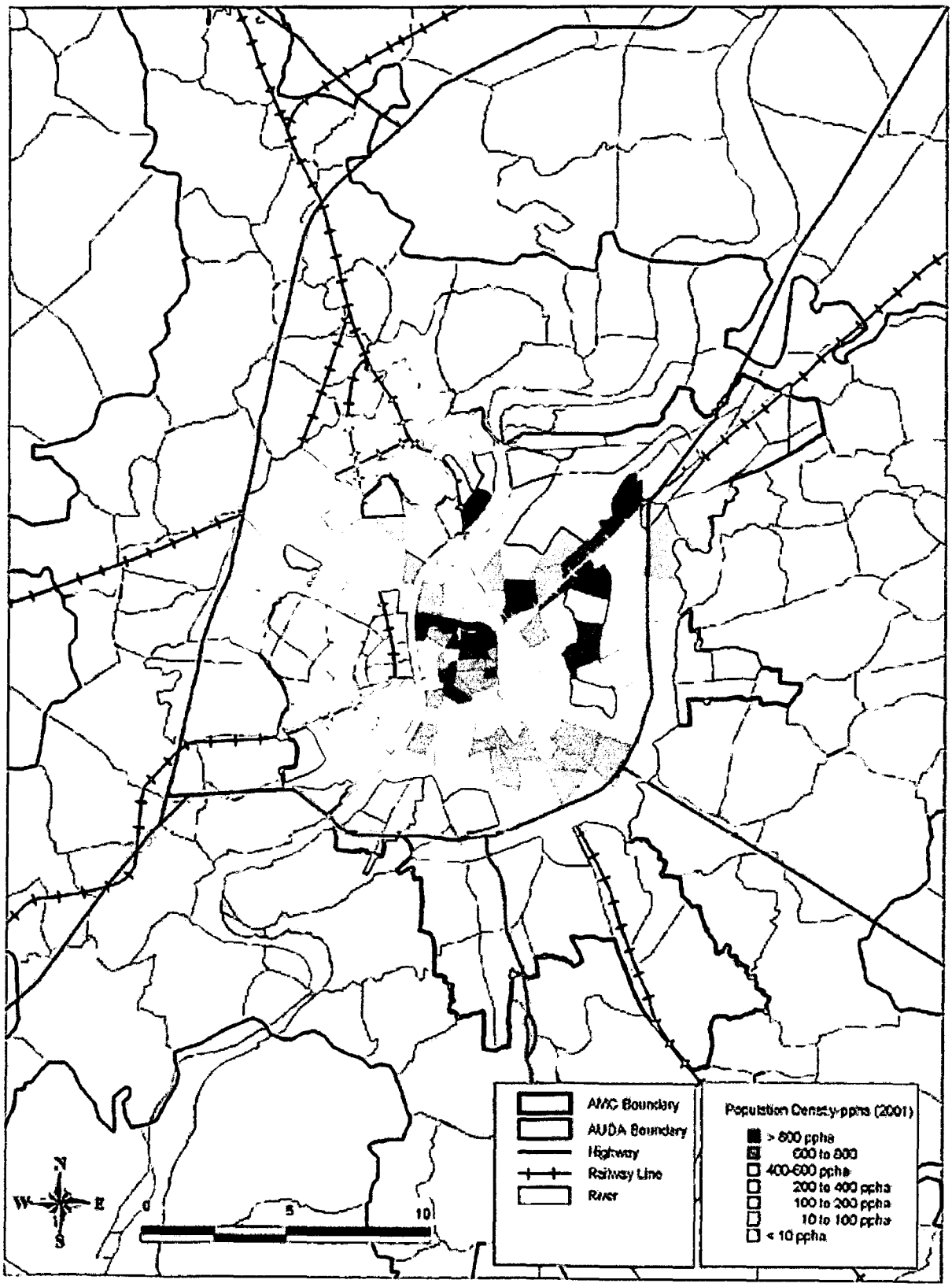

Fig 3.2: Population density of Ahmedabad
Source: www.egovamc.com

3.2.2.3 Land Use

The Ahmedabad Urban Development Authority is responsible for land use planning within its jurisdictional limits. The area under AUDA may be seen as various subunits depending on the administrative jurisdictional limits and extent of development. Of this, the area delineated as Ahmedabad Urban Complex consisting of AMC, outgrowth adjoining AMC and area likely to develop in the ten years has been designated as Ahmedabad Urban Complex.

Land-use in AUDA area

Of the total AUDA area of 1294.65 sq. km, nearly 50 percent is built up. Water bodies and wastelands cover 12 percent and 17 percent of area respectively (See Figure 3.3). Industries cover 9 percent of the total land. As per the State Government Policy, no major industrial development within 24 kms of AMC limit is permitted in AUDA area. Considering existing development conditions a certain area for industrial use is designated for light industry as well as for general industry, along with existing industries at Vatwa, Naroda and Odhav (all lying within AMC), which forms nearly 10.38 percent. (See Figure 3.4)

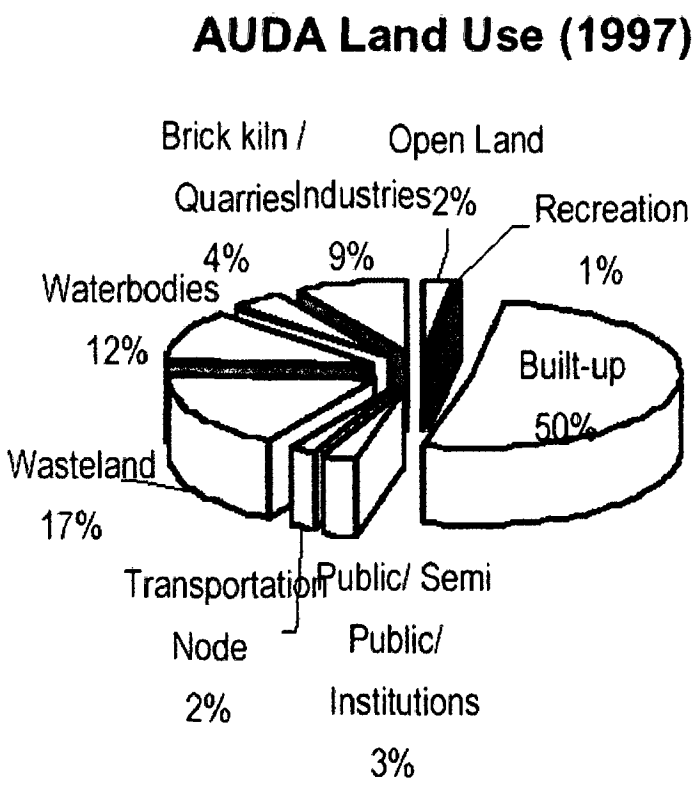

Fig 3.3: AUDA land use 1997
Source: www.egovamc.com

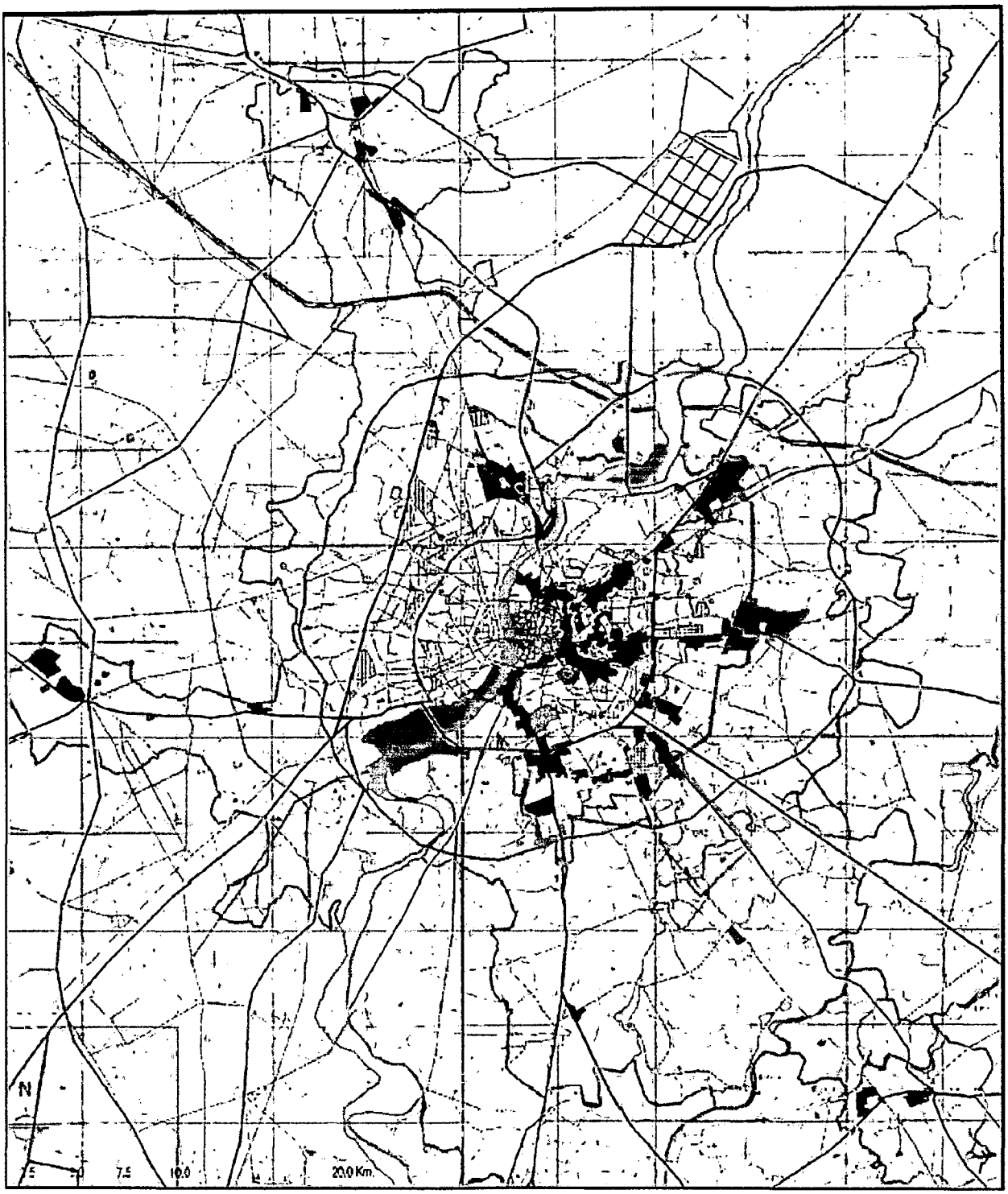

Fig 3.4: Land use of Ahmedabad
Source: www.egovamc.com

3.2.2.4 Infrastructure

Water Supply

Water Supply System in the periphery

In Ahmedabad city, the peripheral areas outside the jurisdiction of AMC, organized water supply is limited largely to gamtal areas covering less than 10% of the population (See Figure 3.5). Due to steep increase in the population and the increase in multi-storied buildings in the city outskirts, the local bodies are not able to provide the requisite water to the households in these areas. Due to these facts, the societies maintain their own bore wells and face problems of excessive draw down in water levels, functional problems and deteriorating water quality with intrusion of fluorides. In such circumstances, the private societies have to look for other sources of water supplies. Many private water companies have emerged to supply bottled water as well as through tankers.

In the eastern periphery also water is drawn from deep tube wells (the depth of these tube wells varying from 160 m to 270 m) by individual societies and in a few cases by local bodies with in Gamtal area. However these tube wells are now unable to satisfy present drinking water needs due to dwindling ground water table.

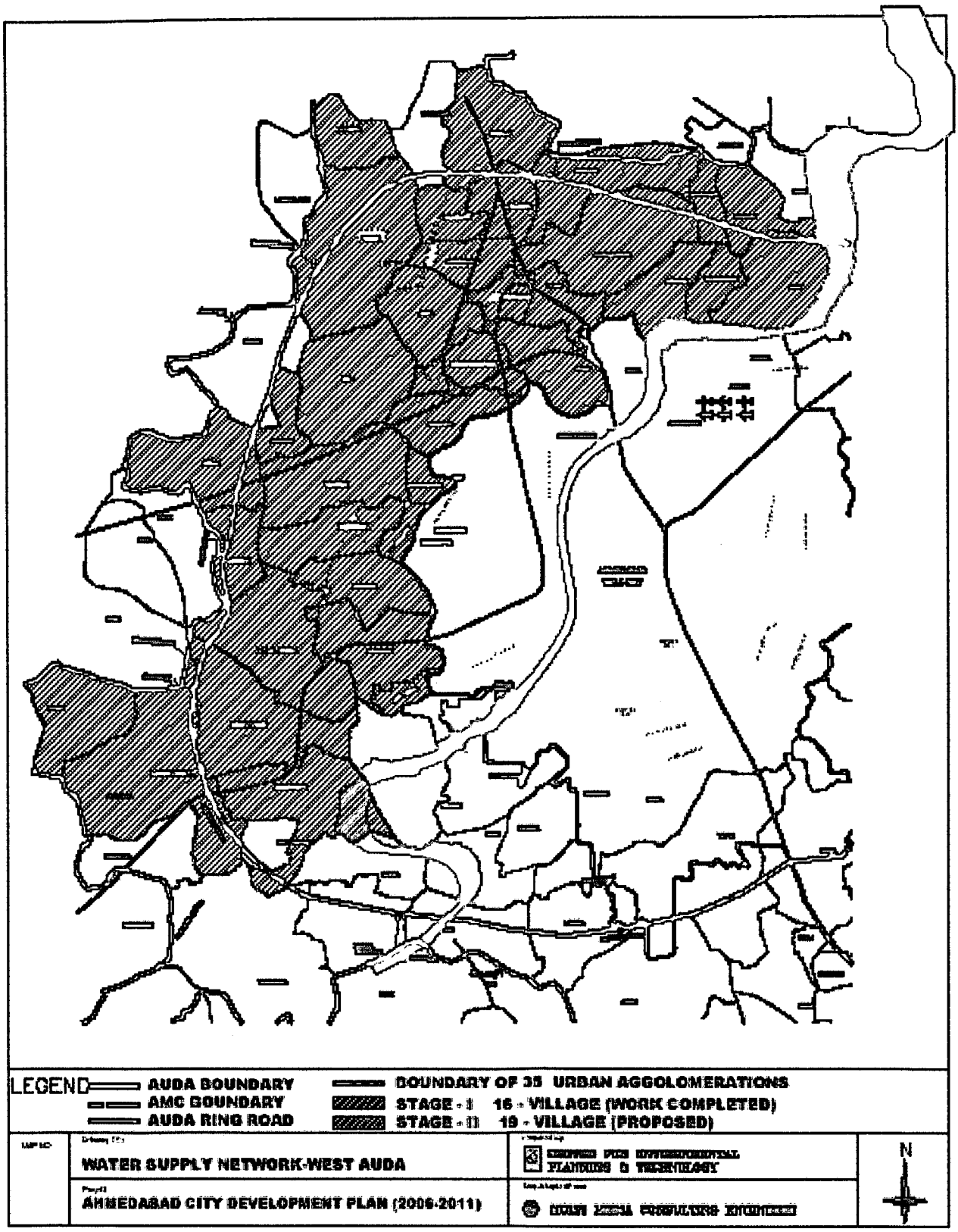

Fig 3.5: Water supply in periphery of Ahmedabad
Source: www.egovamc.com

Drainage / Sewerage System in the periphery

Sewerage network coverage in the peripheral areas is limited. In the eastern periphery, urban growth has extended to eight settlements under AUDA (Refer Figure 3.6). The total area is about 32.34 sq.km. All the settlements are moderately populated pockets. The urban area is presently not having any sewerage system and the sewage is left out in open through local drains. This sewage flows to open fields, to Khari River and other local drains and finds its way to Kharicut Canal and to Khari River. At some places, illegal connections are made and sewage is discharged into GIDC pipeline, which mixes with partially treated effluent. It is estimated that about 16 Mld sewage is generated from this area and is left untreated.

In the west periphery, the area of 73 sq.km located between Municipal boundaries on west side to Sarkhej – Gandhinagar highway was served under Phase I.

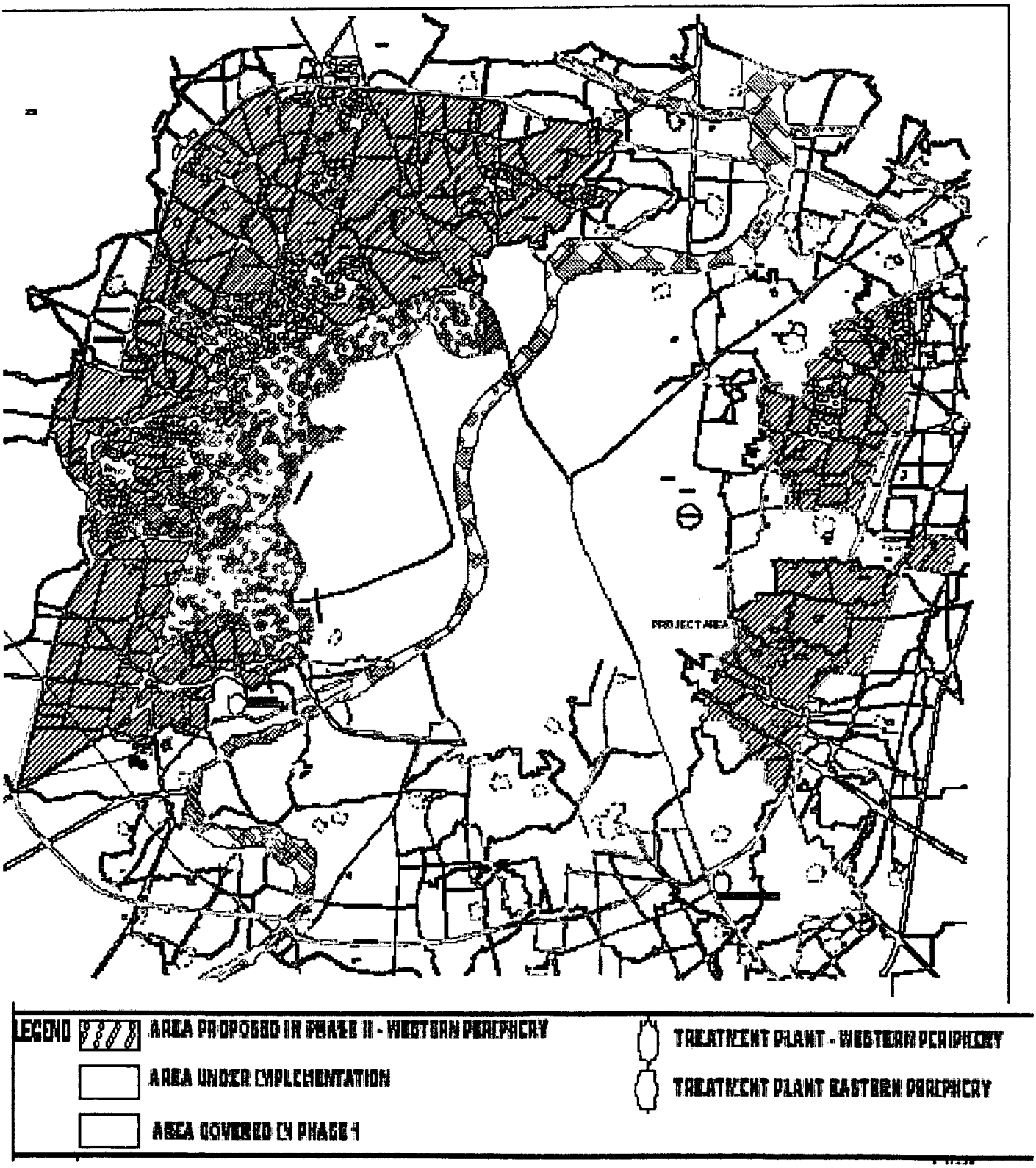

Fig 3.6: Sewage network in periphery of Ahmedabad
Source: www.egovamc.com

Solid waste Management in the Periphery

In the periphery the urban local bodies have initiated measures to collect solid waste through a door-to-door collection system. In the rural local body areas initiative is limited. The disposal of waste is a major area of concern.

3.2.2.5 Driving Force Behind Development

In case of Ahmedabad, the dominant factor behind the developments within the city is private sector. While the role of public sector has been limited to implementing development schemes or town planning schemes. The major setback in Ahmedabad case is in the pace of synchronization of urban planning schemes and actual development. Within urban development authority limits, development has taken shape before the development plans have been implemented. Hence, the provision of infrastructure comes later. The major problem is that the public sector has to reshape development plans before their implementation, which becomes increasingly complicated and expensive in terms of time and effort. The factors behind the fringe development in the western Ahmedabad which make the private sector more active and dynamic are:

1. The resources and low price of land
2. Proximity and connectivity with Ahmedabad city by road and public transport
3. Proximity of western fringe stretch close to Gandhinagar city
4. Availability of land and greener areas, freedom from congestion and pollution of the city
5. Minimal planning regulations, freedom from rigorous approval and permission problems from Ahmedabad Urban Development Authority and Ahmedabad Municipal Corporation and
6. Till recently, loopholes under land ceiling act in acquiring land

3.2.2.6 Important features of the existing development in Ahmedabad

a. The urban development in the fringe area of western Ahmedabad continues without any guidelines due to absence of any statutory development of the area.
b. Regulatory mechanism for haphazard development is coming up with residential colonies in the vicinity of industrial units

c. Residential development is occurring along the transportation corridors. Thus existing transportation corridors and/or availability, of access has spurred ribbon development
d. The residential development is progressing at rapid rate. However development of social facilities, open spaces and infrastructure has not kept pace with it
e. It has been observed that the overall built environment lacks character and cohesiveness
f. The low density and high quality luxurious developments are noted at frequent interval
g. The quality of physical environment in terms of infrastructure such as waste water disposal, storm water disposal, street light, educational and health facilities, fire fighting and recreational areas is rather poor and inadequate
h. The bare minimum infrastructure needed for selling the houses and plots has been provided by the promoters of the scheme. In some cases, even access to the plots is provided by the developer

3.2.2.7 Institutional Setup: Description And Inherent Problems

The Ahmedabad municipal limit includes all the developed areas of the city, and already a framework exists for planning, and controlling of development and provision of infrastructure. The Ahmedabad Urban Development Authority is there to take care of areas beyond municipal limits, which are already witnessing or likely to witness the process of urbanization. For development in the fringe areas, permission has to be taken from the district panchayat or the taluka panchayat. There are basically two major components; one is non-agricultural (NA) permission, and secondly non-agricultural building permission (NABP).non-agricultural building permission is given by the taluka panchayat or the district panchayat. For the non-agricultural building permission, technical opinion is being taken from the Town Planning and Valuation Department (TP & VD) as the district panchayats do not have any technical staff. Technical opinion is given on the basis of the development control regulations (DCR) of Ahmedabad Urban Development Authority, or of the other nearest development authority, whichever is applicable. The revenue department has procedure for conversion of rural land to urban use.

It has been observed that institutional complexity has been the major hurdle in the development of the fringe areas. Various legislative measures have been introduced by the central, state and local governments in the form of development control regulations, and building bye-laws to control and regulate the development.

3.2.2.8 Strategies to implement peri urban development[4]

Based on detailed study, the following seven broad strategies have been identified

1. Increase in jurisdictional limits of urban development authorities
2. Delineation of high pressure zones
3. Creating separate urban development agency
4. Measures to facilitate private sector participation in land development
5. Revising planning norms and development control regulations in peri-urban areas
6. Revising regulatory measures, pertaining to land and housing development
7. Financing and implementation mechanism for peri-urban development, measures to ensure public sector involvement and public-private partnerships

[4] Article PERI-URBAN DEVELOPMENT: Alternative Models for Ahmedabad, SDR

3.3 Driving forces behind development of urban fringe in Western countries and China: A comparison in order of priorities

Western countries	Description	China	Description
1. Transport technology	1. The widespread cars and the advanced transportation system bring cities more chances to grow in a larger area. 2. It thus liberates the western countries from traditional single core pattern and evolves multi core pattern, linear pattern, mainly development along main routes 3. The economic activities in the urban fringe didn't need to worry about how to proximity to the city markets, contrarily they may be pleased with the situations adjacent with airports.	**1. Nature and topography conditions**	1. These are the external forces underlying the development of urban fringe. 2. Soil fertility, terrain and climate have high effects on the agricultural activities. 3. Fringes have suitable natural environments and flat topography surrounding the city will win a better develop platform with the lower cost of exploring land.
2. Development of high	1. With those infant industries becoming the leading ones, most of	**2. Economic growth**	1. Urban fringe has the same periodical development as the

technology	which were located in urban fringe, offered more employment opportunities. 2. Meanwhile it generated a new middle social class who greatly contributed to the large migration from urban centre to the urban fringe.		economic growth. 2. Not like the residential land arises greatly in the fringe of western countries, industrial land (e.g. Industry Park, Township Industry...) is explored firstly in Chinese urban fringe. And then other land uses come forth.
3. Government policy and urban planning	1. The conception of 'garden city', help the urban fringe more rationally and harmoniously. 2. The planning idea of 'Garden city' argued with decentralization city strategy that encouraged suburb's development.	**3. Transportation and communication**	More and more high-speed ways are built, public transportation system has made a great process and cheaper private cars can be purchased by more Chinese citizens... all these endue urban fringe with high accessibility.
4. New housing demand	As the baby boomers grew up and married, the houses in the city centre could not fulfill their demands so they transferred their attention to the urban	**4. Government policy and controls**	The building of large industrial zones, relocation of heavy industry, encouragement of township industry's development and unique administrative pattern are usually

	fringe. It was to some extent stimulate the urban fringe's development.		happening in the urban fringe affected by the policies or plans.
5. Psychological character	People in western countries would like to see some new things, move freely, emphasis individuality and prefer nature. Urban fringe is such a desirable area for them.	**5. Social culture environment and people's psychological characters**	Some researches have shown that people no longer have the strong desires live in the urban centre as before. It may result in more people flow into the urban fringe.

Table 3.3: Driving forces behind development of urban fringe in Western countries and China: An comparison

From above forces, it can be concluded that the development of urban fringe in western countries is highly motivated by the residential migration to urban fringe. It is different from China.

3.4 Examples Of Management Of Urban Fringe

3.4.1 "Urban Agriculture" (UA)

3.4.1.1 Definition and concept

By definition, "***urban and peri-urban agriculture is food and fuel grown in and around cities (where land is meant for non-agricultural activities) directly for the urban market.***" [5]

It means growing crops, raising livestock or otherwise harvesting of edible produce (for humans and animals) in urban spaces, or areas adjacent to it, for sale within the city. It also includes cultivation of crops and animal husbandry on roadsides, along railroads, in gardens, backyards of houses, on roof tops, in vacant plots of industrial estates, on

[5] The Role of Urban and Peri-Urban Agriculture in Metropolitan City Management in Developing Countries, NIUA, Research Series Number74

grounds of large institutions and along rivers (often using recycled urban solid and liquid organic wastes as resources); aquaculture in tanks, ponds and rivers; orchards and vineyards and street trees and even floriculture, food processing and food vending within the confines of the city or in the periphery.

Urban Agriculture (UA) normally produces goods for the daily urban market. It does not specialize in cereal crops. But that does not mean that UA does not cultivate grain crops at all. For instance, fields of mustard, wheat and millets are visible on the floodplain of the river Yamuna in Delhi, though watermelons, flowers, spinach and vegetables are more common. These vegetables are sold in the informal "farmer's market", close to their areas of cultivation. UA is typically intensive cultivation of high yielding crops, producing 3 to 15 times as much per hectare than by common rural methods, dominated by vegetable crops.

It is considered to be more organic and sustainable than rural agriculture for two reasons:

1. The urban waste which is used as fertilizer is more abundant than rural waste and
2. The urban farmer's labour intensive methods use less land and water per unit of production than when agriculture is carried out as an industry.

