PLANNING STRATEGIES FOR THE DEVELOPMENT OF URBAN FRINGE: BHOPAL

A DISSERTATION

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

MASTER OF URBAN AND RURAL PLANNING

By

TOSHI SHARMA

DEPARTMENT OF ARCHITECTURE AND PLANNING
INDIAN INSTITUTE OF TECHNOLOGY ROORKEE
ROORKEE -247 667 (INDIA)

JUNE, 2009

CERTIFICATE

Certified that this report entitled **"PLANNING STRATEGIES FOR THE DEVELOPMENT OF URBAN FRINGE: BHOPAL"**, which has been submitted by MS.TOSHI SHARMA, in partial fulfillment of the requirements for the award of the degree of MASTER OF URBAN AND RURAL PLANNING, submitted in the Department of Architecture and Planning, Indian Institute of Technology Roorkee, is the student's own work carried out by her under my supervision and guidance. The matter embodied in this dissertation has not been submitted by her for the award of any other degree of this or any other institute.

Date: 26-6-09
Place: ROORKEE

Ashutosh Joshi

(Dr. Ashutosh Joshi)
Department of Architecture and Planning
Indian Institute of Technology Roorkee
Roorkee

Singh

(Dr. Nalini Singh)
Department of Architecture and Planning
Indian Institute of Technology Roorkee
Roorkee

CANDIDATE'S DECLARATION

I hereby certify that this report entitled **"PLANNING STRATEGIES FOR THE DEVELOPMENT OF URBAN FRINGE: BHOPAL"**, which has been submitted in partial fulfillment of the requirements for the award of the degree of MASTER OF URBAN AND RURAL PLANNING, in the Department of Architecture and Planning, Indian Institute of Technology Roorkee, Roorkee is an authentic record of my own work carried out during the period from July 2008 to June 2009, under the supervision and guidance of Dr. Ashutosh Joshi and Dr. Nalini Singh, Department of Architecture and Planning, Indian Institute of Technology Roorkee, Roorkee, India.

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

Date: 26-6-09
Place: ROORKEE

(TOSHI SHARMA)

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

Date 26-6-09
Place: ROORKEE

(Dr. Ashutosh Joshi)
Department of Architecture and Planning
Indian Institute of Technology Roorkee
Roorkee

(Dr. Nalini Singh)
Department of Architecture and Planning
Indian Institute of Technology Roorkee
Roorkee

ACKNOWLEDGEMENT

I would like to express my deep sense of gratitude, indebtedness and sincere thanks to my guides Dr. Ashutosh Joshi and Dr. Nalini Singh for their constant encouragement and invaluable guidance towards the successful completion of this work.

My sincere thanks also goes to Prof. Najamuddin , Prof R.Shankar and all the faculty members of Department of Architecture and Planning for their valuable suggestions and encouragement given to me during my tenure in Roorkee.

I wish to acknowledge the inspiration and support provided to me by Bhopal Development Authority and Town and Country Planning- Bhopal. I convey my sincere gratitude to all such organizations that helped me in data collection.

I am also thankful to my sister Nishita and friends Amresh, Saad, Amol, Neha, Anushree Jaya, Leena and Sunita for their constant motivation and support throughout my work. At the end I owe the successful completion of my work to the blessings of my parents.

ABSTRACT

This report is an empirical study which has been conducted to understand the degree to which Urban fringe development can influence the growth of a city. This study tests the effect of unplanned growth in southern fringe of Bhopal by measuring the extent to which it is misbalancing the coordination between different land uses.

The rapid and random expansion of urban centers along their peripheries is a typical phenomenon of urban landscape in developing countries in general and in India in particular. The emergence of fringe zone with its complex problems of adjustments in between rural and urban ways of life has led to serious land use problems-loss of agricultural land, unauthorized urban sprawl, high land values, speculation in land and related problems and has assumed great topical importance but sadly remained a neglected area in urban research.

While a large amount of research has been conducted on the measurement and prediction of impact of fringe development on various land uses, there has been also a systematic trial to study the causal effect for such misbalance. This report gives an 'up to date' picture of the fringe areas of Bhopal which lack development and infrastructure. These areas have fast changing environmental and socio socio-economic conditions brought about by urbanization.