The scale of urban agriculture production in the world is far above common perceptions. It was estimated that in 1993 between 15 to 20% of the world's food was produces in the urban areas. The project, "Cities Feeding People" (1991) cites how Chinese cities are self-sufficient in perishable food crops and how UA is spreading in Asia. Only 6sq.m. of area can produce all vegetables needed for a family of four.[6]

The case of urban agriculture is very important and is of utmost priority in some cases. The example of NCR, France, Britain, and Cuba are discussed in the following paragraphs.

3.4.1.2 Rural-Urban Fringe Of Delhi And Urban Agriculture

The rural-urban fringe has been described as the zone, which lies immediately outside the city area and has strong interactions with the city in terms of daily commuting and exchange of goods and services and bears an urban reflection on the physical, occupational and demographic structure. It is rural compared to the typical urban of the

[6] The Role of Urban and Peri-Urban Agriculture in Metropolitan City Management in Developing Countries, NIUA, Research Series Number74

city area and urban compared to the typical rural landscape. In the Delhi Metropolitan Region this is not a concentric zone around the city, but is polygonal in shape, extending along the axial transportation routes between 25-40 miles from the city.

The peri-urban areas of larger cities have some common characteristics. The sewage networks and pumping stations are generally located in the rural-urban fringe. In Delhi this is in Okhla, which is still in the fringe. But rapid expansion of the city will not let it remain so. Another fringe element is the railway marshalling yards. In Delhi this is located in Ghaziabad and Tughlaquabad.

The green belt with its trees, parks and recreational and cremation grounds lies in the fringe of cities. The purpose of having a green belt is to restrict squatter settlements and urban intrusions into good agricultural lands on the edge of the city and to prevent the City pollution from spreading into the rural areas. But urban expansion is devouring the green belts around Delhi. Within the city too, the open (cultivable) lands are fast diminishing. The Safdarjung airport, which was once upon a time on the fringe is now part of the city and is not being used as a regular airport. It is now only used for recreational purposes or under emergency.

The urban villages within the city have also started showing signs of infiltration with time. In Delhi all the agricultural lands belonging to the residents of these villages have been taken away for building the city. However a few remnants that are left are still cultivated. Here the grain crops are being replaced by cash crops and vegetables, which are cultivated very intensively. Delhi also grows plenty of fodder crops that indicate livestock rearing within the city. These crops are often irrigated by the wastewater generated by the household and use the biodegradable waste as manure. Many of the urban Villages have got totally annihilated in the process of urban development. Those that have remained, have not only changed in their economic structure, population growth, density, literacy and sex composition but have also suffered from unplanned growth with no basic infrastructure such as sewerage, drainage, water, electricity etc. which cause pollution. In the fringe villages agricultural activities dominate followed by tertiary activities. There is a distance decay function present both with regard to the size of population and the non-agricultural activities.

The baseline study by SEEDS identifies a peri-urban belt at 25 kms. from the centre of the city in the north and west, and between 35-40 kms. in the south and the east, where a large proportion of the population engaged in agriculture (out of 197villages, 52 have more than 40% of their population engaged in agriculture; and 70 villages with 20-40 percent workers in agriculture). However, most of the villages that are predominantly agricultural today will get urbanized in the future.

The existing peri-urban area of Delhi points to a diminishing size of the open areas earmarked for the purpose, which would either act as a buffer for the city, or as lung space for people to breathe freely. But as has been mentioned earlier, peri-urban areas are transient in nature and keep shifting away from the main city centre. As a result, the peri-urban areas of Delhi are merging with those of the neighbouring towns and cities. That is, the expansion of Delhi and its surrounding towns are virtually filling in the rural gaps between the cities and advancing towards the creation of a large conurbation. Under the circumstances, Urban Agriculture would be very helpful to recreate open lung spaces for the people to breathe some fresh air and act as buffers.

With more land being transferred to non-agricultural use over the years, there is an increase in the built area and a reduction in the total cropped area. But there are also some cultivable wastelands that have been kept vacant. This indicates that the newly acquired agricultural lands, for urban development, are left fallow for a long time. It is this land that can be used for Urban Agriculture. The area sown more than once has also declined, indicating a reduction in soil fertility for urban development results into severe soil deterioration. Changes in the soil structure prevent farmers from cultivating throughout the year. The changing land use and the soil structure promote intensive agriculture (often with fertilizers that spoil the soil) in order to meet the demand-supply gap of the growing urban market and to reap higher benefits (which is very urban in its characteristics). Land use options indicate that a sizeable amount of Urban Agriculture can be carried out in Delhi. However, the nature of agriculture will be of short-term benefits.

3.4.2 Urban agriculture experiences

3.4.2.1 France

Highly productive agricultural activities are taking place within most European metropolitan areas. In the environs of Paris, only 10 percent of the Île de France is occupied with intensive farming, yet peri-urban agriculture accounts for about 35 percent of the regional crop deliveries in value, mainly in the form of vegetables, flowers and fruit. Producers usually sell their produce directly to Parisians or at local markets.

As urban people in the industrialized world search for green space, cities are being transformed, spreading through the countryside, intertwining built-up and farming spaces.

3.4.2.2 Britain

In London about 30 000 active allotment gardeners control a total of 831 ha of public land, 13.4 percent of which is located inside the urban area and the remainder in the outskirts of the British capital (Crouch, 1997). In the peri-urban areas, market gardening dominates, covering 13 566 ha of public or private land; however, this is largely in decline as a result of continuous urban development pressures. There are also eight city farms in London, up to 2.5 ha in size, "with some horticulture production, where animal keeping predominates" (Garnett, 2000). Additionally, there are about 1 000 beekeepers in Greater London, producing a total of about 27 000 kg of honey annually (Garnett, 2000).

3.4.2.3 Cuba

In Cuba, the city of Havana accounts for 20 percent of the islands' population. Havana has an agricultural potential of about 300 km^2 or 41 percent of the province territory (Novo and Dubbeling, 2000). Official support for urban agriculture started in the 1990s, as a result of food shortages brought about by the decline of imports and food aid from the formerly socialist European sphere.

More than seven out of ten Cubans live in urban areas (Novo and Murphy, 2000). Government recognition of primary sector activities includes making land available on a usufruct basis; the transfer of modern and environmentally sustainable techniques and technologies from extension services and research institutions; providing seed distribution facilities throughout the city; and the training of women, men and children.

Production can be broken down as follows:

316 company farms (supplying state entities)

178 basic cooperative production units;

48 loans and services cooperatives;

Groups of small farmers and gardeners cultivating more than 20 000 orchards and small parcels of land with an average area not exceeding 1 200 m^2 (Novo and Dubbeling, 2000).

One of the biggest challenges of the third millennium is the need to create "sustainable cities" which provide food, shelter, basic services and jobs to the urbanites of the developing regions.

3.4.3 The Urban Fringe Problem: Solutions Under Michigan Law

3.4.3.1 Introduction

Many urban problems of water supply, sewage disposal, drainage, transportation and recreational facilities, are either metropolitan in scope or at least clearly overlap the legal boundaries of existing units of local government. A possible remedy is the formation of new governmental units called metropolitan districts, or special districts, or authorities. Although practice varies from state to state, these districts or authorities are designed to provide one or more closely related municipal-type services over a natural service area, without regard to boundaries of existing local governments. However, they vary widely in the nature and scope of their powers and in degree of independence. Under Michigan law three distinct patterns of such special governments are found. First of all, there are metropolitan districts, which may be established as independent units of government under the terms of the Metropolitan District Act of 1929.[7]

An amendment to the Michigan Constitution in 1927 provides that the state legislature may permit the incorporation of "metropolitan districts" by any two or more cities, villages or townships for the purpose of acquiring, owning, and operating parks, or public utilities, for supplying sewage disposal, drainage, water, light, power, transportation, or any combination of these. The legislature is directed to limit the rate of taxation to be charged by any metropolitan district and to define its powers of borrowing money and contracting

[7] The Urban Fringe Problem: Solutions Under Michigan Law, By Ralph T. Jans, Research Associate, University of Michigan

debts. No property or other rights are to be surrendered by any city, village or township to the metropolitan district without the approval of the voters of the city, village or township. The voters of any metropolitan district are given the power to frame and adopt its charter. The charter is to provide a government for the district, which may enact all ordinances concerning the districts' municipal powers.

The first step in creating a metropolitan district is a resolution by the legislative body of any city, village or township. The resolution proposes the establishment of a metropolitan district and describes the exact territory to be included within it. A similar resolution may be passed by the legislative body of any other city, village or township desiring to become a part of the district. Either the entire area of each governmental unit or only portions may be included. A charter commission is then appointed, composed of one representative from each city, village or township situated wholly or partially within the proposed district. These representatives, or commissioners, are appointed by the legislative bodies of the governmental units involved. Any city with a population of 50,000 or more is entitled to an extra charter commissioner for each additional 50,000 population or major fraction, up to a population of 200,000. For all population over 200,000, one more charter commissioner is allowed for each 100,000 or major fraction.

After appointment, the charter commission meets, elects officers and prepares a budget. The portion of the budget borne by each governmental unit is in proportion to its assessed valuation. Once the preliminaries are done, the charter commission adopts a name for the district and frames the charter. The charter commission must specify in the charter the precise territory to be included in the district and must provide for: (1) the nomination, election and appointment of all district officers; (2) the duties to be performed and the compensation to be received by these officers; (3) the keeping of public records; (4) the publication of ordinances; (5) the maintenance of a system of accounts; and (6) the levy and collection of taxes and the annual appropriation of money for district purposes.

3.4.3.2 Experience Under The Metropolitan District Act[8]

The Metropolitan District Act was originally intended to permit a single governmental agency to provide one or a few closely related municipal services for an entire metropolitan area. In practice the law has *not* been used in this way, and, in fact, has *not* been used extensively. Only six metropolitan districts have been established, and in five cases they do not cover even a major portion of their metropolitan areas. The first metropolitan district was not created until nine years after the enactment of the law in 1929.

3.4.3.3 Advantages Of Metropolitan Districts

Consolidation and Unification

A metropolitan district allows functional consolidation and unified administration of one or more municipal needs of an urbanized area. The district may include all or part of a particular urban fringe or any combination of incorporated and unincorporated places. The special district is an effective means of bypassing a multitude of local government jurisdictions in reaching solutions to problems of metropolitan proportions. This technique may eliminate costly and inefficient duplication of services by many smaller governmental units.

Politically Acceptable

The metropolitan district idea, or a similar technique, may be acceptable to the political forces in an area extending beyond the legal jurisdiction of any single city, village or township.

Costs

The metropolitan district technique permits the costs of providing a service to be borne only by those citizens who benefit directly. It is not necessary to include within the district any portion of a township or incorporated place, which is not directly interested in receiving the proposed service.

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[8] The Urban Fringe Problem: Solutions Under Michigan Law, By Ralph T. Jans, Research Associate, University of Michigan

3.4.3.4 Possible Disadvantages of Metropolitan Districts

The metropolitan district technique encourages divided governmental authority where unified action may be desirable and necessary. The district does not replace any unit of local government. Instead, it is added to an already complex local government pattern. Extensive use of metropolitan districts would make effective coordination of services and expenditures among the various local governments exceedingly complex, if not impossible. Nor is it likely that a single- or dual-purpose district will eventually change into one of multi-purpose scope. Contrary to the claims of its supporters, the special district idea may contribute further to the disintegration, rather than to the integration, of local government activity.

Metropolitan districts offer no long-range answer to the many difficulties confronting urban fringe residents. The most that can be expected from their continued use is temporary solution to a few, but critical, immediate problems.

3.4.3.5 Conclusion

One method of meeting a few basic needs of urban fringe areas is the metropolitan district. Under this plan important services, such as water supply and sewage disposal, may be provided 'by a single governmental unit for a natural service area, regardless of intervening governmental boundaries. The use of this method has the practical advantage of allowing area-wide administration of a few common problems while at the same time not upsetting seriously the existing local governmental pattern.

There are certain weaknesses in the Metropolitan District Act and its constitutional basis. First of all, the formation of metropolitan districts requires complex procedures. Secondly, many services required by fringe area residents cannot legally be provided through the use of this device. For example, metropolitan districts are not authorized to establish and maintain law enforcement and fire protection services. Moreover, general police power is lacking for enforcement of the district's own ordinances and regulations. Consequently, as desirable as the metropolitan district idea may be for the handling of one or two specific problems, it is not an adequate substitute for a full-fledged municipal government.

3.5 Inferences From Case Studies

1. Basic idea of case studies is comparative study of development of urban fringe in Indian as well in western context. Driving forces in both the cases are almost same. But their sequence is different. The basic force behind development of fringe in western countries is development of residential areas.

2. Case study of Ahmedabad gives overall idea of development of fringe area of the city. The major aspects covered effect of urbanization on land use change, institutional aspects and infrastructure. These observations are more or less similar to the case of Pune.

3. Urban fringe areas are outside municipal limits. Because of increasing population in these areas pressure on infrastructure is increasing. Infrastructure like water supply, solid disposal, garbage disposal is poor and inadequate in peripheral areas of the city.

4. As for the peri-urban areas, expansion of the city into the fringe farmlands is reducing traditional agriculture. But since peri-urban areas are belts of perpetual conversion of rural land into urban, transformation of agricultural activities into non-agricultural occupations (that is, from green to brown landuse) is inevitable. At the same time these zones are gaining in horticulture, floriculture, pisciculture and livestock rearing, etc. which produce high value components of food for the urban markets. In fact, Master Plans (as in Delhi and many other cities) are gradually including such usage around cities. Therefore, an appropriate mix of Urban Agriculture and urban development would be more acceptable for city planning, rather than a total change from rural to urban.

5. The basic problem in fringe areas is that agricultural land is not systematically transferred into urban use. So Urban Agriculture can be one of the solutions for this. It will also help in reducing pollution levels and employment generation so that pressure on cities can be reduced.

The basic question is whose responsibility should Urban Agriculture be? The nature of responsibility will range from allocation of land, to provision of water, to building up of a market system, to selling of agricultural produce, to pollution control and the planting of appropriate trees, and so on. The State alone is not sufficient to promote Urban Agriculture in the Indian cities. To make it successful, commitments at the local level is also required; which would mean complete involvement of the community.

6. Integrated development of Urban Agriculture, along with city management, will be a very good tool for improving the quality of life within cities.

7. Another major issue regarding urban fringe is that as these areas are outside the municipal limits, they are not taken care by municipal bodies, and local village authorities also do not consider them. So development in these areas is haphazard. Formation of separate authority to take care of these areas is one of the strategies. In the second part of the case study this aspect is studied. Different solutions are given under Michigan Law for the problem of fringe areas. One of them is formation of Metropolitan Districts.

One method of meeting a few basic needs of urban fringe areas is the metropolitan district. Under this plan important services, such as water supply and sewage disposal, may be provided 'by a single governmental unit for a natural service area, regardless of intervening governmental boundaries

CHAPTER IV

STUDY AREA

4.1 Introduction to Pune District

Pune district is located in the western part of Maharashtra State, on the eastern side of Sahyadri mountain ranges (See Figure 4.1). It is bounded by Thane and Nashik district on north, Ahmednagar on east, Raigad district on west, and on the south by Satara and Solapur. The population of Pune district as per 1991 Census was 55.11 lakhs and 72.42 lakhs as per Census 2001.

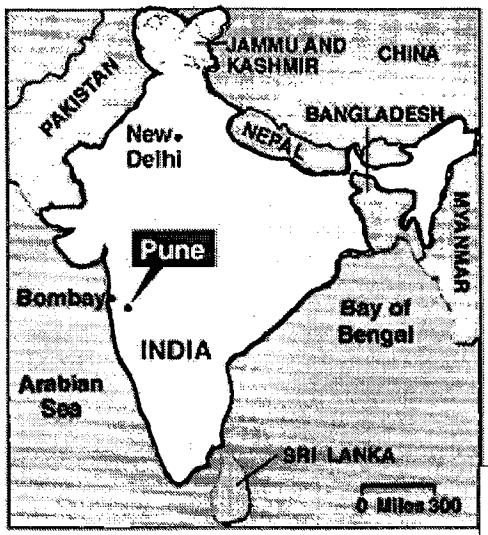
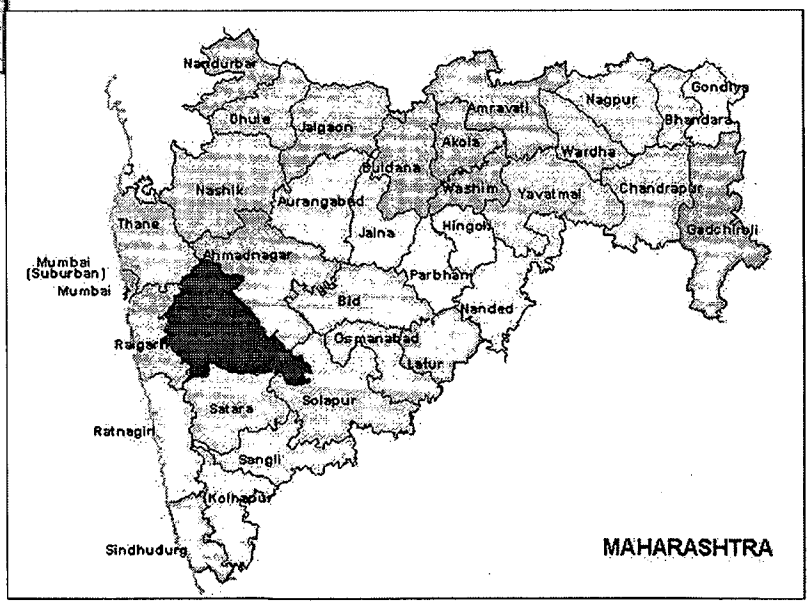


Fig 4.1: Location of Pune in India

Source: www.unipune.ernet.in/ dept/env/pei

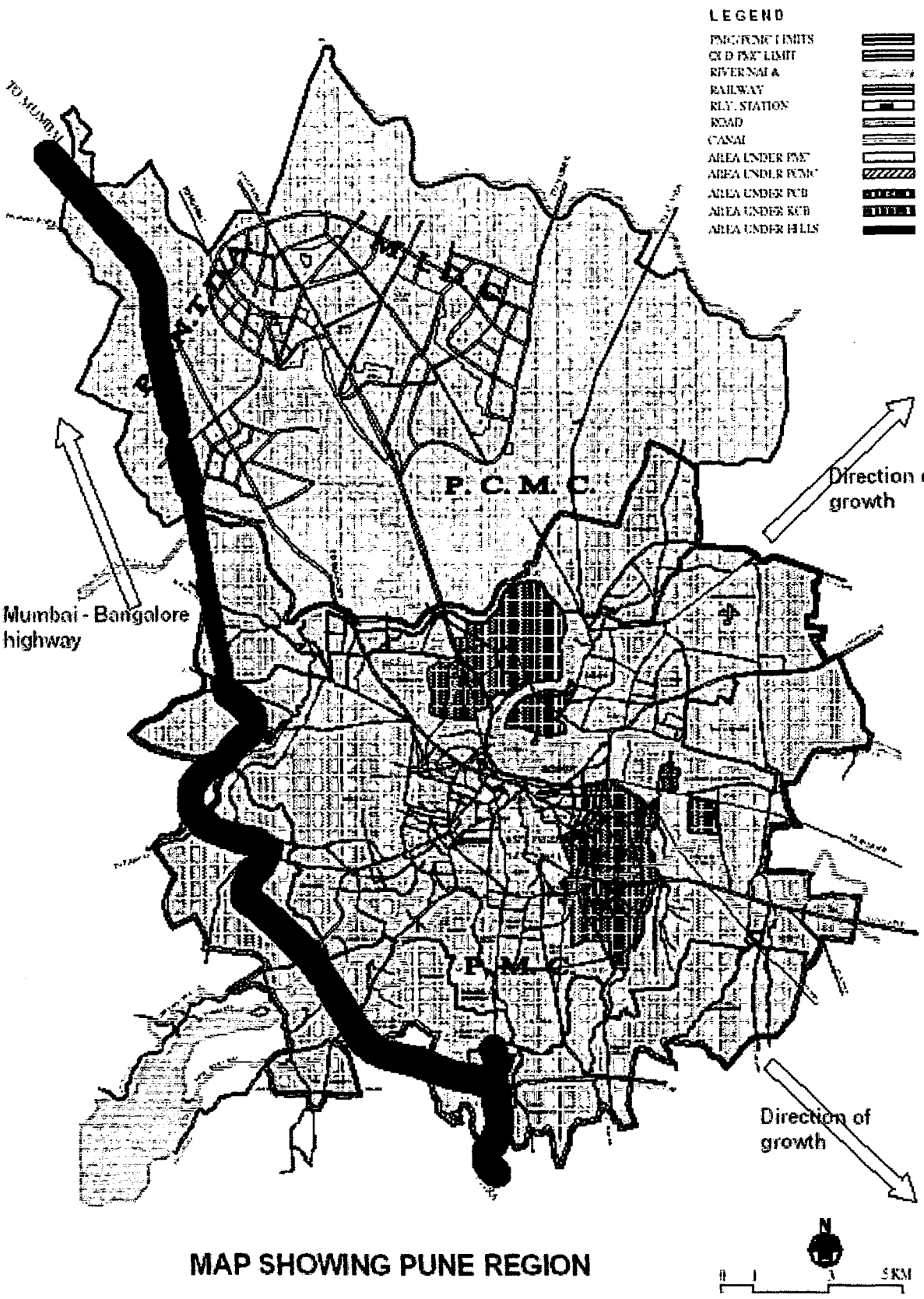


4.2 Physical Description of Pune Metropolitan Region (Refer Map 4.1)

Pune Metropolitan Region is comprised of two major parts as follows

1. Area covered within Pune Municipal Corporation (PMC), Pimpri-Chinchwad Municipal Corporation (PCMC) and three cantonments limits.
2. Fringe area comprising of 53 villages around PMC and PCMC, which further grouped into following 8 sectors, delineated on the basis of physical barriers, contiguity, road linkages, etc.
    A) Northern area along Dehu-Alandi road comprising five villages from Dehu Road to Dudulgaon
    B) Villages falling in the western belt along Pune-Bombay diversion road and lying between existing Pune-Bombay road and Mula river comprising seven villages from Mamurdi to Wakad.
    C) Area to the south of Mula River up to Pashan Khind comprising four villages i.e. Baner, Balewadi, Sus and Mhalunge.
    D) Area to the south of Pashan village up to Mutha river covering six villages from Bavdhan Khurd to Warje, Shivane.
    E) Area on either side of Sinhagad road comprising eight villages from Hingne Khurd to Khadakwasla.
    F) The southern area on eithr side of Pune-Satara road covering six villages of Ambegaon Budruk, Ambegaon Khurd, Dhankawadi, Katraj, Kondhwa Khurd and Kondhwa Budruk.
    G) Area on either side of Pune-Solapur road on eastern side comprising of eight villages of Mohamadwadi, Hadapsar, Fursungi, Manjri Bk., Undri, etc.
    H) Area of Pune-Ahmednagar and Pune-Alandi road comprising of nine villages from Wadgaon Sheri, Kharadi, Dhanori, Wagholi, Dighi, Kalas, etc.

And the villages falling outside the municipal areas and cantonment limits forming the rural area of the region within the 53 villages.



MAP SHOWING PUNE REGION

4.3 Chronological Development of the Metropolitan Region

4.3.1 Since Antiquity Till Date

Pune started as a small settlement called *'kasbe'*. The basic unit of development can be identified as *'wadas'*, which are traditional houses. Development of wadas started with the Peshwa's palace. Developments of wadas lead to formation of *'peths'*. These were planned complex containing residences, commercial areas, recreational facilities etc. Various peths were added as the importance of city grew. Cantonment areas were developed when the city was under the control of British rule. Finally through the industrial development in the post independence period, the city started developing as a metropolis. Pune grow from *'kasbe'* to metropolitan region, but the marks of each stage of development are still visible today. Pune can be sited as a best example of amalgamation of village, town and city.

4.3.2 City in History

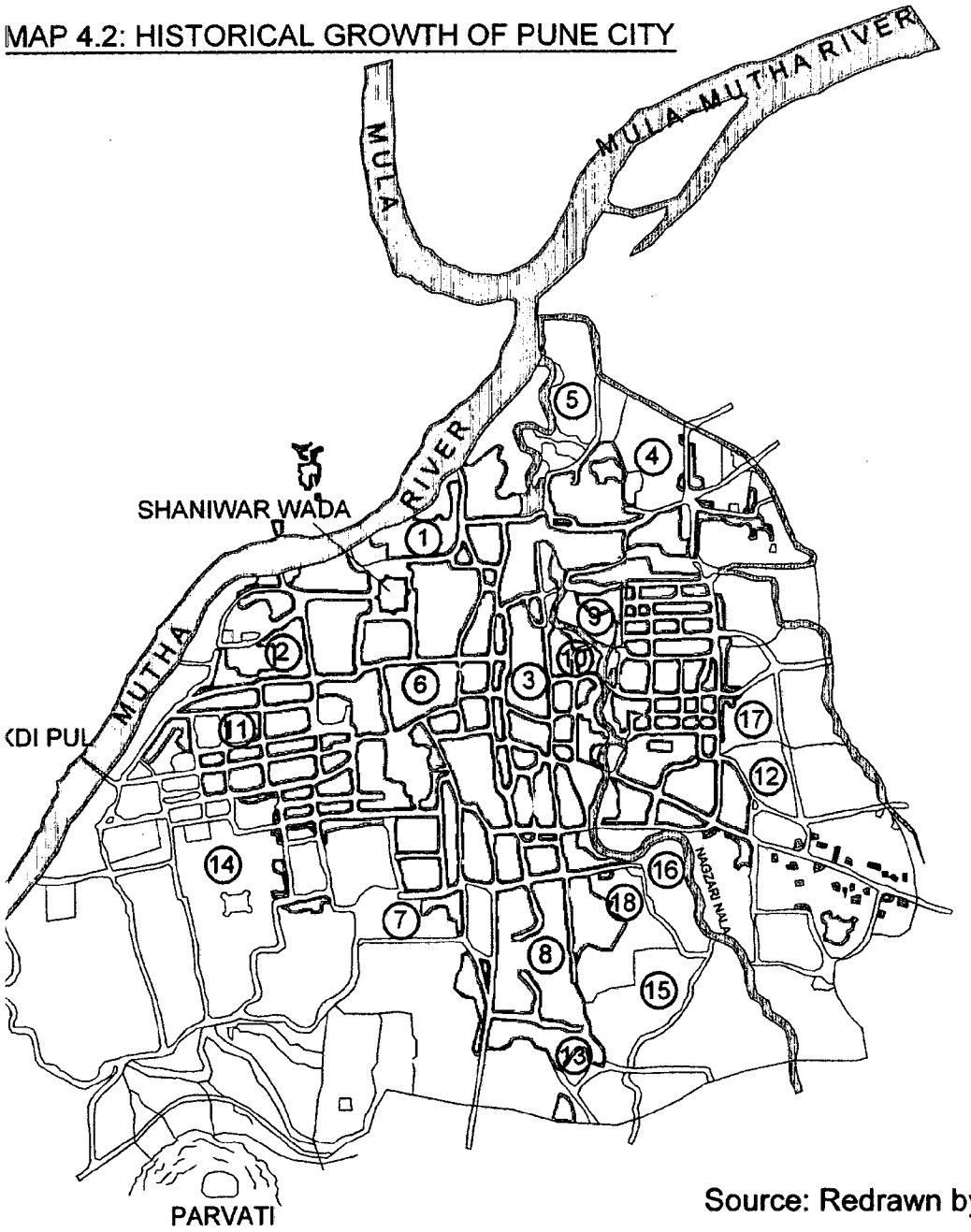
Pune's origins date back at least two thousand years when it was referred to as a settlement near places of religious importance such as Bhimashankar. The Pune city started with a small settlement called 'Kasbe' (meaning locality or *wadi* in Marathi). During the 13^{th} to 17^{th} century, it was under the control of Muslim rulers. Pune gained importance in 1630s during Maratha regime, when it was declared as the capital of Maratha Kingdom. The town changed hands between Marathas and Mughals before the British gained control of it in 1818.

In the post independence period, one of the major reasons for city's development was the flood of 1962. The flood caused extensive damage to the city (mainly the present Gaothan area), due to being low lying. This initiated development of the higher grounds now comprising of the western peripheral development. The development of the city started with the basic unit called as 'wada'.

4.3.3 Transformation In The City Core Through The Years

Subservient lords of the town constructed their mansions or wadas. Many wadas were built after the completion of Peshwa's palace at Shaniwar in 1730. These were traditional houses consisting of large courtyards and entered through massive gate. About 350

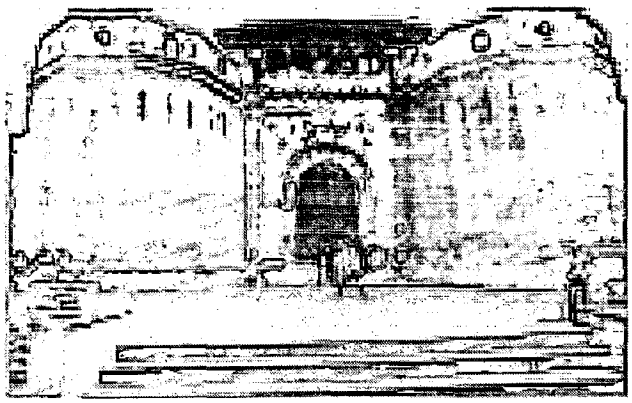
MAP 4.2: HISTORICAL GROWTH OF PUNE CITY



NO.	NAME OF THE PETH		FOUNDING PERIOD	INITIATORS
	OLD	NEW		
1.	KASBA	KASBA	AROUND 1300	EARLY HINDU & MUSLIM RULERS
2.	MURTAZABAD	SHANWAR	BEFORE 1610	MURTAZA NIZAM SHAH
3.	MALKAPUR/ ADITWAR	RAVIVAR	BEFORE 1610	MALIK AMBER
4.	SHAHPURA	SOMWAR	BEFORE 1610	---
5.	ASTAPURA	MANGALWAR	1663	SHAYASTA KHAN
6.	MOHIYABAD	BUDHWAR	1703	AURANGZEB
7.	VISAPUR	SHUKRAWAR	1734	BAJIRAO BALLAL
8.	VETAL	GURUWAR	1750	BALAJI BAJIRAO
9.	NAGESH	NIHAL	1755	BALAJI BAJIRAO
10.	GANESH	GANESH	1755	BALAJI BAJIRAO
11.	NARAYAN	NARAYAN	1761	BALAJI BAJIRAO
12.	BHAVANI	BHAVANI	1767	MADHAVRAO I
13.	MUZAFFARJANG	MUZAFFARJANG	1768-1831	MADHAVRAO I
14.	SADASHIV	SADASHIV	1769	MADHAVRAO I
15.	GHORPADE	GHORPADE	1781	MADHAVRAO II
16.	RASTA	RASTA	1783	MADHAVRAO II
17.	HANMANT	NANA	1789	MADHAVRAO II
18.	GANJ	GANJ	---	

Source: Redrawn by author from Pune Shaharacha Dyankosh (Encyclopedia of Pune City)

wadas are still present in the city in the various stages of repair. These were the basic unit of the settlement.



With the growth of Maratha Empire, the role of Pune also expanded and new 'peths' are added by different Peshwas. Peth was a planned complex including parks, a police post, residential structures of various types, artisan facilities and shops. These were clearly demarcated neighborhoods assigned to care-taker, or 'Shet Mahajans' in the form of hereditary land and administrative grants. Each new Shet Mahajan is required to develop his peth within a specific time frame. In 1637 there were four peths of Kasba, Shaniwar, Raviwar and Somwar. (Fig.1). Just as wada form gave a pattern to city's neighborhoods, the peths provided an urban structure out of well defined wards.

Increasing importance of Pune lead to development of the town and expansion of peths (Refer Map 4.2). More peths were added to cope with the increasing requirement by different rulers. Peripheral villages also started growing. The farmers of these villages supplied vegetables and services to the city. In 1781, a drainage system was laid.

By the year 1800, there were eighteen peths, three forts, a major temple complex (at Parvati 1749), a bridge across the Mutha River (1761), the imperial wada, shrines and market. There were thirteen major gardens, nourished by four major aqueducts, which supplied water to the city from a system of reservoirs.

Pune of 1800 was an impressive inland capital. Pune never had the commercial importance of cities like Ahmedabad or Surat, nor a broad economic base like other imperial seats such as Agra, Delhi, Lahore or Lucknow. Pune had emerged as an indigenous Indian capital, sustaining a system of relatively sovereign cities.[9]

4.3.4 Development During Colonial Period

British gained control over the city in 1818. During 19th century British cantonments were developed. Poona cantonment and Kirkee cantonment were established to guard entry points to the city. These areas grew over the period of time with expansion of roads

[9] Pune: The Emergence of A Metropolis, By Christopher C. Benninger

bungalows and civic amenities. The Pune Municipality was established in 1857. Old Pune deteriorated into the early 20th century, while the British suburbs flourished into well-planned garden neighborhoods. Wealthy Parsi and Gujarati families built impressive bungalows in the 'buffer zone' between the cantonment and the city.

Pune's importance grew with expansion of military, administrative, educational facilities. The Sangam Bridge constructed in 1875, linked Pune by road to Mumbai and gave new direction to development of the city. In 1884 Pune Suburban Municipality was established. By independence the working class population shifted up to the borders of the cantonments in squatter settlements and one-room tenements.,

4.3.5 Industrial Development And Emergence Of A Metropolis

Except for a paper mill, a glass factory and a textile mill, Pune saw very little industrial growth. The ordinance factory was the single major industry in the region. With the bifurcation of the erstwhile Bombay State into Gujarat and Maharashtra and a restrictive industrial policy in metropolitan Bombay, Pune attracted new manufacturing activities during 1960s. Its stable political atmosphere, educated workforce, excellent schools, residential areas and basic infrastructure were the factors attracting investments. It was during this period that outlaying villages like Dehu Road, Chinchwad, Pimpri and Hadapsar grew and became urban in character with manufacturing units emerging on their agricultural lands. This resulted in the annexation of a large number of villages and the creation of the Pimpri-Chinchwad Municipal Corporation, as a twin city across the Mula River.[10]

During the 1970's, the urban activities spilled beyond the erstwhile city limits and it was felt that for comprehensive and integrated planning, a metropolitan region converging on Pune be defined. Accordingly, the Pune metropolitan region was defined in July 1967.

Thus from a 'Kasaba' the city grew with the addition of new peths, then linkages with surrounding villages, establishments of cantonments and the development of suburban neighborhoods generated a new form. Finally through the rapid growth of industries, and related increase in slum population, Pune took on its present form.

[10] Pune: The Emergence of A Metropolis, By Christopher C. Benninger

4.3.6 Growth Pattern Of Pune

With the growth Pune developed in a definite pattern like

1. Lower castes shifting east, south-east
2. Higher castes moving west and
3. Business communities spreading south

After completion of the Peshwa's wada in 1749, the city expanded rapidly to support growing administrative, military, and social requirements. This growth continued except for the period in the 1760's when the Peshwas suffered their tragic defeat at Panipat by the Moguls and Pune was plundered by the Nizam of Hyderabad.

During the Nineteenth Century British Cantonments were developed. Poona Cantonment to the east and Kirkee Cantonment to the north guarded vulnerable entry points to the city. Each grew with the expansion of roads, bungalows and social facilities. The Pune City Municipality was established in 1857. Villages such as Talegaon, Dehu Road, Chinchwad and Pimpri expanded due to their situation along main roads. Construction of the rail line, Assembly Hall, Khadakwasla Dam, water channels and cantonment bazaars created a dual urban character. Old Pune deteriorated from 1818 into the early Twentieth Century, while the British bungalow suburbs flourished into well-planned garden neighbourhood. With the growth of Pune Cantonment, wealthy Parsi and Gujarati families built impressive bungalows in the 'buffer zone' between Poona cantonment and the city. At the same time enhanced artisan and trading activities gave a fillip to development. By independence the working class population of Pune spread up to the borders of the cantonment in squatter settlements and one-room tenements.

Pune expanded in the late Nineteenth and early Twentieth centuries mainly by resettling the depopulated areas of Peshwas. The Sangam Bridge constructed in 1875 to link Pune by road to Mumbai, also opened up the western suburbs for development.

In 1884 the Pune Suburban Municipality was established. In the same year Deccan College was founded. Stone bridges were constructed across the Mutha and Mula rivers. Town Planning Schemes in the early twentieth century attracted middle class residents to these areas. Research institutes and more colleges were initiated as Pune's active political and reformist movements spread. The first half of the twentieth century saw the

'filling-in' of Pune city's old areas, and expansion across the rivers. During this period surrounding towns and villages were experiencing gradual urban transformation.

Except for a paper mill, a glass factory and a textile mill, Pune saw very little industrial growth. The Ordinance Factory was the single major industry in the region, being located in Kirkee Cantonment. With the bifurcation of the erstwhile Bombay State into Gujarat and Maharashtra, and a restrictive industrial policy in metropolitan Bombay, Pune attracted new manufacturing activities during the 1960s. it's stable political atmosphere, educated work force, excellent schools, residential areas and basic infrastructure were factors attracting investments. It was during this period that outlaying villages like Dehu Road, Chinchwad, Pimpri and Hadapsar grew and became urban in character with manufacturing units emerging on their agricultural lands. This result6ed annexation of a large number of villages and the creation of the Pimpri-Chinchwad Municipal Corporation, as a twin city across the Mula River.

Low income, unplanned settlements have been a feature of Pune from its earliest period when 'untouchables' settled along the flood prone banks of the Mutha River. Many illegal settlements grew in post-independence period around the old Pune city on wastelands, or public reserved areas. They originated near work sites like the railway station, warehouses, construction sites, quarries, or other occupation specific locations.

By 1991 there were twelve urban nodes and 156 villages including the Pune and Pimpri-Chinchwad Municipal Corporation, the towns of Dehu, Hadapsar, Alandi, Talegaon, Khadakwasla, Lohegaon and the cantonments of Poona, kirkee, Dehu Road and Lohegaon.

Thus, from a 'Kasaba' the city grew with the addition of new peths. Then linkages with surrounding villages, the establishment of cantonments and the development of suburban neighbourhoods generated a new form.

4.4 Pune City

The city of Pune- the district headquarters lies on the Deccan plateau, at an elevation of 560 meters from mean sea level at 18°30' N latitude and 73°51' E longitude, located at an distance of about 177 Km South East of Mumbai.

4.4.1 Linkages

There are eight main arterial corridors, which pass through the entire city and connect together the old city, fringe area and the region. These arterial roads are Mumbai-Pune highway (NH-4) and Solapur highway (NH-9), which are National highways; Sus road (SH-57), Khadakwasla road (SH-59) and Ahmednagar road (SH-27) that are state highways. Sinhagad road (MDR-35), and Saswad road (MDR-60) are the two major district roads. Westerly bypass of National Highway No. 4 (Mumbai-Bangalore) connects the arterial roads on the west side, namely Baner road. The Pune-Mumbai electrified railway line from east passes through the center of the city connecting Satara district on south and Solapur district on east.

4.4.2 The Phases of Growth Of The City (See Figure 4.2)

The dominant phases of growth can be stated as follows,

1. **Till year 1820**

   The Brahmin area south of river Mutha-Kasba developed into a peth (coherent to ward) under the Peshwa rule. By this time, many other similar wards grew and the peths soon became specialized in certain specific economic activities.

2. **Development between 1820 to 1890**

   This was the phase when the settlements started expanding towards the south of the city and some development towards north along the west banks of river Mula. During the same period, Pune Cantonment and Kirkee Cantonment were established. The construction of Khadakwasla dam in 1880 and Bombay-Pune railway line in 1856 were some of the development projects taken up by British.

3. **Development between 1890 to 1950**

   The city developed considerably equally in all directions with development along the both the riverbanks as well as the newly established traffic corridors towards Mumbai, Satara, and Ahmednagar. The first major step towards urban planning implementation strategy was the implementation of town planning schemes during this phase of development in the city.

4. **Development between 1950 to 2001**

The city has been going a rapid phase of expansion, especially with the growth of peri-urban areas. The Panshet dam bursting disaster of 1961 forced people to move away from the core of the city as the right bank of Mula river washed out many houses. Government organized housing was developed in the areas away from low-lying city core. The inclusion of 36 villages to the Pune Municipal Corporation (PMC) limits was a major event in terms of physical expansion of the city. The development of Software Technology Park in the fringe area boosted development in the western part of the fringe. The main trunks like NH-4, NH-9 and others have become the major areas of dominant development of housing. The task of preparation of development plan for the same has been taken by PMC.

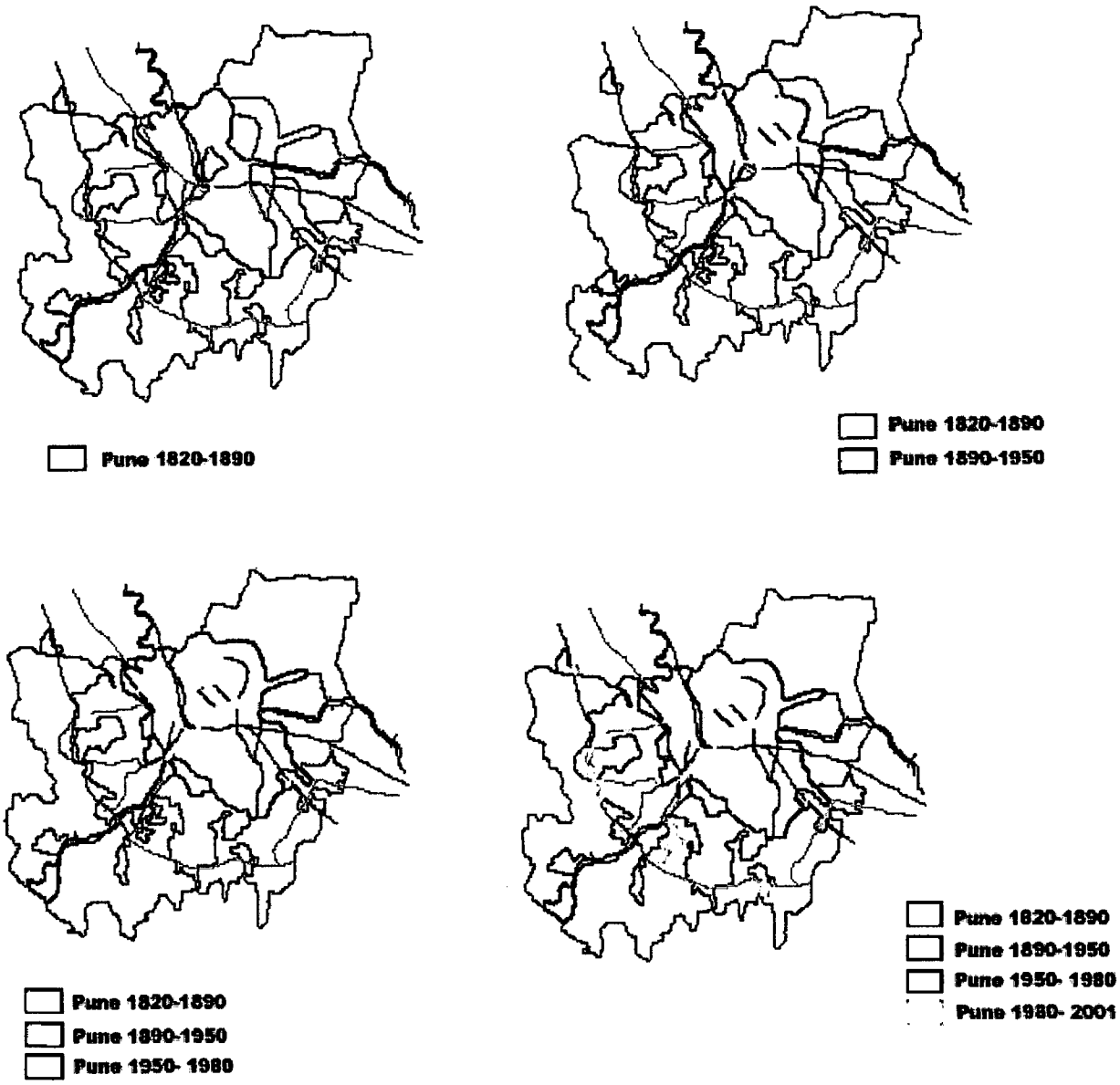


Figure 4.2: Evolution and growth of Pune City

4.5 Demographic characteristics of Pune Metropolitan Region

Sr. No.	Settlement	1951	1961	1971	1981	1991	2001*
1.	Pune Metro Region	7.95	9.93	14.00	20.88	29.96	40.13
2.	Pune Municipal Corporation	4.88	6.07	8.56	12.03	15.60	25.38
3.	Pimpri-Chinchwad Municipal Corporation	0.27	0.40	0.98	2.52	5.16	10.12
4.	Pune Cantonment	0.59	0.66	0.78	0.86	0.82	0.80
5.	Kirkee Cantonment	0.49	0.58	0.65	0.81	0.78	0.78
6.	Other Towns and Villages	1.79	2.22	3.03	4.66	7.6	3.05

Population in Lakhs

Table 4.1: Demographic characteristics of Pune Metropolitan Region

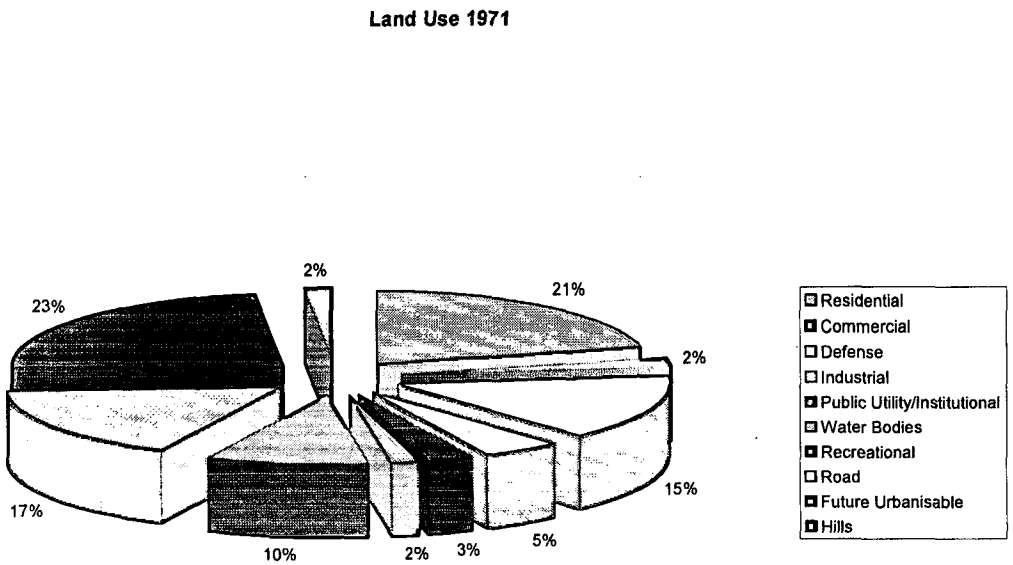
Source: Niyojan Vichar, Special Issue, Vol XXIV, April 1997, TP & VD

*: Figures from Census 2001

4.6 Land Use Characteristics of Pune City and Pune Metropolitan Region

Existing land use statement – Pune (1971 to 1997)

Land Use 1971



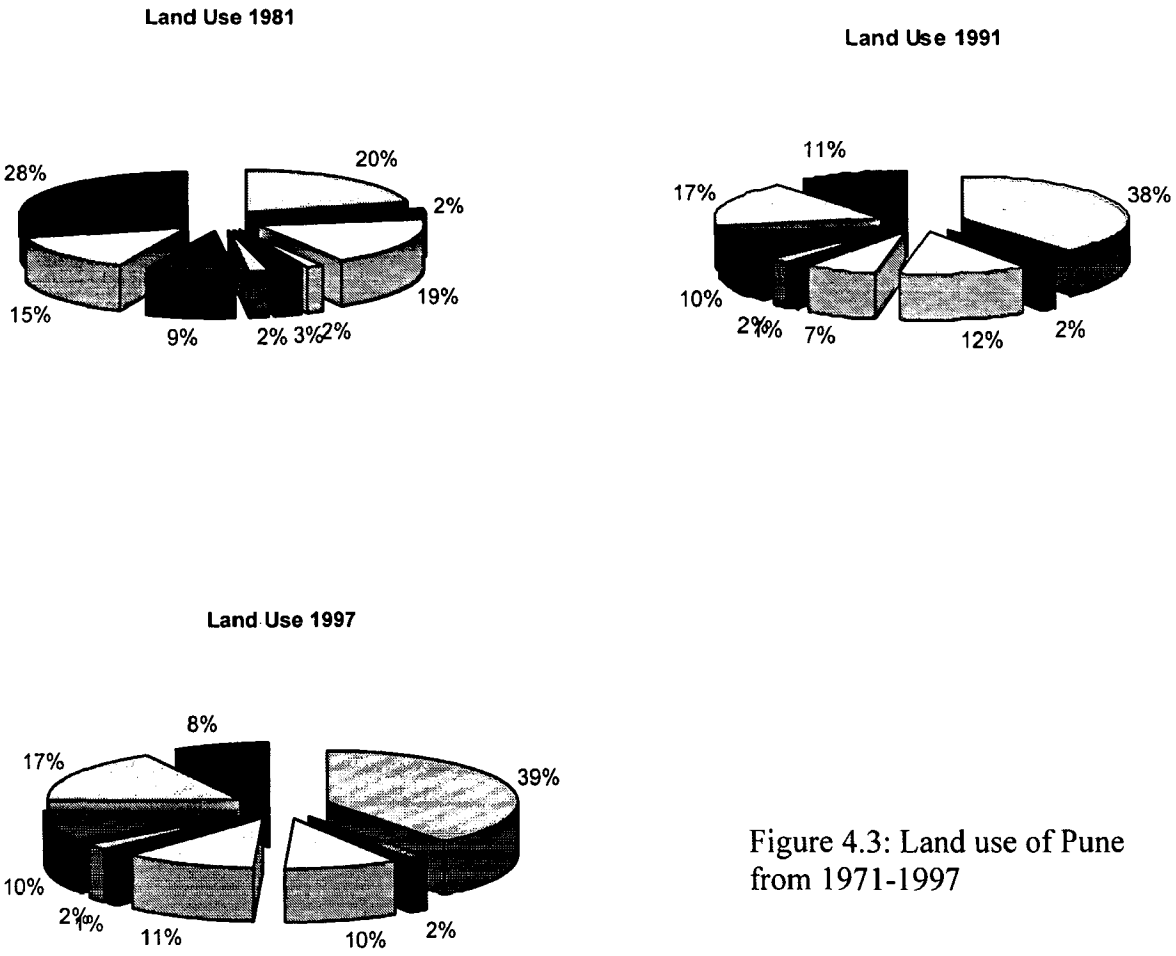


Figure 4.3: Land use of Pune from 1971-1997

Type of Land Use	1971	1981	1991	1997 (Before inclusion Of Villages)
Residential	21.42	20.27	38.17	38.60
Commercial	2.00	1.62	1.73	1.80
Defense	14.78	18.21	12.21	9.50
Industrial	4.80	1.68	6.88	11.00
Public Utility/Institutional	2.80	2.76	1.10	1.10
Water Bodies	1.80	1.80	1.66	1.80
Recreational	9.70	8.24	9.33	9.70
Road	16.80	14.06	16.80	16.80
Future Urbanisable	24.10	27.76	10.32	7.90
Hills	1.80	1.80	1.80	1.80
Total	100.00	100.00	100.00	100.00

Table 4.2: Land use of Pune from 1971-1997

From the analysis, it can be seen that while there is a significant rise in the residential area, the area under transport has not increased at the same rate thus putting tremendous pressure on the city's transportation system. Very distinct feature of Pune is cantonment and defence establishments and defence areas. The hills on the northeastern, southern and forests on the western part act as a barrier to the growth of the Pune.

4.6.1 Existing Land Use of Pune Metropolitan Region (See Map 4.3)

Sr. No.	Particulars	Fringe Area 53 Villages	Outside of Fringe Area 79 Villages	Total
1.	Total Area	48609.55 (100%)	70780.79 (100%)	119390.34 (100%)
2.	Gaothan	374.07 (0.77%)	1362.33 (1.92%)	1736.40 (1.45%)
3.	Residential	1930.50 (3.97%)	23.63 (0.03%)	1954.13 (1.64%)
4.	Plotting and Sub-Division	3162.94 (6.51%)	278.53 (0.39%)	3441.47 (2.88%)
5.	Industrial, Commercial And others	1103.44 (2.27%)	89.81 (0.13%)	1193.25 (1.00%)
6.	Total Area	6570.95 (13.52%)	1754.30 (2.47%)	8325.25 (6.97%)
7.	Roads and Railways	633.47 (1.30%)	701.60 (1.00%)	1335.07 (1.12%)
8.	Water Bodies	1070.57 (2.20%)	1458.37 (2.06%)	2528.94 (2.12%)
9.	Forest Area	2151.25 (4.42%)	9366.07 (13.23%)	11517.32 (9.65%)
10.	Defence Area	5287.75 (10.88%)	483.42 (0.68%)	5771.17 (4.83%)
11.	Agricultural Area	20648.91 (42.48%)	53919.53 (76.32%)	74568.44 (62.46%)

12.	Pastures (Pad)			
	A) Government	1447.83	--	1447.83
		(2.98%)	--	(1.21%)
	B) Private	10067.52	2592.70	12660.22
		(20.71%)	(3.66%)	(10.60%)
	C) Total	11515.35	2592.70	14108.05
		(23.69%)	(3.66%)	(11.81%)
13.	Public-Semipublic	825.12	410.98	1236.10
		(1.70%)	(0.58%)	(1.04%)

Area in Ha.

Table 4.3: Existing Land Use of Pune Metropolitan Region

Source: Niyojan Vichar, Special Issue, Vol XXIV, April 1997, TP & VD

Note

1. Total area of PMC and PCMC = 23786.51
2. Total area of Cantonment Boards = 6462.00
3. Total area of Pune Metropolitan = 119390.34+23786.51+6462.00= 149638.85

4.7 The Pune Municipal Corporation – Sectors

The area covered under the PMC limits is 138.85 sq.km. For planning purposes the entire area is divided into six sectors, which are based on the stages of development. For control of traffic the city has been divided into 91 traffic zones. Suitable traffic zones are clubbed together to form planning units on the basis of considerations such as predominant land use, extent of development, level of available services, level of social facilities, existence of slums etc. these planning units are combined to form sectors. These are six sectors within the PMC limits.

Sector I

It consists of the congested city area called Gaothan, (the old city). This core area of the city consists of 3.6% of the total municipal area, and contains about 35% of the city's population, giving very high residential density. The predominant house type is the old wadas with new redevelopment schemes in the form of apartments. This sector consists of all the high order commercials like the central vegetable market, the jewelry market and the cloth market.

Sector II

It forms the second development zone in the southern parts of the old city, bounded by the hill ranges on one side and sector VI on the other side. Major housing development has takes place in the form of LIG and MIG housing in the form of plotted development. The area could be classified as predominantly a Hindu area with Saras Baug (garden) acting as the focus. The fringe areas like Bibwewadi and Dhankawadi came into the housing market in the early 1980s.

Sector III

It consists of the development area within which housing was initiated after the 1961 floods. This area is contained within the two rivers, Mula and Mutha and consists of MIG and upper MIG group. Erandawana in this sector is predominantly residential with institutions. Kothrud has experienced the fastest rate of development in the housing market.

Sector IV

It is primarily institutional area with minor residential development. It consist of Pune University, the Agriculture College and other institutes. This area has a connotation of being an 'elite' area due to the residential development predominantly catering to HIG group and the house type that is bungalow. The development of new roads for the National Games 1994, passing through this area has given lot of impetus to the housing development.

Sector V

This sector consists of the northern parts of the city beyond the Mula river up to the Airport. Until the 1980's, this area was completely isolated in terms of development. This area is predominantly under defence and jail. Major development in this area took place in the later part of 1980's.

Sector VI

This area has seen development over different periods.

4.8 Pune Cantonment – A Brief

The Pune Cantonment was established in 1817, when British first claimed reign over the town of Pune. This area has major institutions like the southern command and armed forces medical college. Besides, this area acted as residential area for the British officers creating a colonial atmosphere.the housing development was predominantly on leasehold. The development based on road width instead of F.A.R. heralded the advent of multistoried apartments in the cantonment.

4.9 Pimpri-Chinchwad Municipal Corporation

The Maharashtra Industrial Corporation had established a large industrial estate (4000 Ha) at Pimpri Chichwad. At present PCMC prepared a revised development plan for 1986-2006. the total area within the PCMC is 8800 Ha. About 1500 Ha of land is acquired by the New Town Development Authority and 800 Ha has been developed. The poredomonant use in the corporation is industrial, covering 1771.64 Ha.

4.10 The Development of Fringe of Pune

The fringe area of Pune has developed due to two major reasons

1. The population Growth
2. The functional transformation of the city

1. Population Growth

The expansion in the size of city in terms of jurisdiction was partly a response to successive larger populations that the city attracted and partly to the peripheral spillovers, which needed to be brought within the ambit of 'planning' (See Table 4.4). By 1981 Pune has become a million plus city, where after in a few years, Pimpri-Chinchwad, new town was born. The town is also virtually an expansion of Pune.

Under Maharashtra State Government, department of urban development, notification 1997, 36 peripheral villages/parts of villages, skirting the then existing PMC limit and having a total area of 230.04 sq.km. were merged in the Corporation. As a result, PMC area has increased from 138.85 sq.km. to 368.89 sq.km. The area newly added is more than one and half times the original area.

Demographic Pattern of Pune City

Year	Population (Lakhs)
1971	8.56
1981	12.03
1991	15.66
1996	20.26
2001	25.38

Table 4.4: Demographic Pattern of Pune City

Source: Pune Shaharacha Dyankosh (Encyclopedia of Pune)

2. Functional transformation

With the growth in population came the functional transformation of the city. The cause and effect relationship between the population of the city and its functions would indeed be of an interchangeable nature. From an educational and cultural center the city gradually became a center of large scale manufacturing industries. In just a couple of decades after independence, the Pune urban agglomeration became the second order industrial complex of the State attracting migrants from all parts of the country. The city in fact started becoming a trendsetter of new ideas and more modern ways of living. Another important event in the history of Pune was the bursting of the Panshet dam in the year 1961. the repercussion of this disaster was a boosted development in the fringe areas both by the local authority as well as individual. The local authority contributed to the development of fringe area in the form of housing for the flood affected in the fringe areas, which are a comparatively higher elevation than the city core. The individuals who wanted to move out of the congested noisy city core, breaking the joint family system started buying plots for housing in areas like Dhankawadi, Sahakarnagar on the southern and Western parts of the city. This has been a major element to understand the trend of development and direction of growth of the city.

The Fringe Area of Pune

The entire fringe area of Pune city is comprised of 53 villages beyond the municipal limits as demarcated till 1997. Out of these villages 36 are included in the municipal limits in the

year 1997. out of these 36 villages, 13 are again excluded, which form the study area of this research.

4.11 Sectors in the Fringe

The 53 villages have been grouped as per the provisions of Regional Plan 1976 in six sectors from A-H, on the basis of geographical contiguity, natural barriers and keeping in view the development and planning purposes of these villages. (See Map 4.5, 4.6)

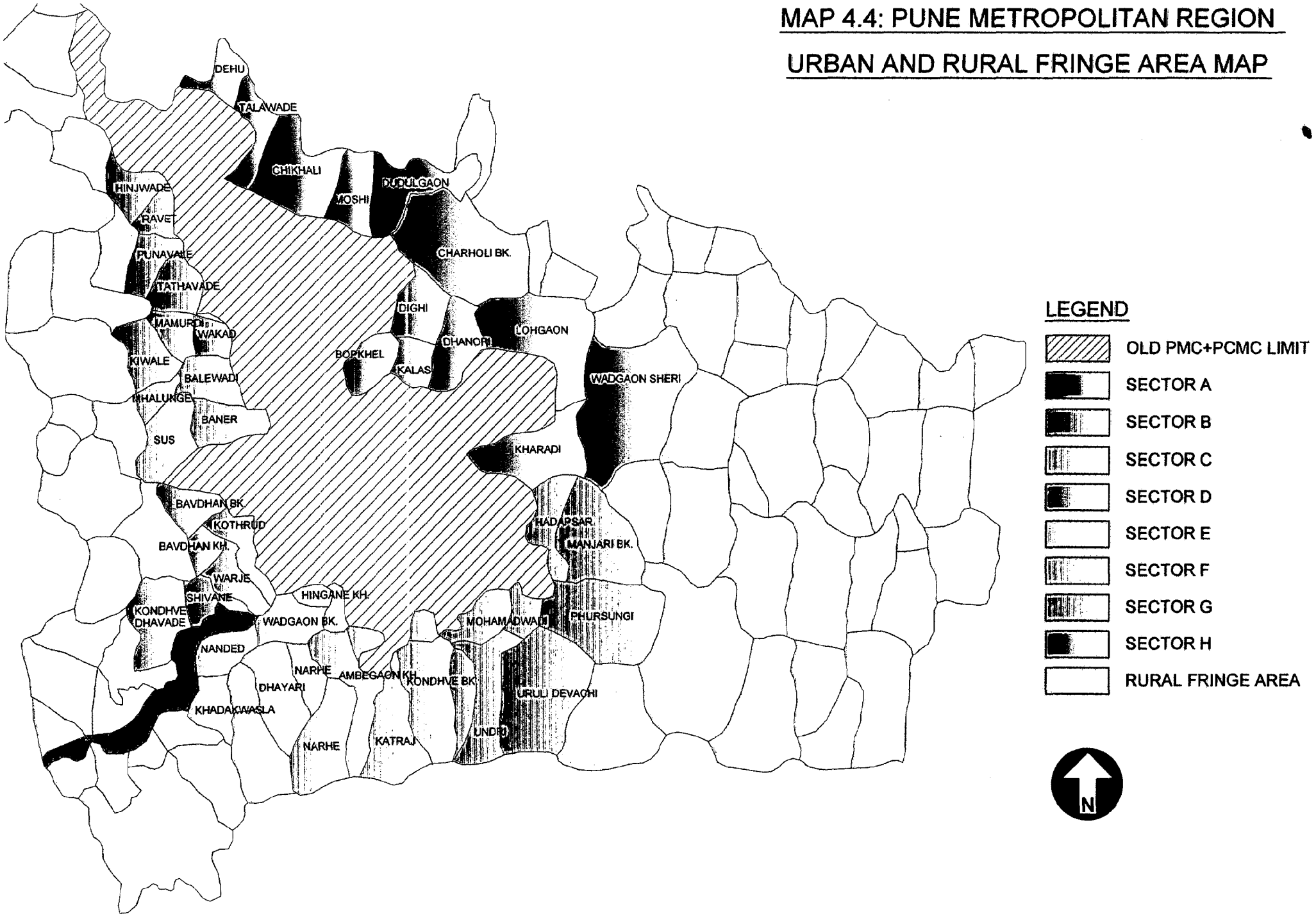
Sec No.	No. of Villages	Name of the Villages
A	5	Talawade, Chikhali, Moshi, Dudulgaon
B	7	Kiwale, Ravet, Mamurdi, Punavale, Tathavade, Wakad, Hinjawade
C	4	Mhalunge, Baner, Balewadi, Sus
D	6	Bawdhan Bk., Bawdhan Kh., Kothrud, Warje, Shivane, Kondhave-Dhavade, (Uttamnagar)
E	8	Hingane Kh., Wadgaon Bk., Wadgaon Kh., Wadgaon-Dhayari, Narhe, Nanded, Kirkatwadi, Khadakwasla
F	6	Abmegaon Bk., Ambegaon Kh., Dhankawadi, Katraj, Kondave Kh., Kondhave Bk.
G	8	Undri, Pisoli, Mahamadwadi, Hadapsar, Phursungi, Manjari Bk., Mundhava, Uruli Devachi
H	9	Wadgaon-Sheri, Kharadi, Dighi, Kalas, Dhanori, Bopkhel, Charholi Bk., Lohagaon

Table 4.5: Sectors in the fringe

Source: Niyojan Vichar, Special Issue, Vol XXIV, April 1997, TP & VD

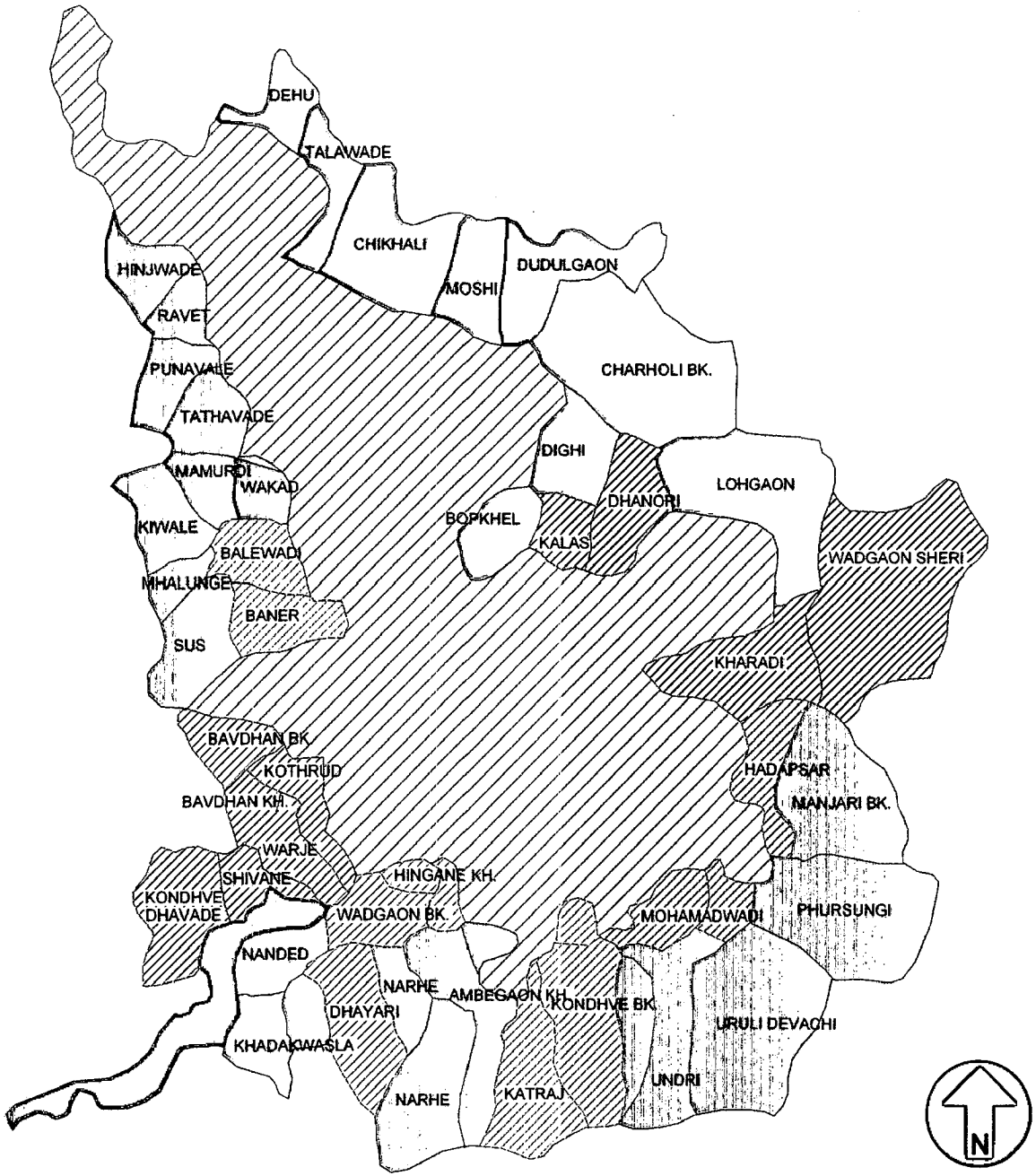
MAP 4.4: PUNE METROPOLITAN REGION

URBAN AND RURAL FRINGE AREA MAP



MAP 4.5: PUNE METROPOLITAN REGION

URBAN FRINGE AREA MAP 2001



LEGEND

- OLD PMC+PCMC LIMIT
- SECTOR A
- SECTOR B
- SECTOR C
- VILLAGES IN SECTOR C INCLUDED IN PMC LIMIT
- SECTOR D
- VILLAGES IN SECTOR D INCLUDED IN PMC LIMIT
- SECTOR E
- VILLAGES IN SECTOR E INCLUDED IN PMC LIMIT
- SECTOR F
- VILLAGES IN SECTOR F INCLUDED IN PMC LIMIT
- SECTOR G
- VILLAGES IN SECTOR G INCLUDED IN PMC LIMIT
- SECTOR H
- VILLAGES IN SECTOR H INCLUDED IN PMC LIMIT

4.12 Population and Growth rates in the Fringe Villages of Pune City (Sectors C-H)

Village	Population 1991	Growth Rate 81-91	Population 2001	Area in Ha.
Balewadi	1920	47.90	5000	476.96
Baner	6133	109.0	22436	822.35
Sus	**2269**	**39.0**	**N.A.**	**913**
Mhalunge	**1838**	**16.0**	**N.A.**	**523.19**
Sector C				
Bavdhan Bk.	3065	202.0	**N.A.**	558
Bavdhan Kh.	2676	47.0	6000	591.29
Kothrud	1058	**N.A.**	23183	364.05
Warje	17676	246.0	48952	745
Shivane	8756	35.0	7200	812
Kondhwa Dhav.	3061	68.0	**N.A.**	1273.61
Kopare	**2277**	**22.0**	**N.A.**	**308.42**
Sector D				
Hingne Kh.	8769	274.0	34720	207.49
Wadgaon kh.	1522	64.0	1800	153.3
Wadgaon Bk.	9588	128.0	40972	462
Nanded	**4069**	**34.0**	**N.A.**	**481.25**
Narhe	**1415**	**47.0**	**N.A.**	**433.23**
Dhayari	8878	69.0	19420	1241.03
Kirkatwadi	**2508**	**68.0**	**N.A.**	**312.3**
Khadakwasla	**18070**	**8.50**	**N.A.**	**786**
Sector E				
Dhankawadi	27727	413.0	93512	314
Katraj	10137	177.0	32973	2133.51

Ambegaon Bk.	**5061**	**172.0**	**3432**	**440.99**
Ambegaon Kh.	**1042**	**144.0**	**15520**	**1368.03**
Kondhwa Kh.	3439	**N.A.**	24500	489.76
Kondhwa Bk.	4678	44.0	18900	684.75
Sector F				
Undri	**1047**	**32.0**	**3000**	**1059.77**
Pisoli	**1191**	**65.0**	**N.A.**	**486.23**
Mohamadwadi	3561	44.0	12900	704.16
Hadapsar	39530	92.0	60184	911.40
Manjari Bk.	**20216**	**23.0**	**N.A.**	**1928.74**
Mundhwa	**8058**	**N.A.**	**N.A.**	**22**
Sector G				
Wadgaon Sheri	32445	149.0	57900	625
Kharadi	11679	141.0	42400	785
Lohagaon	**10329**	**-39.0**	**N.A.**	**3683**
Dhanori	13878	249.0	30572	969.79
Kalas	11344	2.50	13900	526
Sector H				

Note: Village shown in red are outside PMC milits

Table 4.6: Population and Growth rates in the Fringe Villages of Pune City (Sectors C-H)

Source: Draft Development Plan 2001-2021 for newly added villages

4.13 Fringe Area Existing Land Use

The area of 36 villages that are newly added to PMC limit is 230.4 Sq.Km. as per land revenue department. The sector wise existing land use statement for the year 1996 is as follows, (See Map 4.7)

Sr. No.	Sector	C	D	E	F	G	H	Total
	Land Use Description							
1.	**Residential**	**194.69**	**376.05**	**364.02**	**898.61**	**582.55**	**725.8**	**3141.7**
	% of fringe LU	6.2	11.97	11.59	28.6	18.54	23.1	
	% of Sector LU	7.18	8.27	9.12	36.01	11.86	16.7	13.60
2.	**Mixed LU**	**1.1**	**5.8**	**5.81**	**35.47**	**4.19**	**8.09**	**60.4**
	% of fringe LU	1.83	9.6	9.61	58.65	6.94	13.38	
	% of Sector LU	0.04	0.13	0.15	1.42	0.09	0.19	0.24
3.	**Commercial LU**	**0.33**	**1.01**	**3.47**	**1.46**	**1.75**	**3.44**	**11.4**
	% of fringe LU	2.85	8.85	30.23	12.74	15.29	30.03	
	% of Sector LU	0.01	0.02	0.09	0.06	0.04	0.08	
4.	**Industrial LU**	**0.12**	**3.85**	**18**	**38.04**	**9.05**	**49.21**	**118**
	% of fringe LU	0.1	3.26	15.22	32.16	7.65	41.61	
	% of Sector LU	0	0.08	0.45	1.52	0.18	1.13	
5.	**Public Semipublic**	**96.26**	**15.66**	**426.52**	**34.69**	**229.92**	**32.26**	
	% of fringe LU	11.52	1.87	51.06	4.15	27.53	3.86	
	% of Sector LU	3.55	0.34	10.69	1.39	4.68	0.74	
6.	**Defence**	**0**	**2040.34**	**0**	**0**	**192.04**	**749.43**	**2981.81**
	% of fringe LU	0	68.43	0	0	6.44	25.13	
	% of Sector LU	0	44.85	0	0	3.91	17.24	12.96
7.	**Agriculture/ Open**	**1758.68**	**1095.25**	**2123.55**	**826.15**	**3362.97**	**2591.85**	**11758.45**
	% of fringe LU	14.96	9.31	18.06	7.03	28.6	22.04	

	% of Sector LU	64.89	24.08	53.2	33.11	68.47	59.63	51.11
8.	**Forest**	**33.53**	**228.71**	**225.29**	**14.45**	**170.63**	**10.84**	**683.45**
	% of fringe LU	4.91	33.46	32.96	2.11	24.97	1.59	
	% of Sector LU	1.24	5.03	5.64	0.58	3.47	0.25	2.97
9.	**Hills/Hill Slopes**	**537.83**	**647.36**	**606.31**	**461.12**	**134.77**	**14**	**2401.4**
	% of fringe LU	22.4	26.96	25.25	19.2	5.61	0.58	
	% of Sector LU	19.84	14.23	15.19	18.48	2.74	0.32	10.44
10.	**Water Bodies**	**32.63**	**63.56**	**129.18**	**73.35**	**95.84**	**34.53**	**431.1**
	% of fringe LU	7.57	14.74	29.97	17.48	22.23	8.01	
	% of Sector LU	1.2	1.4	3.24	3.02	1.95	0.79	1.87
11.	**Transportation**	**55.22**	**71.52**	**89.35**	**110.18**	**127.81**	**127.34**	**581.42**
	% of fringe LU	9.5	12.3	15.37	18.95	21.98	21.9	
	% of Sector LU	2.04	1.57	2.24	4.42	2.6	2.93	2.53
	Total Area (ha.)	**2710.38**	**4549.13**	**3991.5**	**2495.53**	**4911.53**	**4346.8**	**23004.86**
	% of Fringe LU	**11.78**	**19.77**	**17.35**	**10.85**	**21.35**	**18.9**	
	River	154.4	211.25	218.63	44.16	222.97	129.06	980.47

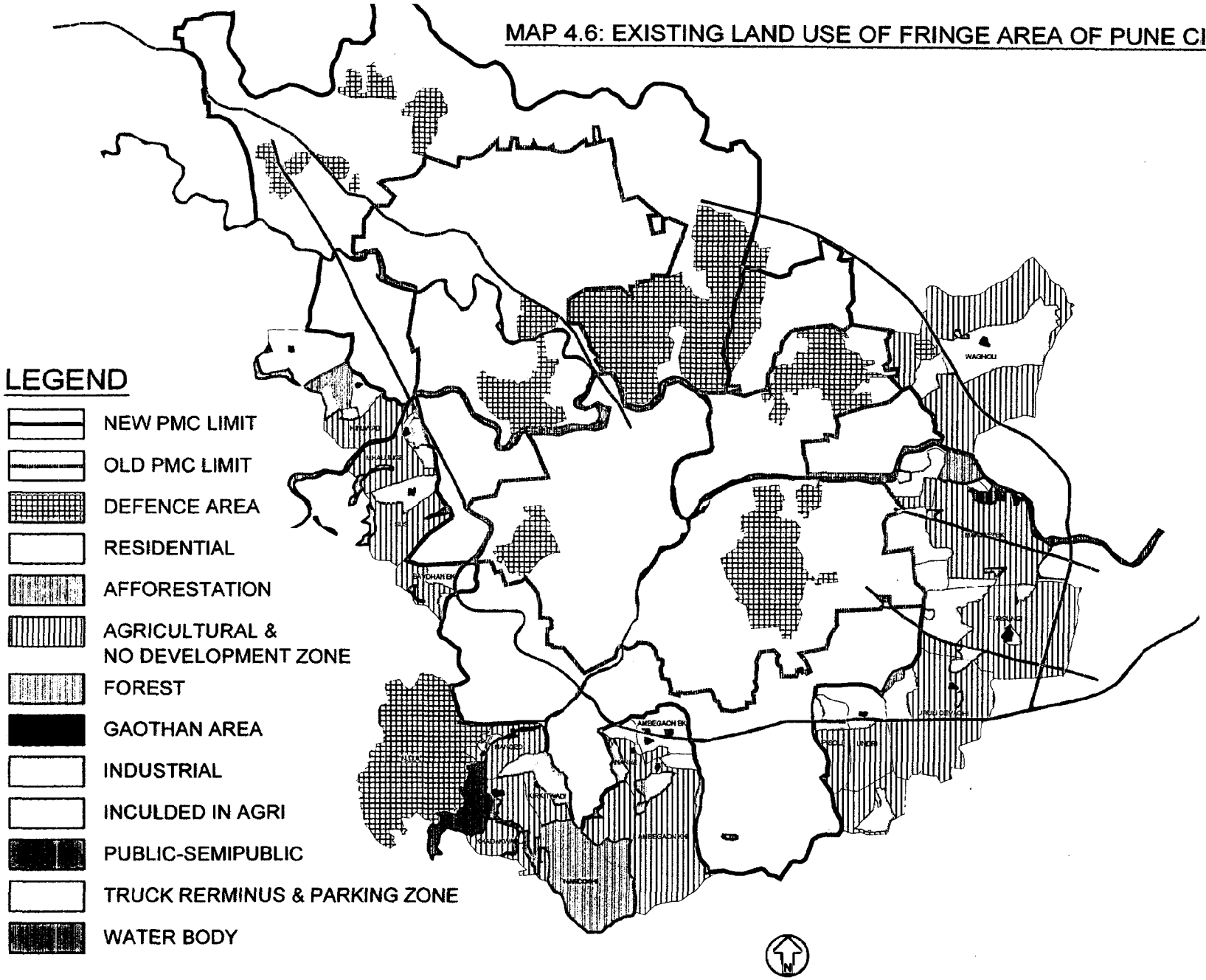
Table 4.7: Fringe Area Existing Land Use
Source: Pune Municipal Corporation

Existing Land Use Analysis of the Fringe Area

1. About 52.71% is under agriculture/open land category (34.74% under agriculture and 17.97 as vacant lands/wastelands). All this area would be available for development.
2. A large chunk of land i.e. 13.05% is under defence use mainly National Defence Academy (NDA) where no planning by PMC is to be intervened.
3. The land use in the form of purely commercial use is negligible, that is 0.05%, however the mixed land use is 0.27%, which is substantially high in highly developed areas like Dhankawadi, Wadgaon Sheri, etc.
4. Industrial development is limited to only 0.52% of the total land but wherever present, it is in congested areas.

5. 3.68% of the area is under public and semi public use for institutional areas like sports complex etc.
6. The actual area obtained as hill and hill slopes works out to be 9.8% of the total area. These hills and hill slopes may form a part of large open space reservoir for the city.

MAP 4.6: EXISTING LAND USE OF FRINGE AREA OF PUNE CITY



Source: Redrawn by author from Town Planning & Valuation Department

4.14 The Land Market Scenario In The 36 Villages

Price is an indicator of housing situation in an urban area. Several factors influence the increase of urban land and real estate prices. Permanent urban growth is accompanied by the investment in public and private services. These factors serve to enhance the urban environment and increase the value of land and property. The land values in the fringe area are based on the market trend of various villages in each sector as reflected in June 2000 in the sectors C to H. these prices are dominated by distance from city core, availability of infrastructure, and type of housing available in the particular area.

Land Prices in the Various Sectors

Sector in the Fringe Area	Land Price, Rs./Sq.Ft.
Sector C	157.50
Sector D	232.14
Sector E	125.00
Sector F	195.00
Sector G	91.70
Sector H	130

Table 4.8: Land prices in the various sectors
Source: www.punerealproperties.com

The values are based on average of the land values of all villages in each sector. The land prices are highest in sector D. Kothrud village in sector D displays the highest price followed by Warje in the same sector. The land price helps to understand the direction of growth.

CHAPTER V

OBSERVATION AND PROBLEM OVERVIEW

Field Observations

Field observations are very important as they present overall picture of the present situation in the villages.

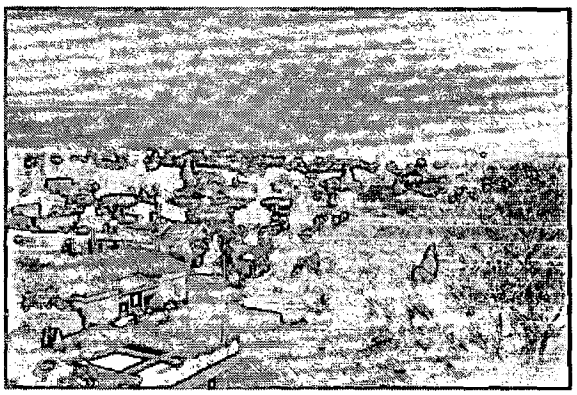
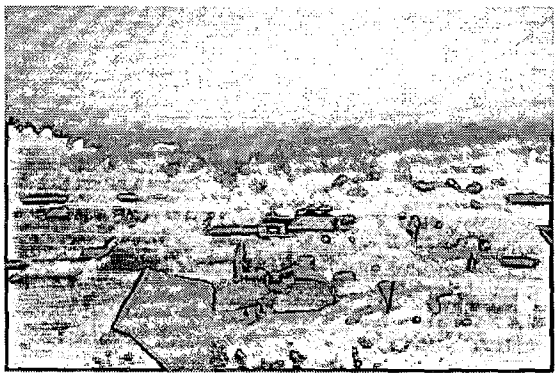


Figure 5.1: Manjari village near Hadapsar in the fringe area of Pune City.

Figure 5.2: Core area of the village presents rural character with traditional houses with sloping roofs.



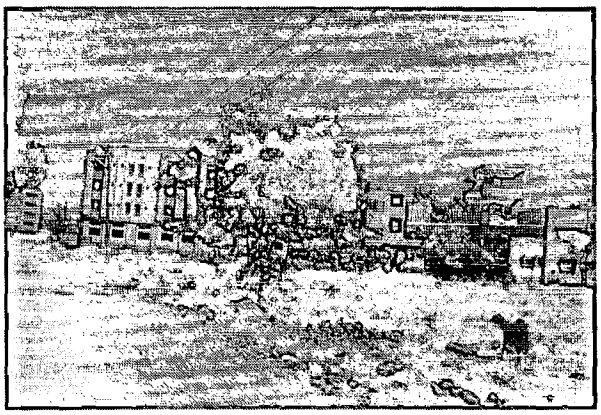


Figure 5.3: Development of apartment buildings can be observed on the road connecting the village to main city.

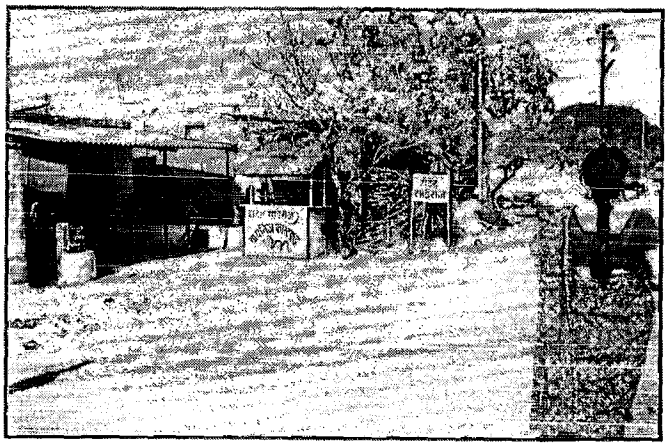


Figure 5.4: Influence of urban area on the village can be observed in the form of small hotels like Chinese restaurants.

Figure 5.5: There are no recreational spaces in the villages. People gather in such semi covered spaces, like space in front of shops etc.

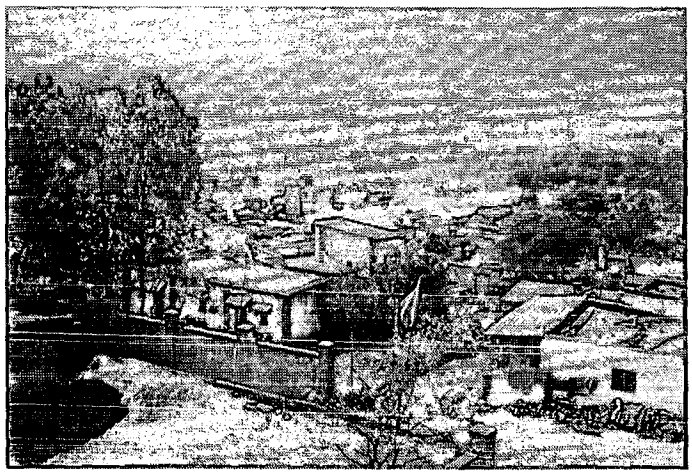


Figure 5.6: Ambegaon village situated on the NH-4. 60% of this village is under the jurisdiction of PMC. Agriculture in this village diminishing rapidly.

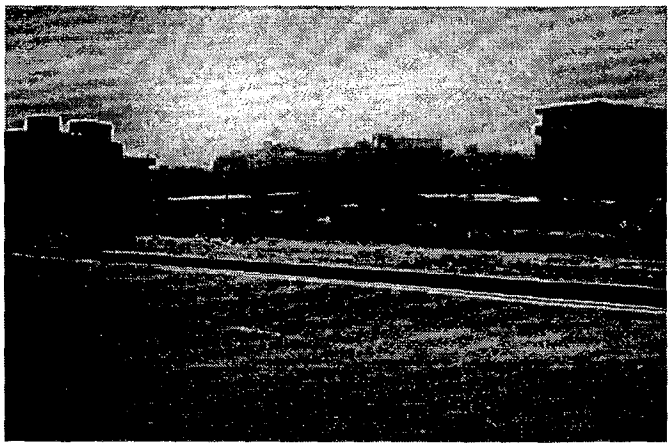


Figure 5.7: Area along national highway is developing rapidly. Construction of apartment buildings is the major activity.

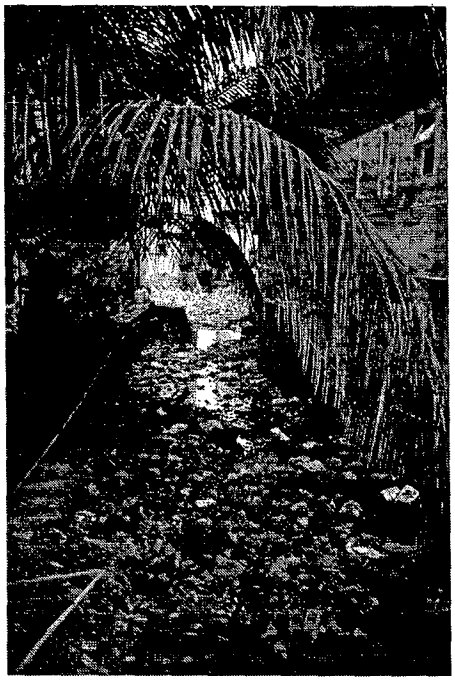


Figure 5.8: Infrastructure in fringe area villages is below standard, leading to environmental deterioration of the area.

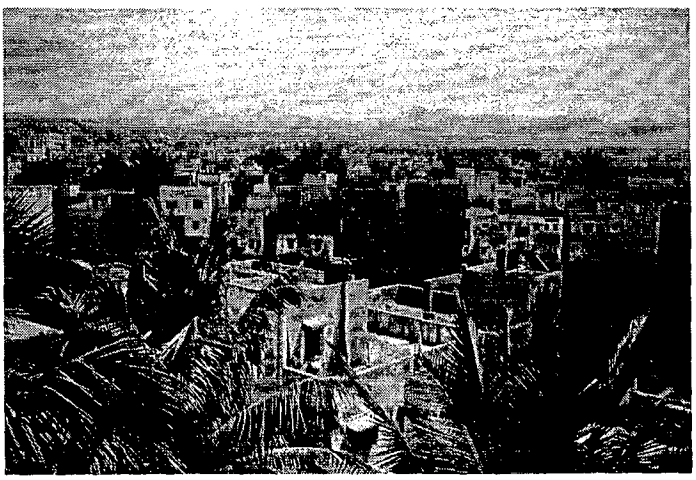


Figure 5.9: Fringe of Pune City is losing its unique character with the development of modern buildings. Main role of the fringe is to satisfy the demand of housing.

CHAPTER VI

LEGAL ASPECTS AND INSTITUTIONAL SETUP

6.1 Institutional Setup in Pune

Any good planning proposal cannot be achieved without proper implementing agency. Role of implementing agency is very crucial. Implementation agency uses certain rules like acts, laws, reservations to implement development proposals at right time and at right place. In Pune city predominant implementing agencies are Pune Municipal Corporation and Town Planning & Valuation Department.

PMC is the main agency for implementing development plans under the guidance of TP & VD department. This basically takes into account all developed areas of the city. The major tasks of TP & VD department include preparation of regional plans and guiding Municipal Corporation. The same agency is also responsible for the preparation and implementation of town planning schemes as sanctioned by the state urban development department. Municipal Corporation is divided into various other departments which carry out day to day works like water supply, disposal of sewage etc.

6.2 The evolution of the statutory legal framework

The administration of the city is known right from the Peshwas rule of 1764 where there were proper land records, house taxes, toll etc. In 1818 British gained control over the city and the tasks of surveying, mapping were started by them. In 1858 municipality was established, which rose to Municipal Corporation in 1950 after independence with cantonments functioning separately till date. The Bombay Town Planning Act of 1915 became applicable to Pune in 1916. Using modern town planning techniques along with land acquisition act a large scale development was carried out including implementation of town planning schemes to decongest the city core area. The municipal corporation followed the Bombay provisional Municipal Corporation Act 1949, through which certain efforts for efficient administration of the city and cantonments was tried to be establish amalgamating the city and suburban municipalities.

6.3 Initial planning efforts

Pune Municipality took steps to control development of the growing town on the west, north and south of the congested parts of the city by preparing town planning schemes under the provisions of the Bombay Town Planning Act, 1915. In addition, the Municipality undertook several improvement schemes under the then municipal act.

In 1952, the corporation prepared a Master Plan of Greater Pune for the area within and with some contiguous areas beyond the corporation limits. However the Master Plan was not submitted to Government for sanction under the 1954 act.

6.4 Development Plan

Till the period of 1961 the Municipal Corporation had faced problems of inadequate funds, non-functional taxation system and most importantly the incapability to manage the expanse from 44sq.km. to 139sq.km. This led to dilemma whether to concentrate funds on improvement of old city, or divert them to the new peripheral areas. The development plan of Pune was prepared by the Pune Municipal Corporation under the provisions of the 1954 Act in the year 1964, which was sanctioned by government under Urban Development and Public Health Department Notification No. TPS-1365-M, dated 7.7.1966 to come into force from 15.8.1966. The development plan has two parts:

1. Dealing with problems of old city- its traffic conditions, the road widening, and creation of open spaces. Slum improvement and slum clearance were one of its major concerns.
2. Dealing with problems of controlling development in the areas around and outside the city. Since this area has more open space it was stressed upon that the slum control and planning of roads etc. would be easier in this area.

Pune Municipal Corporation was the implementing agency. The ground reality was, funds required to implement the plan were not made available. There was lot of land that could not be acquired for public use though it was envisaged for the same in the plan.

6.5 Regional plan

Under the Maharashtra Regional and Town Planning Act, a Regional Plan can be prepared for the region established by the government. Government established Pune Metropolitan Region in 1967, including Pune City, Pune and Kirkee Cantonments, Pimpri-Chinchwad area, the area under Pimpri-Chinchwad New Town Development Authority

and villages from the Pune and Haveli Tehsils. A Regional Planning Board was constituted for preparation of regional plans.

Under the state government notification of September 1997, the adjacent 36 villages out of 53 were integrated in the municipal limits. This demanded preparation of new development plan. The Pune of 1960s is transformed from pensioner's paradise and centre for education to an industrial, chaotic city.

6.6 Initial planning efforts in the urban fringe area

6.6.1 Proposals in 1987 Development Plan

The revised development plan was sanctioned by government in 1987. But it does not directly apply to fringe areas. The basic concepts used in proposal were

1. Provision of green belt to control the development in southern part of the city. Provision was made to check urban sprawl on hills i.e. to protect environment sensitive areas.
2. Transferable Development Rights (TDR) was used as a tool to control the development. Here Municipal Corporation takes land from owner free of cost and gives back certificate of TDR. With this the owner can start development anywhere in municipal limit according to rules of PMC. The city is divided into three concentric zones (A, B and C) for the implementation of TDR. The owner can even sell his certificate. The TDR was decided on the basis of population density and development of the area. Zone A consists of city core area comprised of 42 wards. TDR can be transferred from this zone to other zone but not within this zone. Zone B was the outer ring of city core area, comprised of 34 wards and TDR in this zone can be utilized in this zone only. Zone C consists of outermost ring of the fringe area and TDR in this zone has to be utilized in this zone only.
3. Dispersal of commercial and tertiary sector job centres to develop multinucleated structure in the city. Six district centers were proposed.
4. Containment of industrial employment in city-a curb on further growth of industries within or near metropolitan cities was recommended.
5. Reorienting the traffic pattern in PMC limit based on studies.

6. Industries such as electronic, software, printing shall be located outside 25Kms of the periphery of the city, according to Maharashtra's industrial policy.
7. In any layout admeasuring more than 0.4 Ha or more for residential use, 10% of total area of land shall be reserved as open space.

6.6.2 Proposals of Draft Development Plan 2001-2021

1. The practice of green belt of an area of 249.01 Ha (1.08%) is continued on the southern hill side. No construction activity is allowed in this area.
2. The entire 36 fringe area villages have been grouped in sectors from C to H. this delineation is done for the ease in the building sanction process and better control on development in fringe area of the city.
3. A proposed recreational land use consisting of gardens, parks, and playgrounds together is 476 Ha (2.07%)
4. Proposed area for Industries is to be 488.37 Ha. The types of industries however are not mentioned.
5. A no objection certificate from the fire brigade department is essential for buildings of 15m and above irrespective of locational aspects.

6.7 Procedure for the conversion of agricultural land

The process of conversion of agricultural land to nonagricultural uses is inevitable and vital. Following flow chart shows the procedure in case of fringe areas of Pune city.

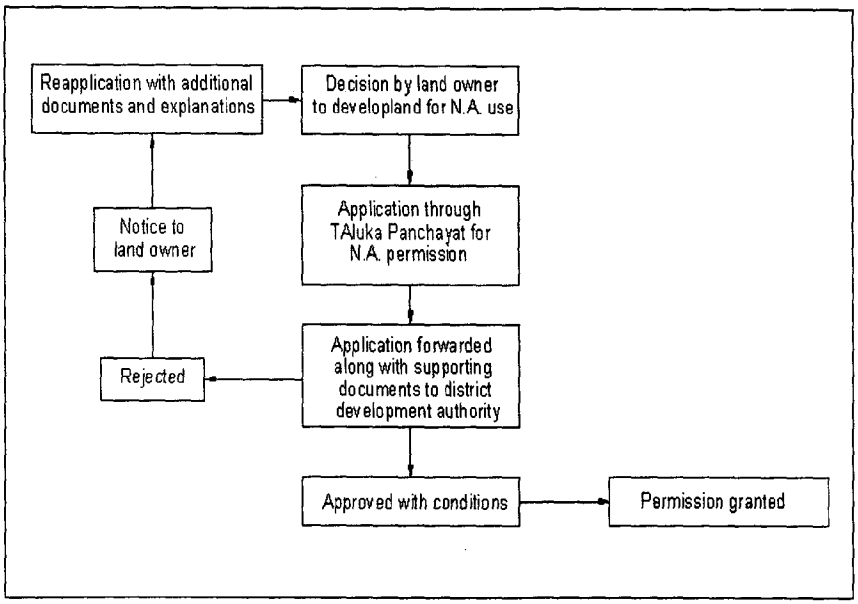


Figure 6.1: Procedure for conversion of agricultural land

6.8 Conclusions

Observing the legal tools available to the implementing bodies, it can be stated that the tools available are powerful means to achieve development plan proposals. Tools such as town planning schemes are very useful measures to regulate growth in the fringe areas of the city. Role of local bodies is also very important as its failure can lead to haphazard development which can be observed in the case of studied villages. The overall structure shows that there is no separate organization to prepare development plan for fringe area. Inclusion of fringe area villages is actually adding to pressure on PMC. It can be proposed that a separate agency is formed for fringe areas. Green belt is proposed in development, construction activity is not allowed in these areas. But people construct their houses and after some period with payment of certain fine these are included in residential zone. So measures should be taken to prevent such practices.

CHAPTER VII

SURVEY ANALYSIS

7.1 Field Survey

Field survey is the very important tool in hands of planner. It is basically used to gather comprehensive information about population in selected study areas. Study area is villages in the urban fringe on Pune as delineated by Town Planning and Valuation Department. There were 36 villages grouped in six sectors. Out of these 36 villages 23 villages were included in PMC limit in 1997. So the study area includes remaining villages. To analyze the changes taking place in the lives of people in fringe areas due to development, certain case study villages have been chosen and studied in greater detail. Out of these, two are within PMC limit.

These four villages have been chosen from different locations and they are at different stages of development. The four villages are

1. **Dhankawadi**
2. **Hadapsar**
3. **Ambegaon Budruk**
4. **Manjari Budruk**

7.1.1 Objective of the Field Survey

The objective of this study is to analyze the impact of urbanization on the fringe areas of the city. The field survey basically throws light on following information

What is the influence of urbanization on:

1. Land Use
2. Institutional setup
3. Infrastructural Facilities

7.1.2 Data Sources

Data from various sources is collected to visualize the overall picture of the study area. Various secondary data sources are used mainly, Census of India, various publications of government, media etc. Census data is basically used to get generalized picture of the

study area. Field survey is used as a tool to get comprehensive information about population in the selected villages.

7.1.3 Introduction to case study areas (See Map 7.1)

7.1.3.1 Dhankawadi

This village is located on busy Pune-Satara road. Initially when the village was not under the jurisdiction of Pune Municipal Corporation, the land was available at cheaper rates as compared to the city. Due to this reason the area started developing rapidly, dominantly in the form of residential use. The need for integrating this village in the municipal limits was stressed upon by PMC from 1981; however political interventions stopped the same. Finally this village merged in PMC limits in 1997. This village is selected as case study area to see is there any advantage of integrating this village in PMC limits.

7.1.3.2 Hadapsar

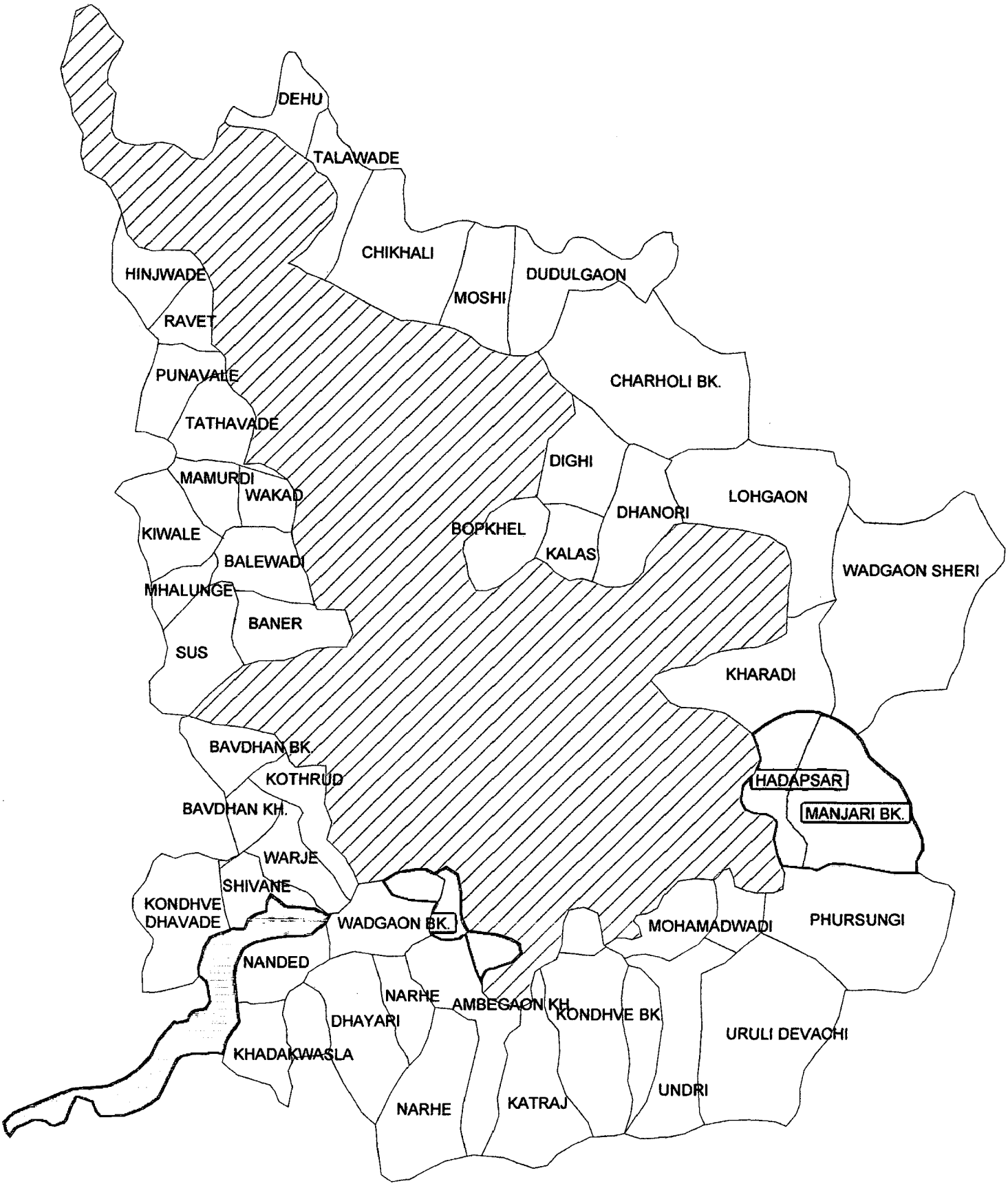
This village is known for its rich fertile soil. The major part of the vegetables, fruits and other agricultural products for the city of Pune and surrounding villages were supplied from this village. Its growth in actual terms started after establishment of an industrial estate by PMC in 1981. This village merged in PMC limit in 1997.

7.1.3.3 Ambegaon Budruk

This village is located on Pune- Mumbai highway (NH-4) which is the main reason for development of this village. 60% of the village is already included in PMC limit. The study area is the remaining part of the village. Highway is the main attraction. Shift from agricultural to non-agricultural uses is mainly seen in this village.

7.1.3.4 Manjari Budruk

It is located on the east of PMC limits near Hadapsar. The main feature of this village is Sugar Institute. It is located on the banks of Mutha River. The village is mainly rural in character. Development can be seen on the main road connecting the village to the city. Agricultural land in this village is also decreasing. Many large farms are now converted into small nurseries and remaining land is sold for residential purpose.



MAP 7.1: LOCATION OF CASE STUDY VILLAGES

The study included analysis of primary and secondary data. The aspects covered in both the cases are as follows

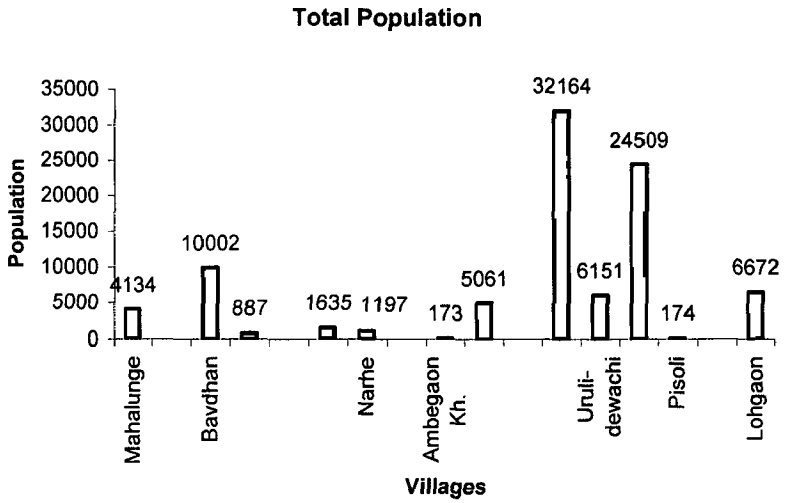
Analysis Of Secondary Data	Analysis Of Primary Data
1. Demographic Aspects	**1. Land Use**
a) Total Population	**2. Physical Infrastructure**
b) Sex Ratio	a) Water Supply
c) Family Size	b) Sewage Disposal
d) SC-ST Population	c) Garbage Disposal
e) Level Of Literacy	d) Libraries & Organized Parks
f) Male-Female Literacy	e) Housing
2. Occupational Structure	**3. Connectivity**
a) Working Population	a) Distance to Facilities
b) Male-Female Working Population	b) Public Transport
c) Main Cultivators	c) Trip Time
d) Main Agricultural Workers	**4. Socio-Economic**
e) Population Engaged In Household Industries	a) Occupational Structure
f) Main Other Workers	b) Income Groups
	c) Migration
	d) Land Cost

Table 7.1: Aspects Covered in Analysis of Data
Source: Secondary Data- Census Of India

7.2 Analysis of Secondary Data

7.2.1 Demographic Aspects

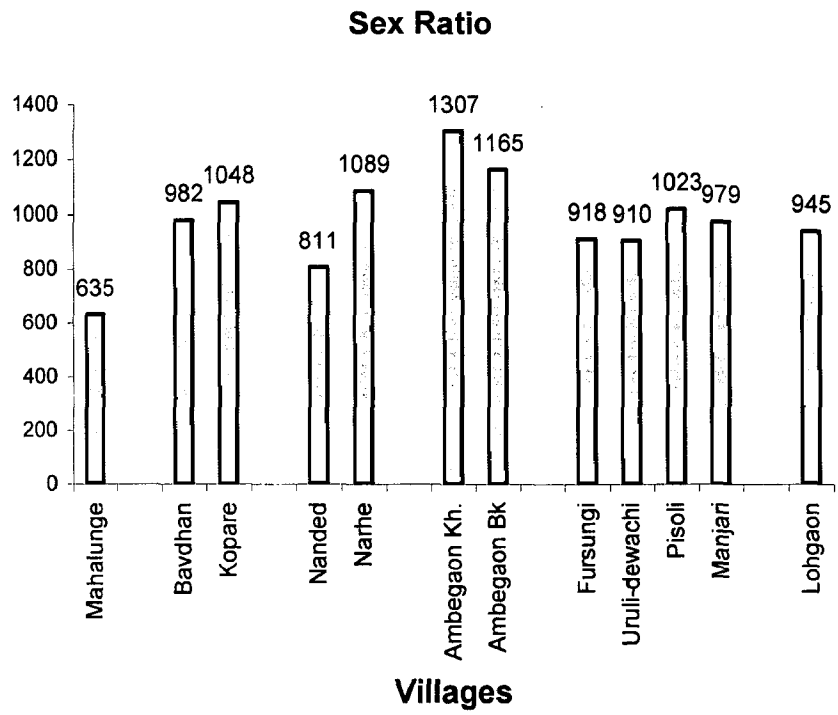
a) Total Population



There is disparity in population in villages of fringe area. Population ranges from 173 in Ambegaon Kh. to 32164 in Fursungi. Villages on the main transportation routes are more populated.

Figure 7.1: Comparative analysis of total population in villages in fringe area
Source: Census of India 2001

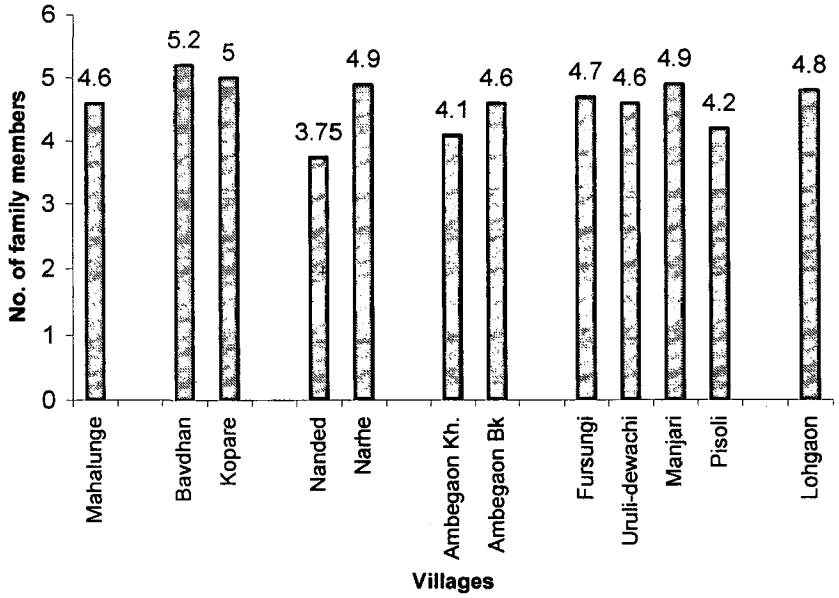
b) Sex Ratio



Sex ratio is higher in many villages in the fringe area. It ranges between 635 in Mhalunge to 1307 in Ambegaon Kh.

Figure 7.2: Comparative of sex ratio in villages area
Source: Census of India 2001

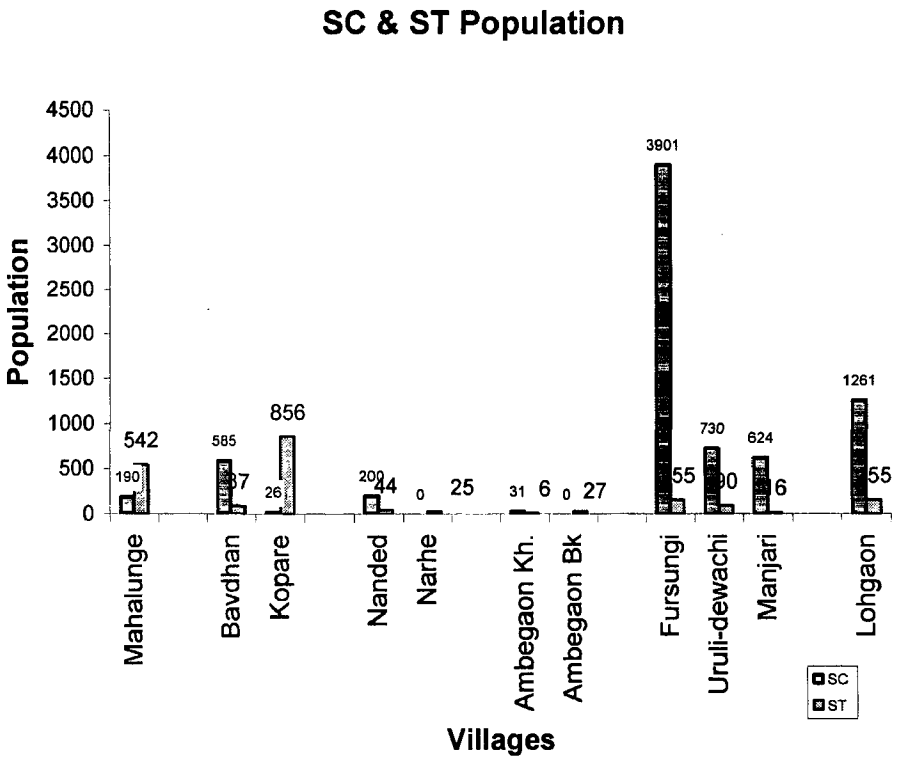
c) Family Size



Average family size in fringe area villages is 4.6. If we compare this with city there is no much difference. In rural areas also families are becoming small.

Figure 7.3: Comparative of sex ratio in villages area
Source: Census of India 2001

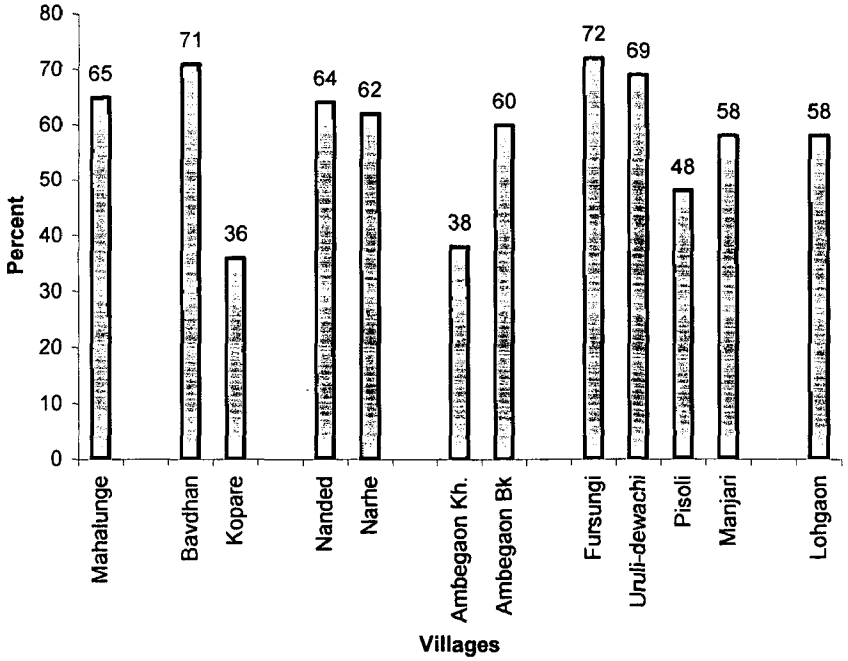
d) SC-ST Population



SC- ST population is not much in the villages. Maximum SC population is in Fursungi. But if we compare it with total population the percentage is very less.

Figure 7.4: Comparative analysis of SC & ST population in villages in fringe area
Source: Census of India 2001

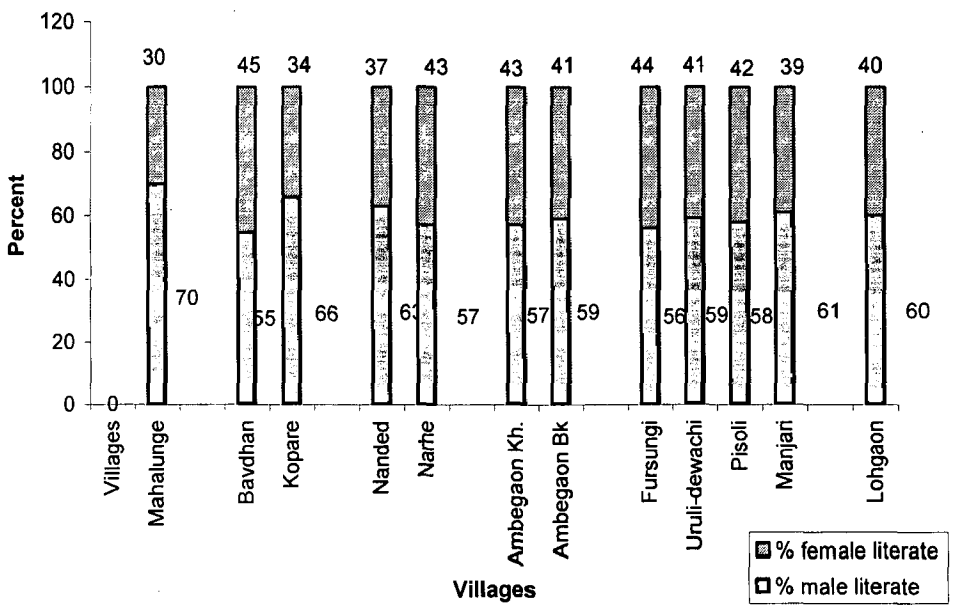
e) Level Of Literacy



Level of literacy in villages ranges from 36% to 72%. The figure is lowest in Kopare and it is highest in Fursungi.

Figure 7.5: Comparative analysis of level of literacy in villages in fringe area
Source: Census of India 2001

f) Male-Female Literacy

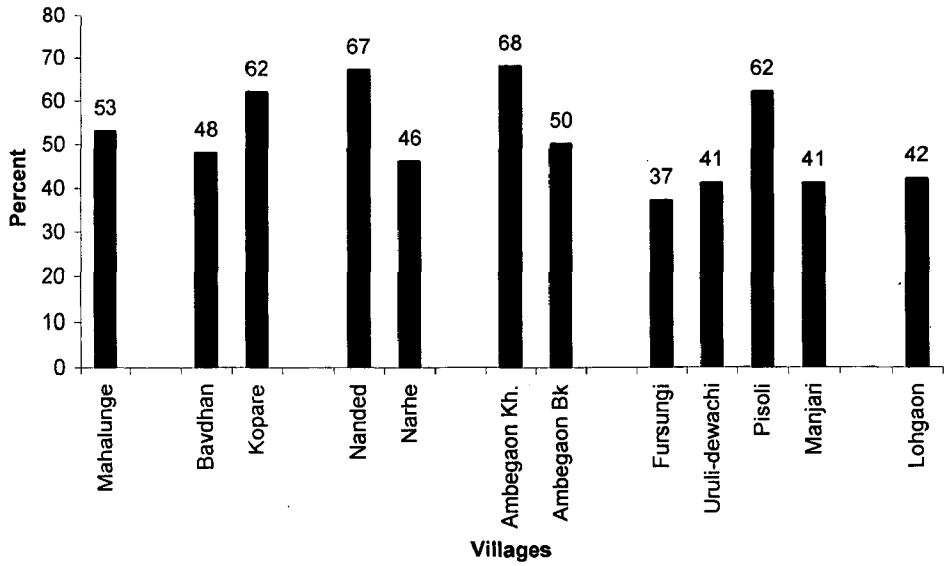


In all the villages males are more literate than females. The percentage of literate females ranges from 30 to 45. The figure is lowest in Mhalunge and it is highest in Bavdhan.

Figure 7.6: Comparative analysis of male-female literacy in villages in fringe area

7.2.2. Occupational Structure

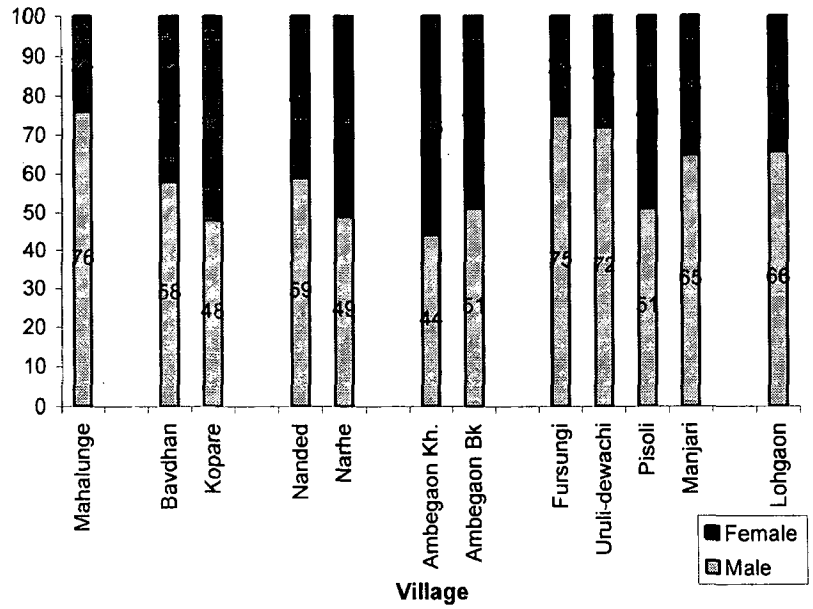
a) Working Population



Percentage of working population is lowest in Fursungi (37%) and highest in Ambegaon Kh. (68). If we compare population of these two villages, Fursungi is the village with maximum population and Ambegaon Kh. with lowest population

Figure 7.7: Comparative analysis of working population in villages in fringe area
Source: Census of India 2001

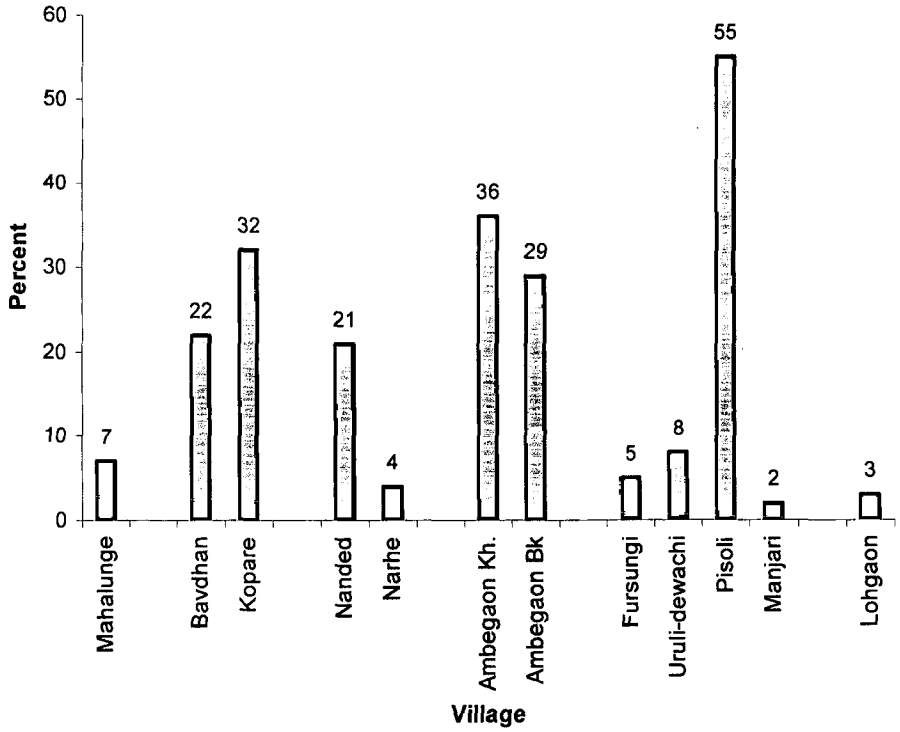
b) Male-Female Working Population



In about five villages percentage of female working population is more than male.

Figure 7.8: Comparative analysis of male-female working population in villages in fringe area
Source: Census of India 2001

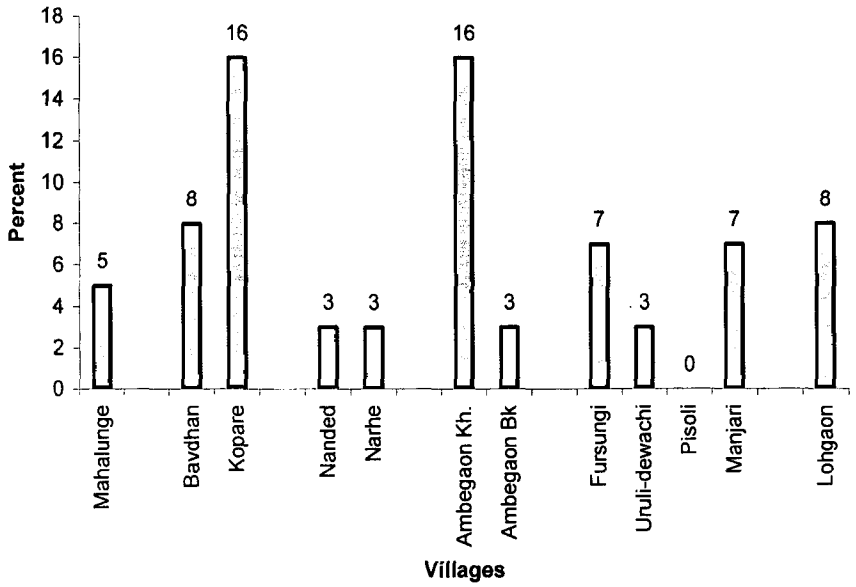
c) Main Cultivators



Percentage of main cultivators is highest in Pisoli (55%) and it is lowest in Manjri (2). Shift in occupation is taking place from primary to secondary.

Figure 7.9: Comparative analysis of main cultivators in villages in fringe area
Source: Census of India 2001

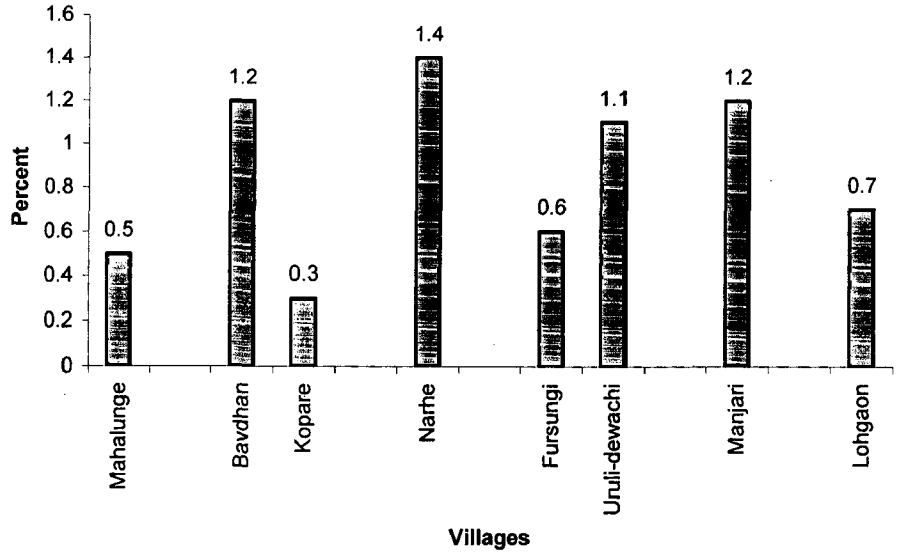
d) Main Agricultural Workers



Maximum percentage of agricultural labour is only 16%. So the shift can be seen in occupation.

Figure 7.10: Comparative analysis of main agricultural labors in villages in fringe area
Source: Census of India 2001

e) Population Engaged in Household Industries



Percentage of population engaged in household industries is very less.

Figure 7.11: Comparative analysis of population in household industries in villages in fringe area

f) Main Other Workers

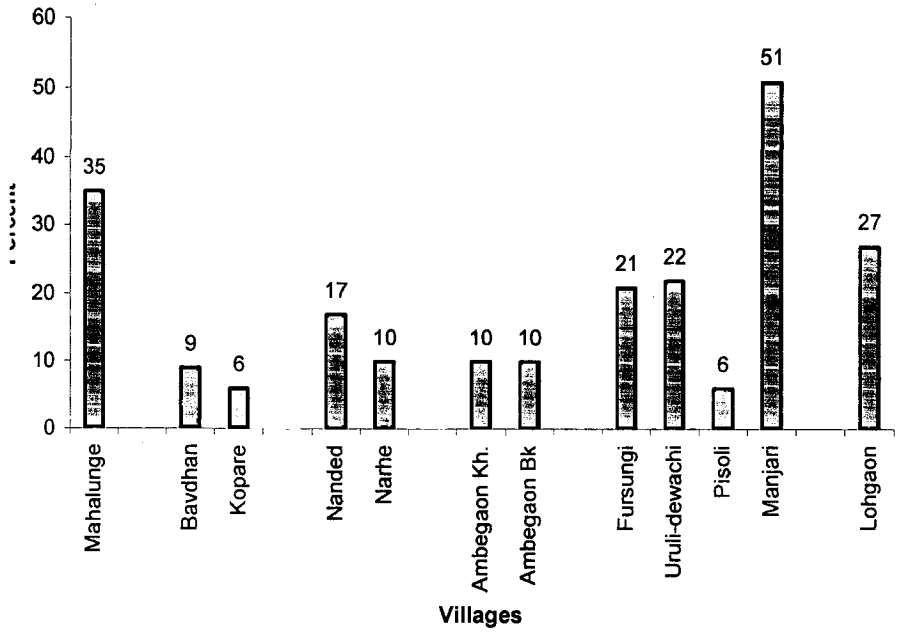


Figure 7.12: Comparative analysis of main workers in fringe areas villages
Source: Census of India 2001

7.3 Analysis of Primary survey

7.3.1 Case studies – Fact Sheet

Aspect	Dhankawadi	Hadapsar	Ambegaon Bk.	Manjari Bk.
Location	It is located on the south of Pune in sector F. (NH-4) Pune-Satara road passes through the eastern part of this village. This is included in PMC limit in 1997.	It is located on the east of PMC limits in sector G. The old municipal boundary and Mula-Mutha river divides this village in two parts. Solapur road (NH-9) and Mumbai Solapur railway line are the major features.	It is located on Mumbai Bangalore highway. Some part of this village is included in PMC limits. Survey is done for the remaining part of the village. It is developing rapidly because of highway.	It is located on the east of PMC limits near Hadapsar. The main feature of this village is Sugar Institute. It is located on the banks of Mutha river.
Area	314 Ha.	911.40 Ha.	N.A.	1958.5 Ha.
Population as per Census 2001	84496	62682	5061	24509
Land prices Rs./ Sq. ft. for year 2005	2784	1050	503	1405
Settlement pattern	Haphazard and closely built 3-4 storey apartments similar to chawls dominate the scene. Narrow roads lead to disorganized congested residential schemes.	Low rise distributed structures with green spaces/farms are seen in the village. The entire village displays a segregated settlement patterns. Apartments can be seen on the major routes.	Part of the village is included in PMC limit. Survey was conducted for the remaining part. Small rural houses can be seen along contours.	Apartments are located along major road connecting the city. Inner village is dominated by traditional rural housing.

Table 7.2: Case studies-fact sheet *Source: PMC*

7.4 Study of existing land use

7.4.1 Existing land use statement – Dhankawadi

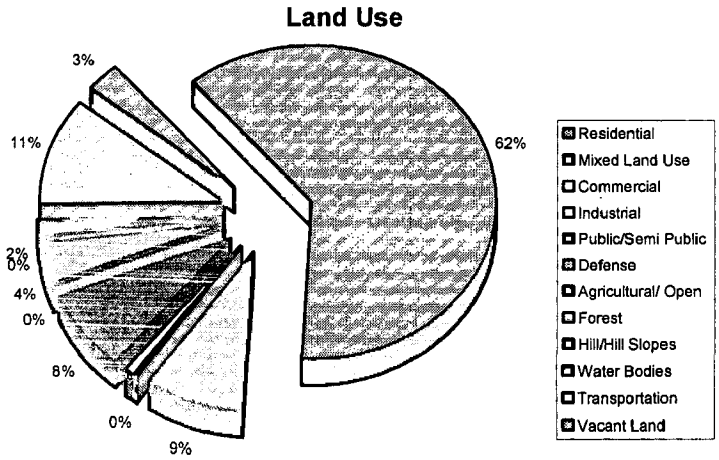
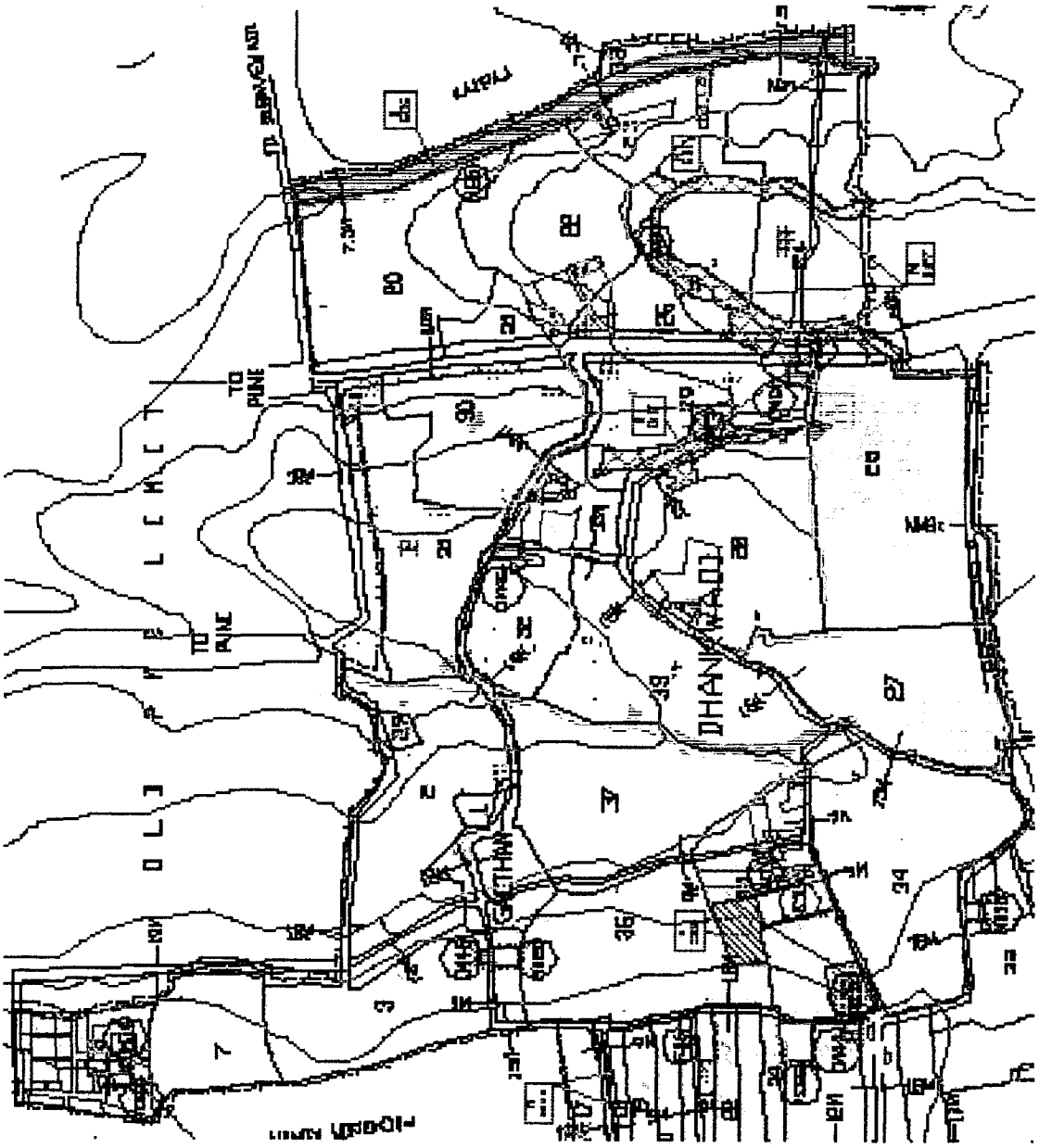


Figure 7.13: Existing land use statement- Dhankawadi
Source: PMC

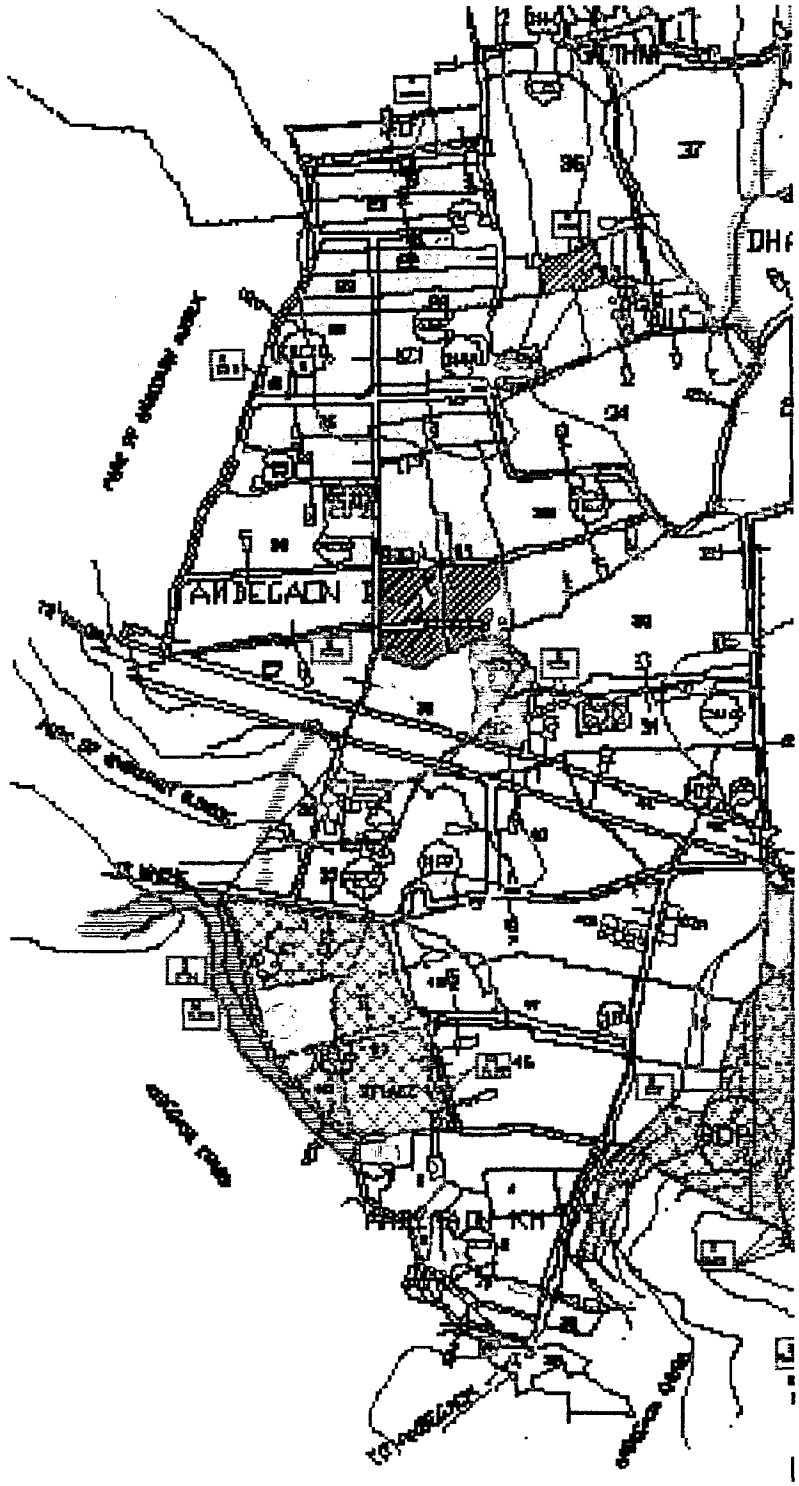
Sr. No.	Land Use Description	Area in Ha.	% Of Village Area
1.	Residential	195.12	62.14
2.	Mixed Land Use	27.82	8.86
3.	Commercial	0.8	0.25
4.	Industrial	2.67	0.85
5.	Public/Semi Public	26.21	8.35
6.	Defense	0	0
7.	Agricultural/ Open	12.59	4.01
8.	Forest	0	0
9.	Hill/Hill Slopes	0	0
10.	Water Bodies	3.76	1.7
11.	Transportation	34.95	11.13
12.	Vacant Land	10.07	3.21
	Total	314 Ha.	

Table 7.3: Existing land use statement- Dhankawadi

- From the above land use statement we can see that the major portion of the village comes under residential use, because of low land prices than the core city areas. (See Map 7.2)
- The mixed land use, transportation and public/semipublic uses form the equal share in the total land use distribution with low availability of open spaces, which is only 4.01%.



Map 7.2: Land use plan of Dhankawadi
Source: PMC



Map 7.3: Land use plan of Ambegaon Bk.
Source: PMC

7.4.2 Existing land use statement – Hadapsar

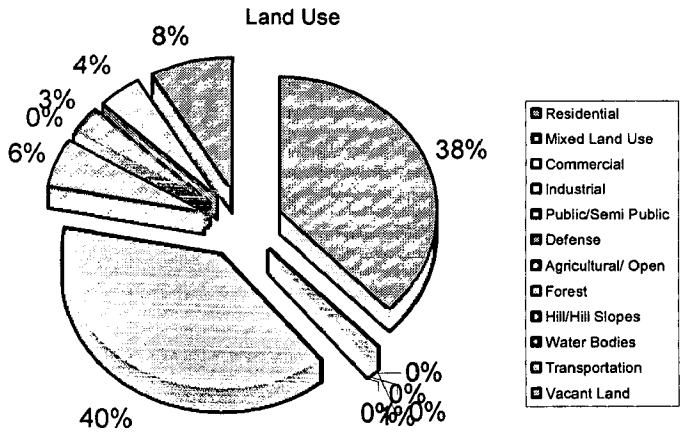


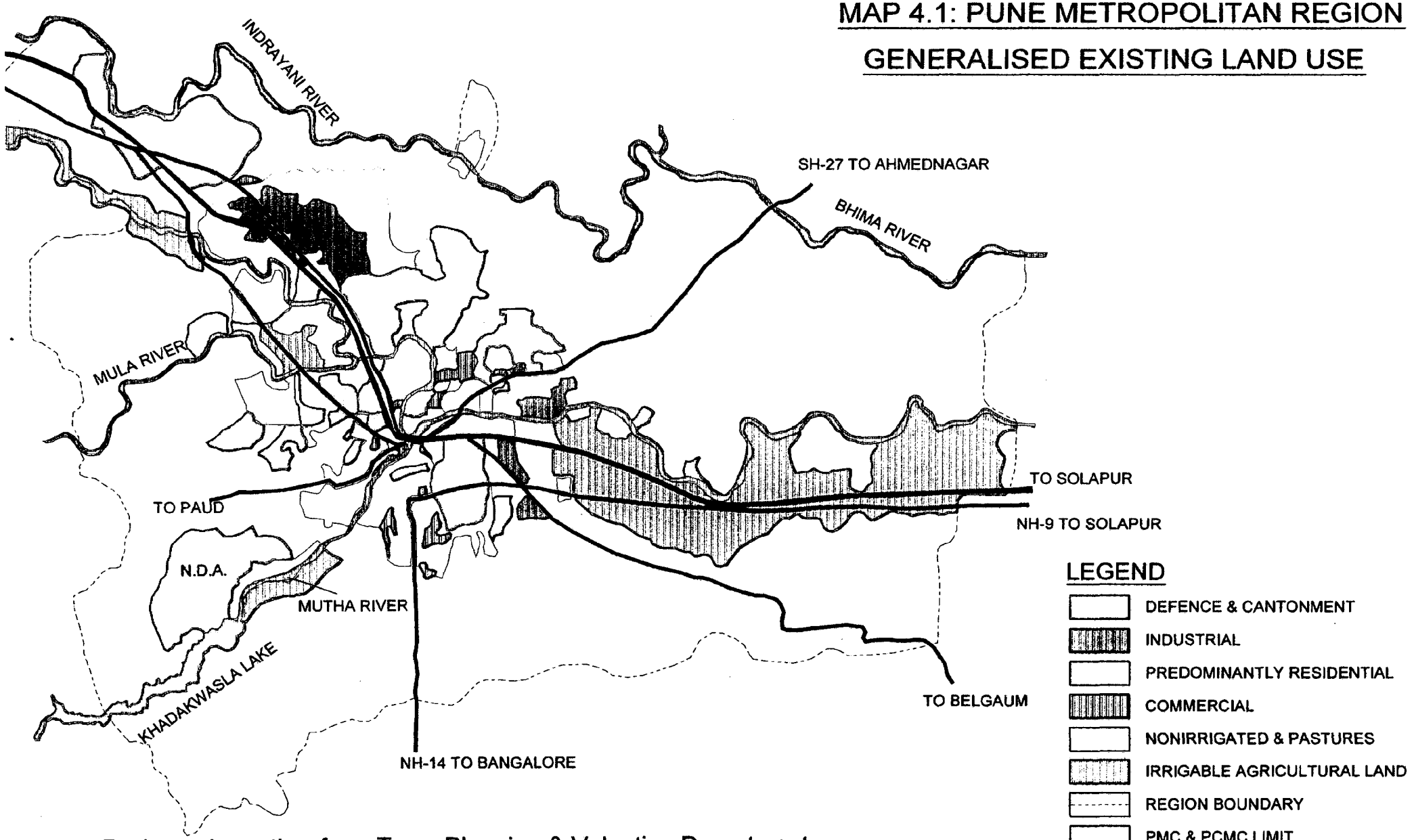
Figure 7.14: Existing land use statement- Hadapsar
Source: PMC

Sr. No.	Land Use Description	Area in Ha.	% Of Village Area
1.	Residential	344.45	37.79
2.	Mixed Land Use	3.04	0.33
3.	Commercial	0.51	0.06
4.	Industrial	2.57	0.28
5.	Public/Semi Public	6.64	0.73
6.	Defense	0	0
7.	Agricultural/ Open	355.17	38.97
8.	Forest	50.85	5.58
9.	Hill/Hill Slopes	0	0
10.	Water Bodies	31.62	3.47
11.	Transportation	39.23	4.3
12.	Vacant Land	77.01	8.45
	Total	911.4	
	River	7.94	

Table 7.4: Existing land use statement- Hadapsar
Source: PMC

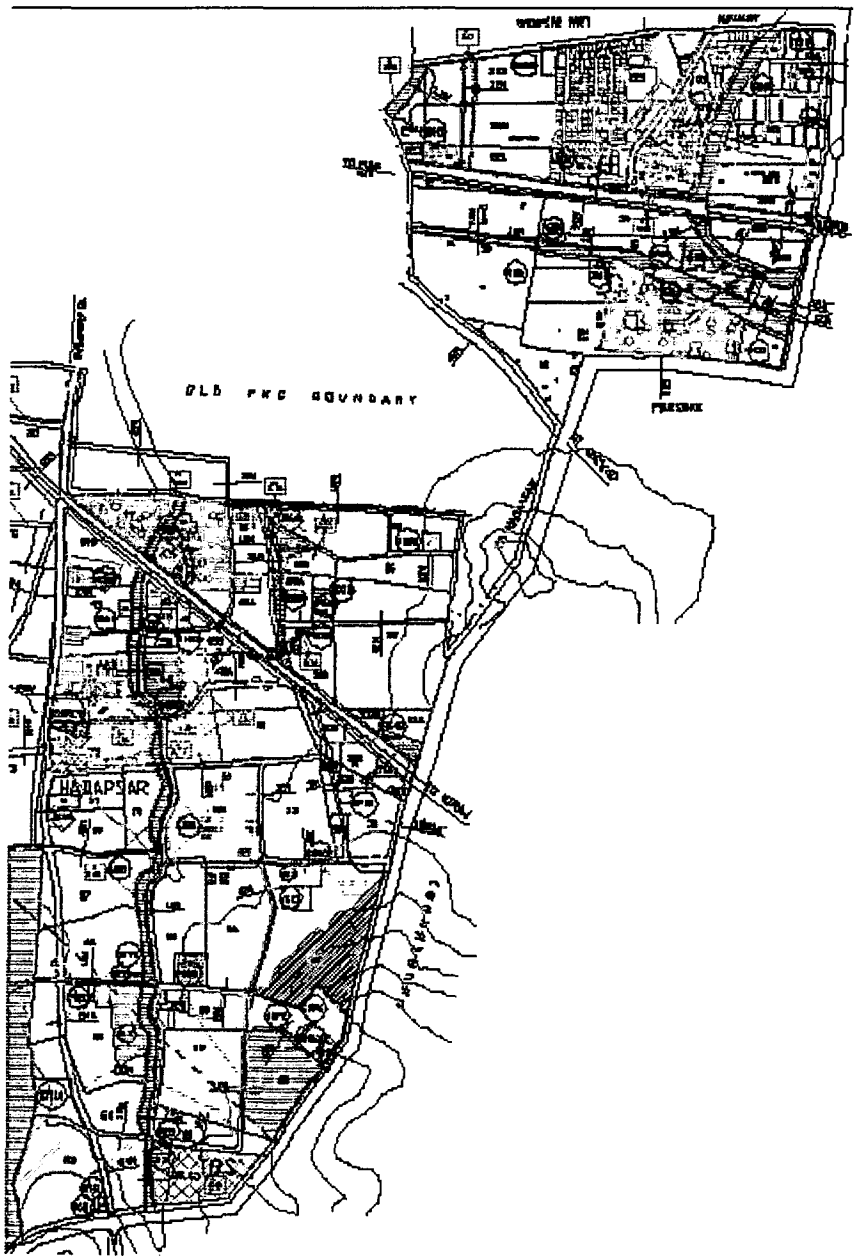
- As seen from the land use statement, the major portion of the land is utilized for agriculture purpose because of the agricultural activity that has been taking place from the years on the fertile soil. (See Map 7.4)

MAP 4.1: PUNE METROPOLITAN REGION
GENERALISED EXISTING LAND USE



Source: Redrawn by author from Town Planning & Valuation Department

- The main residential activity is along the trunk routes and this is the major reason of higher percentage of residential use after agriculture.
- The mixed use, commercial, industrial, and public-semipublic forms a negligible part in the total land use.



Map 7.4: Land use plan of Hadapsar
Source: PMC

7.4.3 Existing land use statement – Manjari Budruk

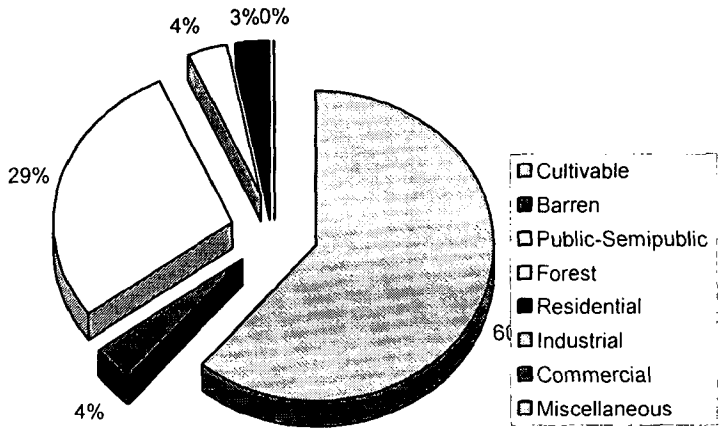


Figure 7.15: Existing land use statement- Hadapsar
Source: Grampanchayat, Manjari Budruk

Sr. No.	Land Use Description	Area in Ha.	% Of Village Area
1.	Cultivable	1195.72	61.0
2.	Barren	77	3.93
3.	Public-Semipublic	559	28.54
4.	Forest	69	3.5
5.	Residential	56.9	2.9
6.	Industrial	1	0.05
7.	Commercial	1	0.05
8.	Miscellaneous	0.69	0.03
	Total	1958.5	

Table 7.5: Existing land use statement- Manjari
Source: Gram Panchayat Talathi Office

- Major portion of the village is under agriculture use. But very few farmers are taking interest in agriculture. Most of the times the land is kept as it is until it gets good price, then farmers sell it to private developers.
- Some farms are now converted into small nurseries fulfilling the demand of the main city
- Second major land use is institutional. This is because of Sugar Institute in the village.
- Industrial and commercial uses form negligible part in the total land use.

7.5 Availability of Physical Infrastructure

7.5.1 Water Supply

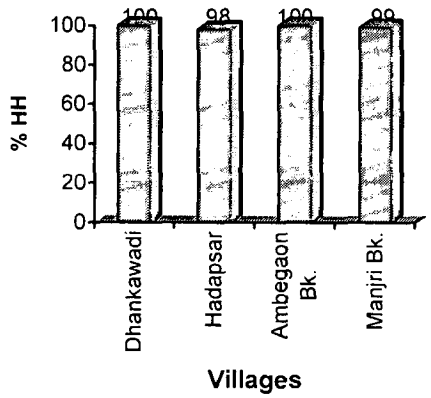
For the entire fringe area comprising the 36 villages, the study of availability of water supply shows the following facts applicable,

- 82% (4.23 lakhs) of the population is dependent on Gram Panchayat (now municipal corporation after merger) piped water sources.
- 18% (93060 persons) of the total population of the fringe obtains water from bore wells/wells, etc.
- The quantity of water available daily in the fringe area is at an average rate of 35-40 litres per capita per day (lpcd) as against 150 lpcd for the city.
- 40% (41360 nos.) of the households have individual water connections while 42% depend on common stand posts or tankers.
- Out of the total supply of water, 30% of it is lost in distribution process due to leakages.

Percentage of households consuming piped water supply (PMC)

Village	% Of HH with PMC piped water supply
Dhankawadi	100
Hadapsar	98
Ambegaon Bk.	100
Manjari Bk.	99

Table 7.6: Water Supply Scenario
Source: Primary Survey



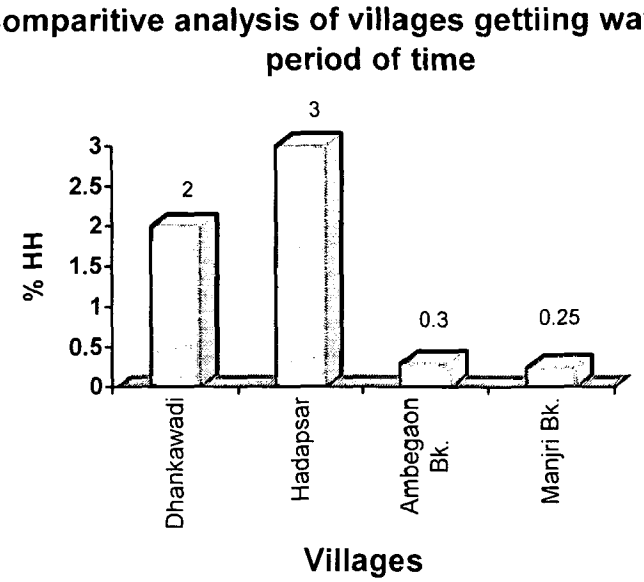


Figure 7.16: Water supply scenario
Source: Primary Survey

7.5.2 Sewage Disposal

Almost half of the total households in the fringe area i.e. 53% (54802 nos.) have the facility of connection to underground sewer lines for sewage disposal. While the rest of the households depend on septic tanks or it is disposed off in the *nalas* or vacant lands. Due to this trend, the unhygienic conditions have starting developing harmful and non suitable for human settlements.

Village	% HH with the facility
Dhankawadi	100
Hadapsar	100
Ambegaon Bk.	100
Manjari Bk.	99

Table 7.7: Sewage scenario
Source: Primary Survey

7.5.3 Garbage Disposal

The scenario in case of the entire 36 villages is as follows,

Percentage of households using organized garbage disposal methods (fringe area)

1. Households who avail the facility of organized garbage bins for dumping the garbage – 45%

2. Households who throw garbage on the nearest open land available (including road) – 43%
3. Households who compost the garbage – 6%
4. Households who burn the garbage – 2.5%
5. Households who throw the garbage at the roadside drains – 3.5%

Village	% of HH having facility of organized bins
Dhankawadi	100
Hadapsar	95
Ambegaon Bk.	80
Manjari Bk.	85

Table 7.8: Garbage Disposal scenario
Source: Primary Survey

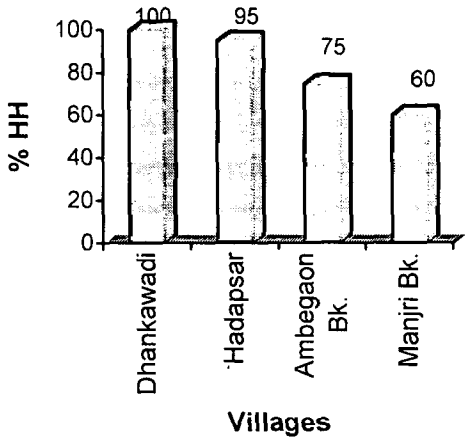


Figure 7.17: Garbage Disposal scenario
Source: Primary Survey

7.5.4 Libraries and organized parks

There is a complete absence of libraries and parks in the entire 36 villages. The percentage of households that utilize the facility within the village as compared to the distance the people have to travel to avail dispensaries and clinics demonstrates the base level of availability of the infrastructure. Following tables display the base level of infrastructure based on the same principle for the four villages.

7.6 A comparative study of availability of social infrastructure

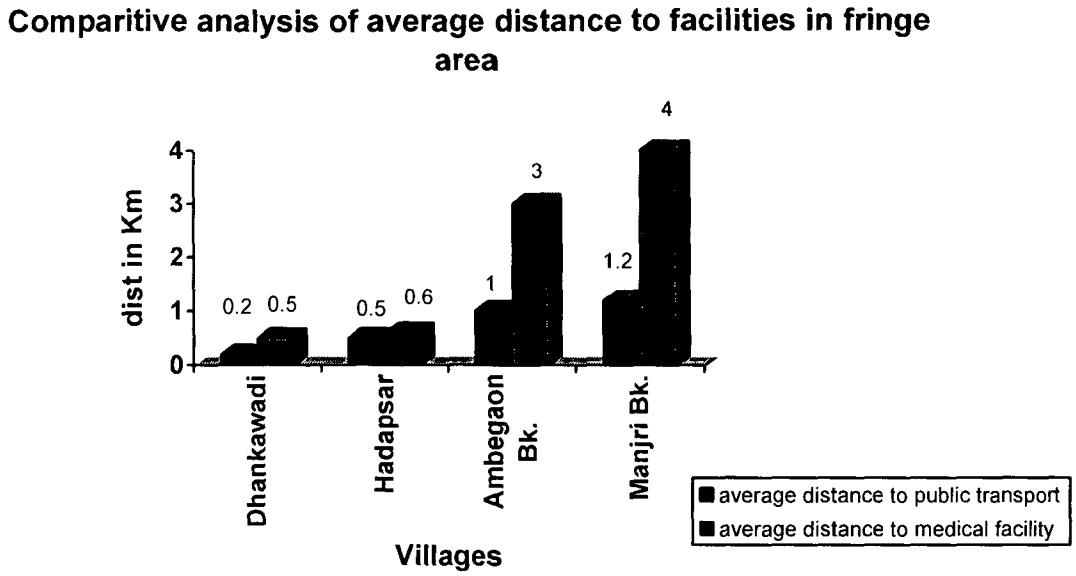


Figure 7.18: Comparative analysis of average distance to facilities in fringe area
Source: Primary Survey

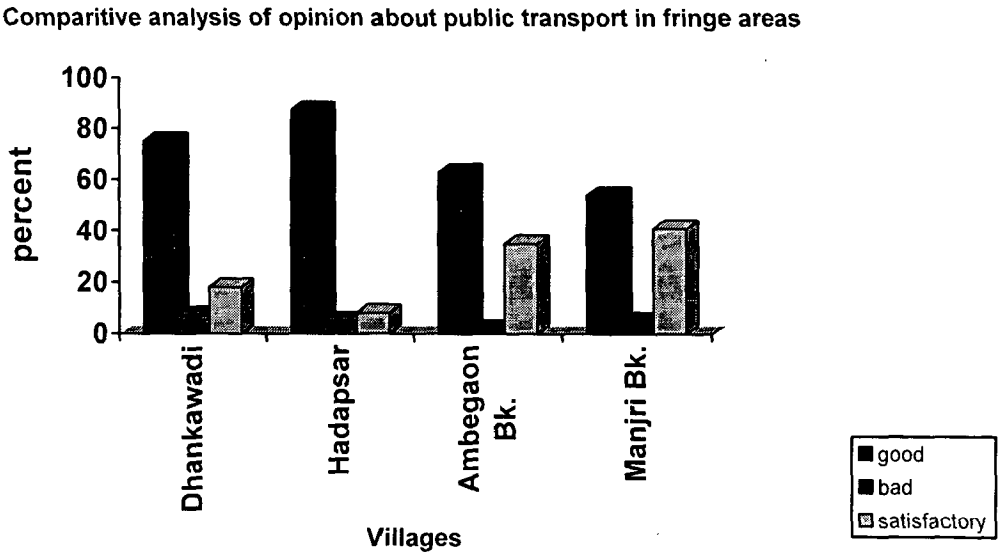


Figure 7.19: Comparative analysis of opinion about public transport in fringe areas
Source: Primary Survey

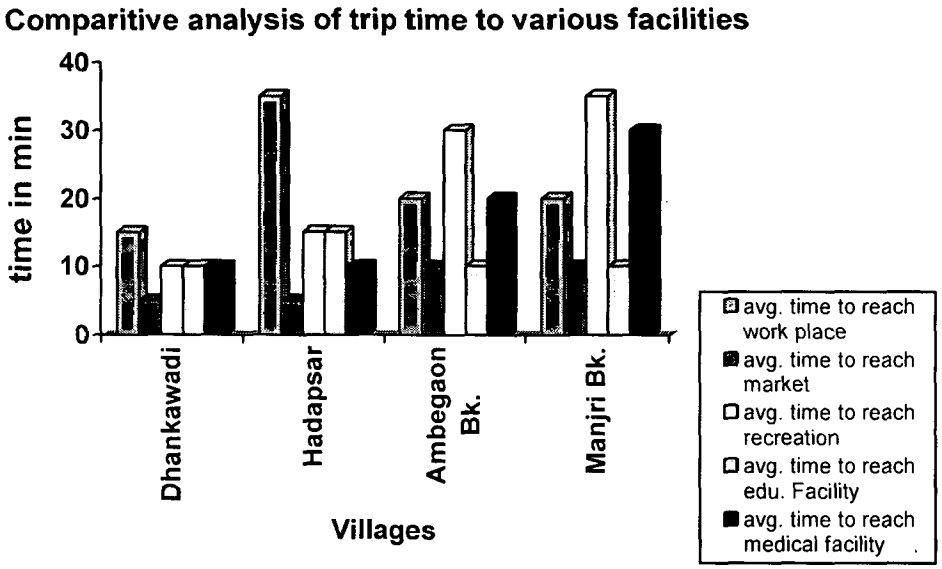


Figure 7.20: Comparative analysis of trip time to various facilities
Source: Primary Survey

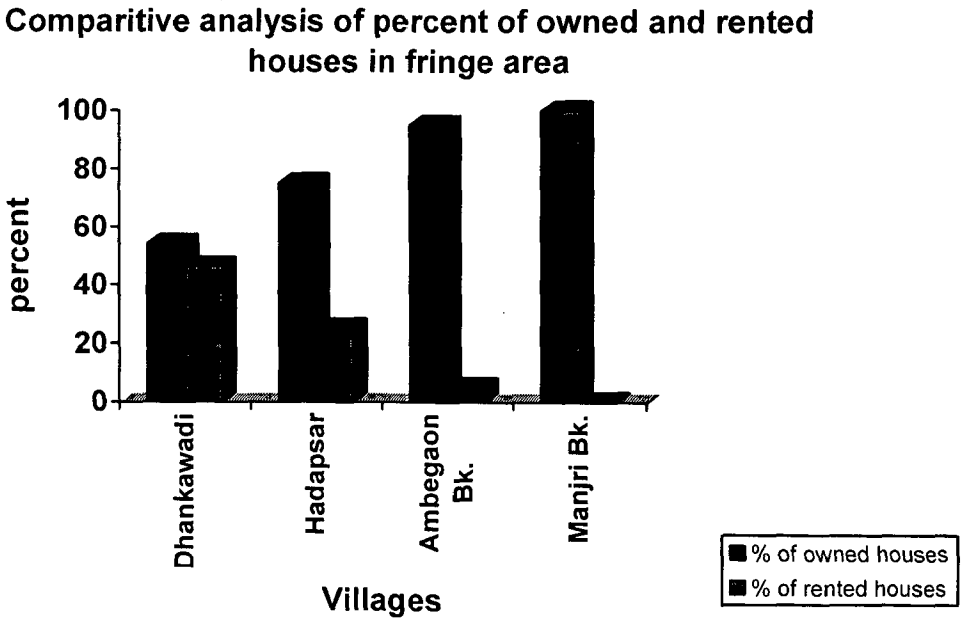


Figure 7.21: Comparative analysis of percent of owned and rented houses in fringe area
Source: Primary Survey

7.7 Socio-Economic Profile

7.7.1 Occupational structure

The percentage out of the total worker population involved in non-agricultural activities is a striking indication of the urbanization. The higher the percentage higher is the village under urban influence and going under the urbanization process.

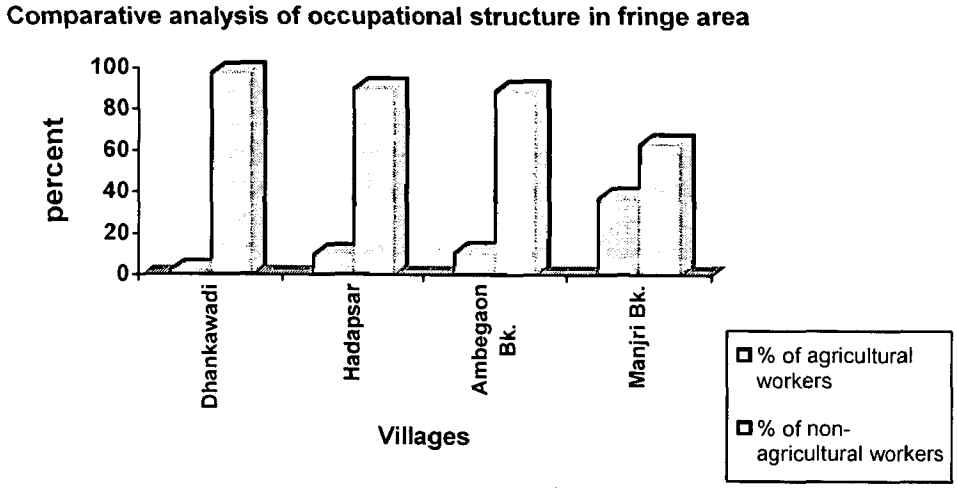


Figure 7.22: Comparative analysis of occupational structure in fringe area
Source: Primary Survey

7.7.2 Income Groups

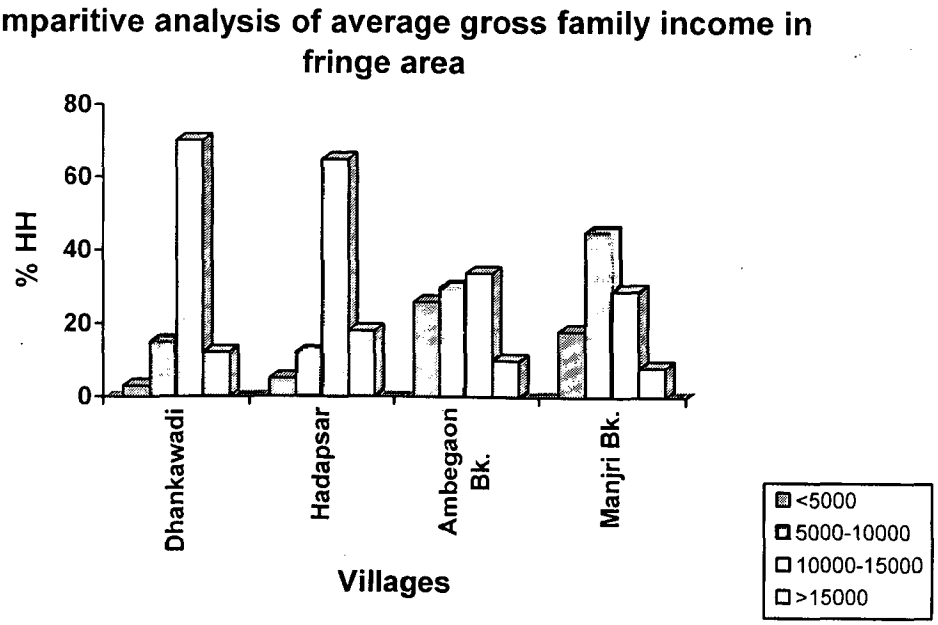
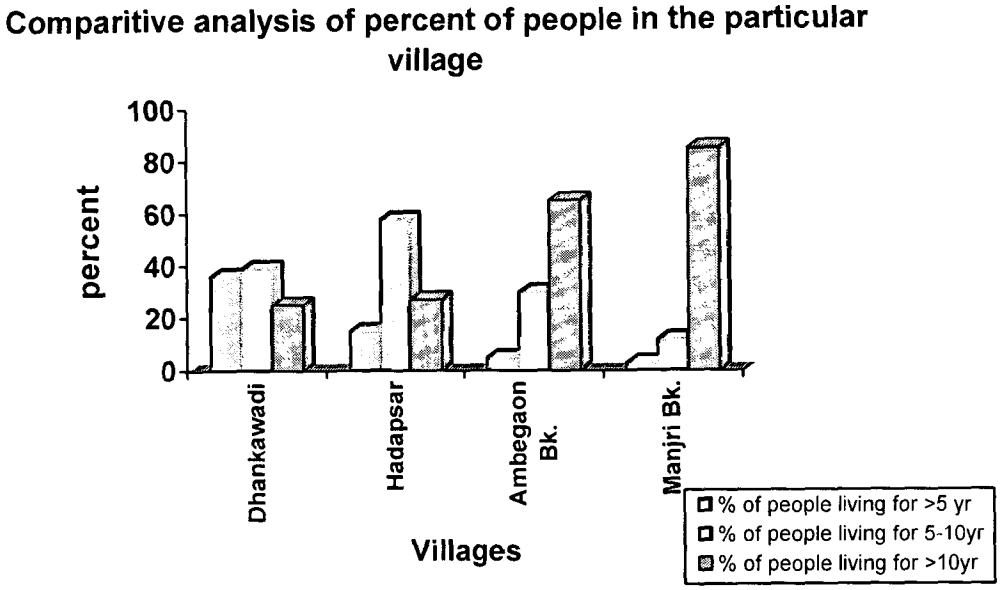


Figure 7.23: Comparative analysis of average gross family income in fringe area
Source: Primary Survey

7.7.3 Migration Characteristics



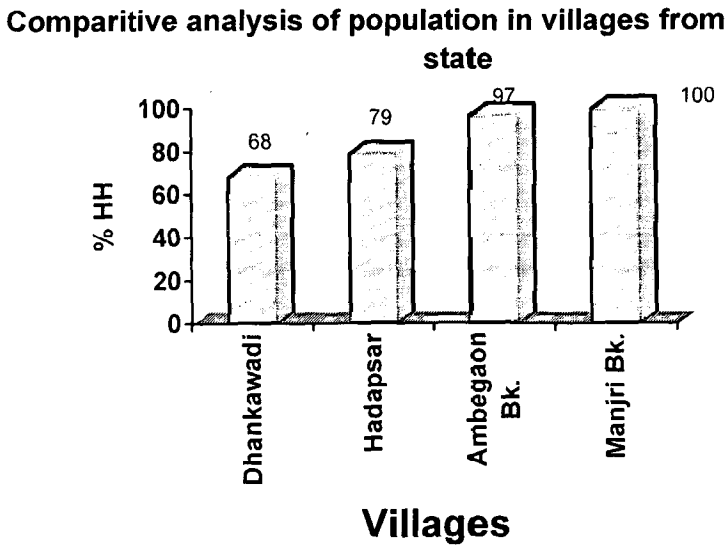


Figure 7.24: A comparative study of migration characteristics
Source: Primary Survey

7.7 Land cost

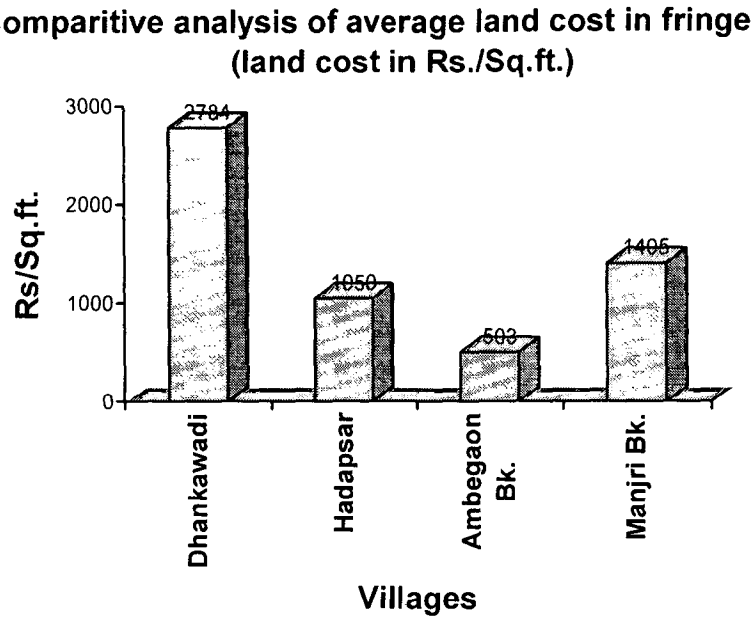


Figure 7.25: A comparative study of land cost
Source: Primary Survey

7.8 Conclusions

Sr. No.	Issue	Dhankawadi	Hadapsar	Ambegaon Bk.	Manjari Bk.
1.	Water Supply				
a)	PMC Pipeline	O	O	O	O
b)	Supply Time	●	●	●	●
2.	Sewage Disposal	O	O	O	O
3.	Garbage Disposal	O	O	●	●
4.	Distance to Public Transport	O	O	O	●
5.	Distance to Medical Facility	O	O	O	●
6.	Recreation Facility	●	●	●	●
7.	Conversion of Agricultural Land	●	●	●	O

Table 7.9: Problematic areas in fringe area villages
Source: Primary Survey

Note:

o — Major Problem Area

o – No Problem

Problem on first priority

Problem on second priority

Problem on third priority

The entire fringe area is facing problem in terms of inadequacy of basic infrastructure services. In villages PMC pipeline is there, but water is available only for 15-30 min. so the major problem is of water supply. The four case studies represent different stages of development. Infrastructure in Dhankawadi and Hadapsar is much more developed than the other two case studies. Inclusion of these villages to PMC limit is one of the reasons behind it. Wherever there is better environment, infrastructure, there higher class tends to settle. There are no recreation places in fringe area villages. These villages are entirely dependent on main city for recreation facilities. The analysis outcome from this chapter is used to find out critical issues in the next chapter.

8.1.2 Infrastructure

Infrastructure in fringe areas of Pune City is very poor. Main problem areas are

Sr. No.	Problem	Percentage
1.	Major problem in fringe area is water supply	79%
2.	Disposal of garbage	67%
3.	Sewage disposal	61%
4.	Problem in reaching place of work	52%
4.	Nuisance created by mosquitoes & stray dogs	46%
5.	Insufficient toilets	45%
6.	Air pollution	14%
7.	Congestion	10%

Table 8.1: Issues related to infrastructure
Source: Draft Development Plan foe newly added villages (2001-2021)

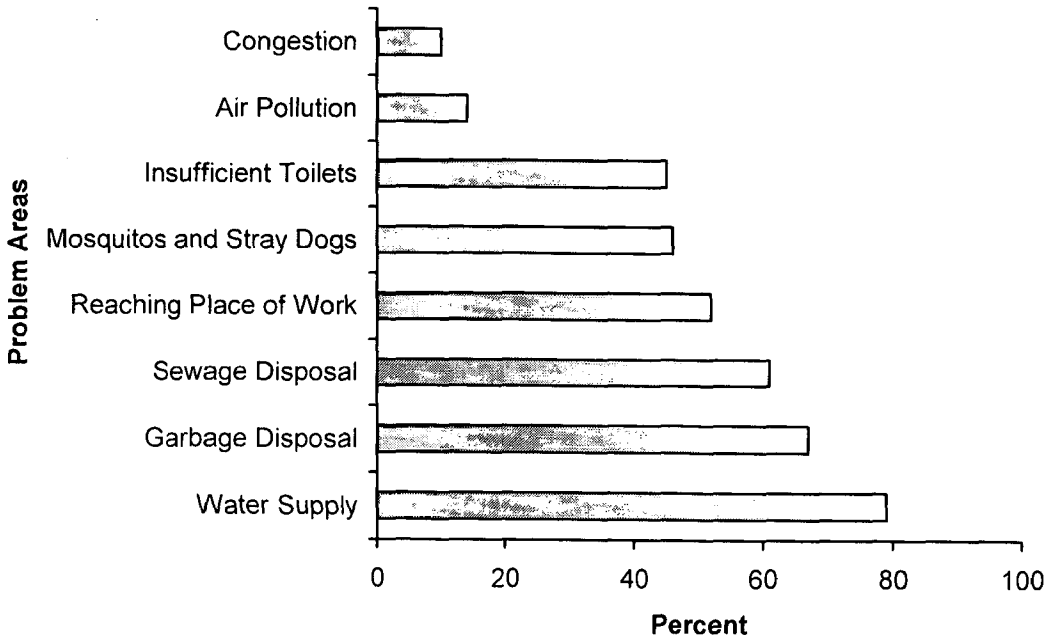


Figure 8.1: Issues related to infrastructure
Source: Draft Development Plan foe newly added villages (2001-2021)

- Libraries and organized parks are inadequately provided in fringe areas
- PMC pipeline is there in most of the villages but quantity of water available is very less
- 30% of the quantity of water supply is lost in leakages during distribution

It is clear from above that water remains the most problematic area in fringe area villages followed by disposal of garbage and disposal of sewage.

8.1.3 Legal Aspects and Institutional Setup

Issues related to legal aspects and institutional set up in case of Pune City can be listed as follows.

1. Inclusion of villages in the PMC limit increase area under jurisdiction by 2.7 times
2. Weak control over illegal constructions in fringe area
3. The ward boundaries are not extended in the expanded municipal limits even after the declaration of the same as urban areas as per State Government Notification of year 1997.
4. There is no act in case of violation

8.2 Planning Strategies

Urban fringe is generally considered as planner's last frontier, which is generally not defined. It has peculiar characteristics like dynamic nature of land use, presence of various types of land uses, untidy landscape and potentially rich wild life. The planning strategy should be clear and defined to respond to the unique nature of urban fringe.

8.2.1 Multifunctionality: Development Principle

The major task in urban fringe areas is to provide urban fabrics to these areas and to reduce pressure on the main city on one hand and on the other hand to maintain its unique character.

This can be achieved by developing a multifunctional approach.

If vast areas of land in the urban fringe are to be covered in warehousing, their impact could be lessened by using its vast roof for solar panels or wild vegetation.

Rubbish disposal, wild life conservation, and recreation provision can usefully be combined on the same parcel of land.

Urban growth and urban expansion is ubiquitous. Cities that experience population and economic growth inevitably experience urban expansion too. The key issue facing public sector decision makers is not whether or not urban expansion will take place but rather

what is likely to be the scale of urban expansion and what needs to be done to adequately prepare for it.

Figure 7.2 shows urban expansion of Pune from 1992 to 1999. From the figure it is clear that Pune is expanding at tremendous rate and there is urgent need to control or manage this growth for better environment in the city. In table 7.2, ten parameters are considered and percentage change is calculated to give an idea of the present situation.

Measure	1992	1999	Annual Change
Population	3,508,945	4,401,868	2.06%
Built up Area (Sq.Km.)	92.54	191.20	11.02%
Average Density (Persons/Sq. Km.)	37,916.96	21,139.08	-8.07%
Built up Area Per Person (Sq.m.)	26.37	47.31	8.78

Table 8.2: Urban Expansion of Pune
Source: The Dynamics of Global Urban Expansion

From the figure it can be observed that with the fast rate of urbanization Pune is continuously engulfing surrounding rural areas. Development in the Southwest direction is restricted because of defence area. So the city is expanding in all direction. Development along NH-4 is more intense.

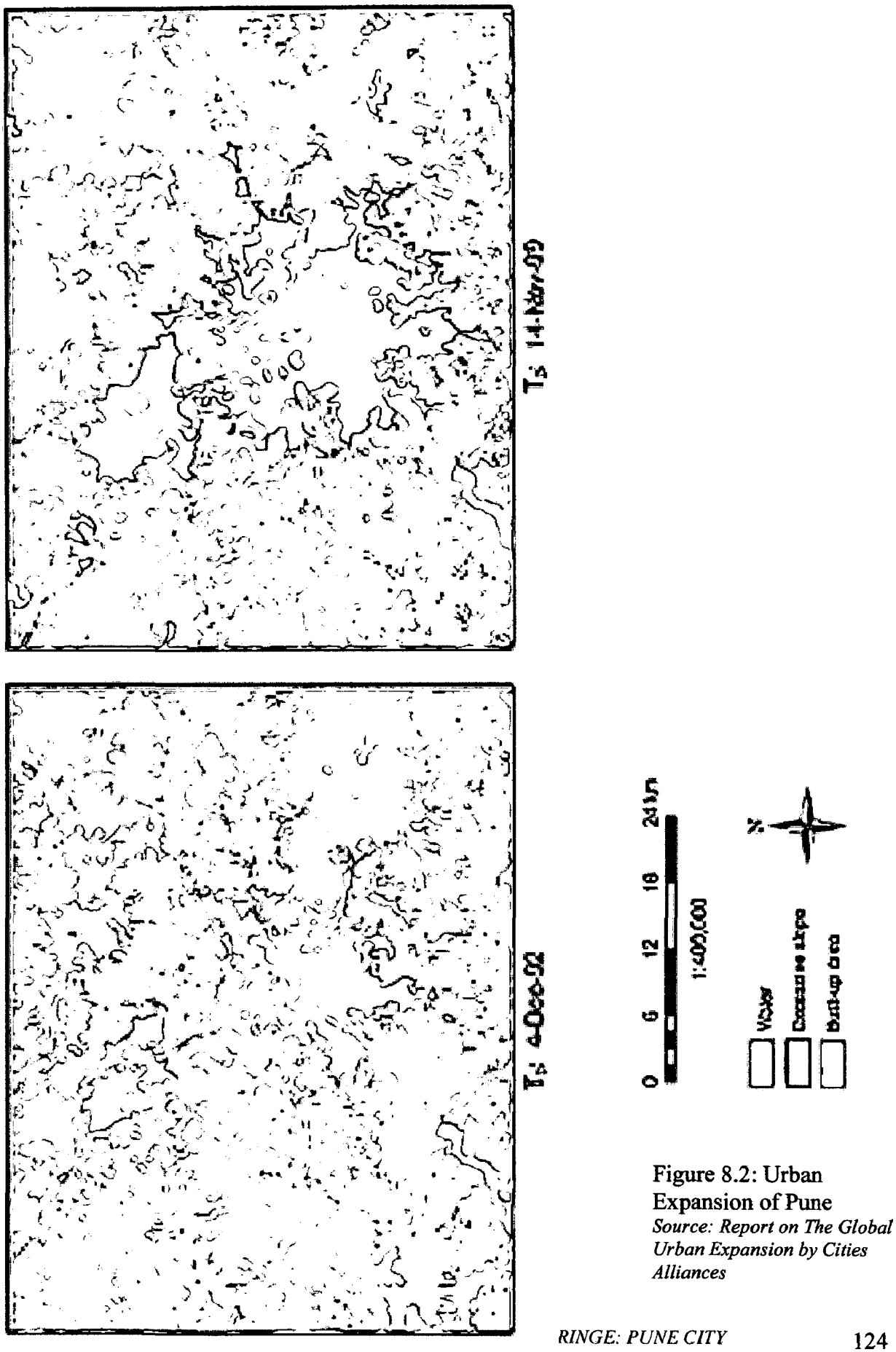


Figure 8.2: Urban Expansion of Pune
Source: Report on The Global Urban Expansion by Cities Alliances

Three types of urban expansion policies are studied.

1. Policies that seek to affect rural-urban migration
2. Policies that seek to affect the distribution of urban population among cities
3. Policies that seek to affect the process of urban development in individual cities and metropolitan areas

In case of Pune city third type of policies are adapted as in first two cases failure is seen in most of developed countries. The tools used for these policies are

Regulatory tools	Positivist/Activist tools
Assumes that most decisions and investments in urban expansion are undertaken by households and private firms, and seeks to guide this process through legislation and enforcement.	Focuses on the development decisions and investment of the public sector, and seeks to guide the development process by public land acquisition by undertaking key strategic investments in public infrastructure and in public facilities, housing.
Tool 1 Urban Growth Control	Tool 1 Public land acquisition and allocation
Tool 2 Zoning and land subdivision regulation	Tool 2 Investment in public infrastructure
	Tool 3 Public-private partnership in development projects

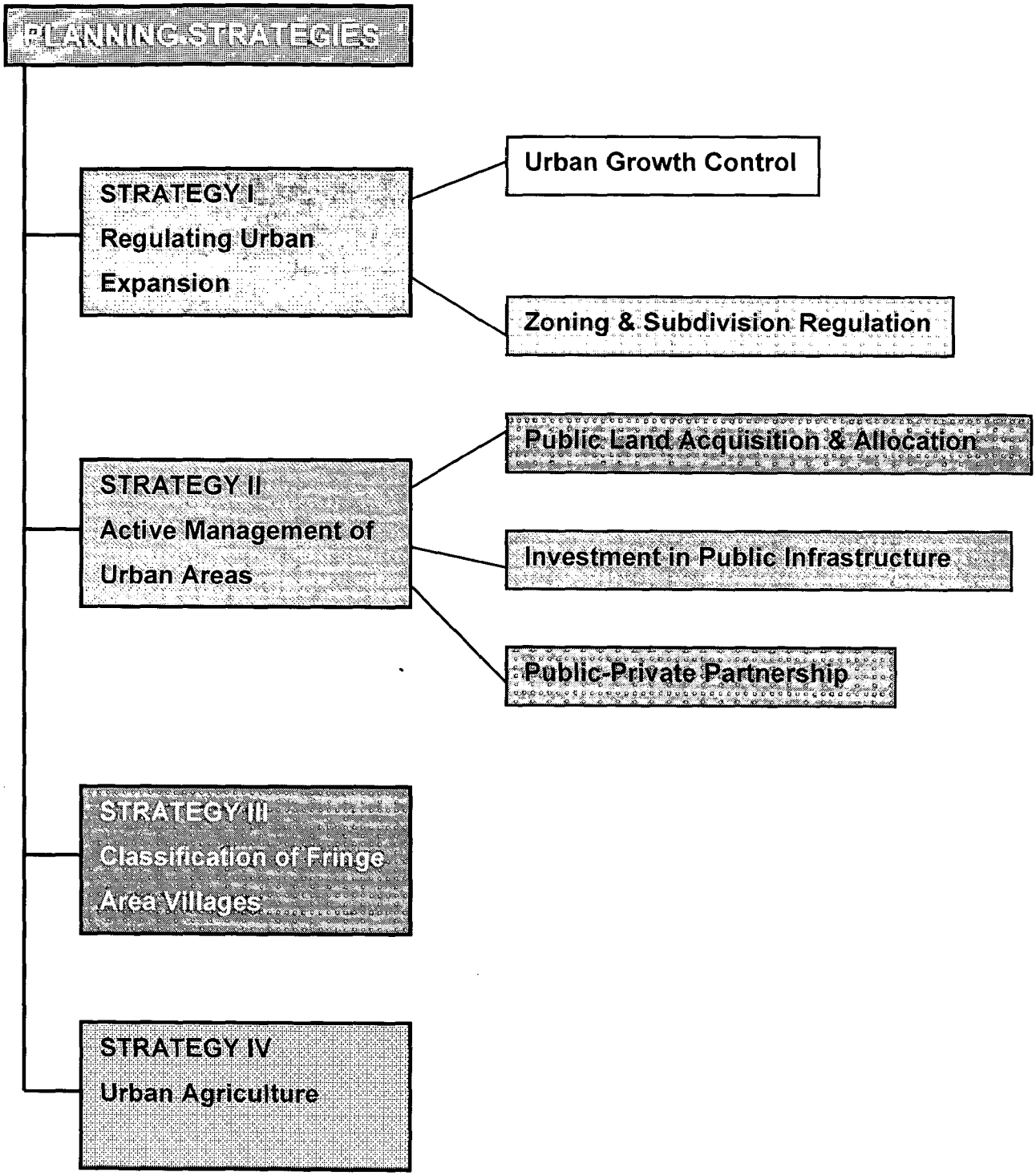


Figure 8.3: Planning Strategies
Source: Drawn by author

8.2.2 Strategy I

Regulating urban expansion

1. Urban Growth Control

a) Greenbelt legislation to prevent the conversion of rural to urban land at the fringe areas
b) Quotas for building permits
c) Delays in releasing public lands for urban development
d) Increasing cost of infrastructure for private developers
e) Prohibiting development that will further congest the existing road network or create more pollution
f) Restricting the ability of municipalities to raise the necessary capital to extend infrastructure networks
g) Increasing the risk to residential developers of litigation by environmental groups

2. Zoning Regulations

a) Regulation clearly identifying lands on which no development is allowed for various reasons
b) Prescribe the type of urban use that may be allowed
c) Restricting lands to single type of use – residential, commercial, or industrial – seeking to prevent multiple uses or the use of residences for work purposes.
d) Density limitations, allowable floor area ratios (FAR) and building height restrictions

8.2.3 Strategy II

Active Management Of Urban Expansion

1. Public land acquisition and allocation

Government should acquire land to keep it away from development. Land can be acquired by government and after subdivision of land and provision of infrastructure; this land can be sold to private developers.

2. Investment in public infrastructure and public facilities

Public investments in infrastructure enable and guide urban development. Inner-city roads that are constructed with a view to connecting one city to another typically end up

enabling development along their routes. So do inter-city or suburban railroads that attract development around stations. So provision of such infrastructure both attracts and repels development.

3. public-private partnerships in urban development projects

A tool of land readjustment can be adapted. Land readjustment involves collaboration between municipal authorities and land owners to develop an area on the urban fringe now in non-urban use. Landowners agree to a plan that assigns them smaller plots, leaving adequate land for urban infrastructure, as well as some land that can be sold at market value to pay for the construction of infrastructure and public facilities. Landowners agree to these schemes because the smaller plots they are left with, now in a fully serviced urban neighborhood can fetch much higher prices than the larger plots they previously owned.

8.2.4 Strategy III

Classification of fringe area villages

Villages in fringe area are in different stages of development.

These villages should be classified in different categories and based on their analysis policies should be formulated. The categorization can be done based on influence of urban area on the village.

8.2.5 Strategy IV

Urban Agriculture

Urban agriculture can be use as one of the tool to maintain character on fringe areas along with providing employment opportunities in these areas, thus reducing pressure on main city.

As there is no single solution present to deal with the problems, various tools should be tried.

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ANNEXURE

A. HOUSEHOLD SURVEY FORMAT

Department of Architecture & Planning

Indian Institute of Technology, Roorkee

This is a study carried for the fulfillment of thesis work under the supervision of Dr. Ashutosh Joshi & Dr. Nalini Singh, Department of Architecture & Planning, IIT Roorkee, Roorkee.

Sl. No. Location

Date:

Migration Characteristics

Q.1. Since how many years you have been staying here? For the last-

1) 0-5 2) 6-10 3) 11-15 4) 16-20 5) 21-25 6) 26-30 7) 31& above

Q.2. Where were you staying before?

1. If, within city, where? ----------
2. If, within Maharashtra, where? ----------
3. If, outside state, where? ----------

Q.3. a) When did you come to Pune? ----------

b) Why?

1) Employment 2) Education 3) Better environment 4) Avoid social tensions

5) Work transfer 6) Marriage 7) Relatives & Friends

House status

Q.4. Plot area of residence----------sq.ft.

Q.5. Built up area ----------sq.ft.

Q.6. Market value of land----------Rs/sq.ft.

Q.7. Market value of built up----------Rs/sq.ft.

Q.8. Is your house 1) rented 2) owned

Q.9. If rented, rent per month, Rs.-

1) 100-400 2) 400-700 3) 700-1000 4) 1000-1300

5) 1300-1600 6) 1600-1900 7) 1900-2200 8) 2200 & above

Q.11. Vehicle ownership

A) 1) Single 2) Multiple

B) 1) Bicycle 2) Scooter 3) Car 4) Three wheeler

5) Three seater rickshaw 6) Six seater rickshaw 7) Tempo 8) Truck 9) Bus

Q.12. Do you have parking facility within your residential plot?

1) Yes 2) No

Q.13. Total monthly expenditure on,

Sr. No.	Item	Rs. Per month
1.	Food	
2.	Education	
3.	Recreation	
4.	Transportation	
5.	Health	
6.	House Maintenance	
7.	Security	

Infrastructure characteristics

Q.14. Building access

1) Vehicular 2) Pedestrian (Pathway etc.) 3) By steps 4) All these

Q.15. Do you have piped water supply?

1) Yes 2) No

Q.16. Source of water supply in household

1) PMC line 2) Grampanchayat line 3) Pvt. Well 4) Bore well at------ distance

5) Community well at----------distance 6) Hand Pump at----------distance

Q.17. How many hours/minutes of piped water supply do you get in a day? ----------

Q.18. Is a water meter fixed?

1) Yes 2) No

Q.19. Cost of water charges/month----------Rs./month

Q.20. Quality of water

1) Drinkable 2) Non-drinkable

Drainage system

Q.21. How is sanitary waste disposed off from your house?

1) Underground sewer 2) Septic tank 3) Street gutters 4) Open

Q.22. How is garbage disposed off from your house?

1) Organized garbage bins 2) Open lands 3) In gutters 4) On road 5) Other

Q.23. Cost of garbage disposal Rs/month (in case of organized)

1) Nil 2) 1-10 3) 11-20 4) 21-30 5) Above 30

Q.24. Utility services used by the household

Sr. No	Facility	Dist. In Km.	Travel Mode	Cost	Time req	Satisfaction
1.	Daily Shopping					
2.	Shopping Centre					
3.	Police station					
4.	Post Office					
5.	Primary Education Nursery Primary Secondary					
6.	College/higher edu					
7.	Dispensary/Clinic					
8.	Hospital Pvt. Govt.					
9.	Place of recreation					
10.	Other (Temple etc.)					