In Bhopal lots of developmental activity is going on in fringe areas, in lack of proper planning and implementation and thus conditions in these areas are degrading rapidly. In the light of this fact, for improving the living conditions, the thesis focuses in drawing planning strategies for the development of urban fringe of Bhopal city considering land-use pattern, physical infrastructure improvement and suitable legislation and land use policies.

LIST OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

The existence of the urban fringe is a no reputed fact since the down of civilization. But the concept and its planning needs were understood only recently.

Rapid urbanization is the sole cause of emergence of the urban fringe as well as slums in the cities. Urbanization is caused due to industrialization, as the small town grows into a city and gradually into metropolis, the rate of migration increased, and putting pressure on land. As the percentage of urban land decreases its values go up and it is out of reach of the lower income groups, leading to the unprecedented growth of the urban fringe.

The rural areas were clearly defined from the urban areas by walls, gates etc. in the olden days. The people inside the urban area were engaged in non agricultural activities, while outside it, the rural people were primarily engaged in agriculture and animal husbandry. Even today the place of the differentiation can be clearly seen. What were rural villages in the municipal limits have now been unmistakably transformed by the location of urban residential, commercial and industrial complex. The marked forces play a significant role in the lives of the rural people bringing about changes in their life styles.

The fringe may be defined as "that area of mixed urban and rural land users between the point where full city services cease to be available and the point where agricultural land users predominate" (Blizzard and Anderson)

Thus this dichotomy between two contrasting concepts has led to the need for the management of the urban fringe so as to regulate growth and unplanned developments.

Hence, the fringe areas remained devoid of legal planning inputs and the potential (both the use and misuse) they represented escaped the attention of planners.

Urban fringes have become the focal point of urban forces unleashed by unbridled greed of the builders, urgent need of the resident of the city, and failure of the plan to of lack of control. The development becomes morbid spot on the city landscape. Absence of proper development control and the controlling agency, the problem of urban fringe is getting worse and aggravated due to non-confirming land use, sub standard services, and consequent environmental and landscape problems etc.

1.2 NEED FOR THE STUDY

There is a need to study emergence of fringe areas because of the problems that exit there in. The provision of infrastructure by the public agencies is demand based to the extent of

registered demand. The demand is not registered in such settlements more due to the fact that they are unintended and also due to planning incapability. As the result of this, planning intervention seems to be partially ineffective. A viable alternative to this problem is sought through this study. The trend of further developments in Bhopal clearly envisages the possibility of unintended settlements and engulfing of urban villages. So planning's strategy should be made to accommodate for such developments so that "the present urban fringe should not remain as an area which is lacking in infrastructure facility and housing layout facility for a longer period".

Startling incongruities between fact and planning fiat are found in this part of the growing cities. Be cease of this zone urban functions and residences greatly spill far beyond the political boundaries of settlements and urban growth being very rapid, it is very difficult to keep abreast of the statutory boundaries in the fringe frontier.

- The vast expanses of this sprawling area are of great interest to real estate owners, planning official, tax commissioners and social scientists.
- To real estate owners, it represents an area to be easily exploited.
- To land use planner, it is an area of rapid population growth, unrestricted subdivision, incompatible land uses, sporadic and fragmented growth and spreading slums.
- To city officials, it represents a sizeable proportion of their daytime population escaping tax and legal jurisdiction.
- To social scientists, it represents a population troubled by rural nostalgia but having an urban appetite".

Fringe areas show following peculiar physical characteristics.

- Physically disintegrated and sporadic development,
- Chaotic land use patterns
- Environmental degradation due to non-confirming land uses,
- Land speculation, spiraling increases in land prices, at a rate more than that in main area,
- Speculative unsubstantiated by the other fringes.
- Ribbon development

The study of fringe areas is relevant because the city conditions grow around and beyond the fringe areas represent the potential for future urban growth and also determine the direction of growth of the city.

1.2.1 Relevance of Study for the city of Bhopal

Bhopal is the capital town of Madhya Pradesh. Before independence it was a princely state town. In 1956 Bhopal was selected as the capital of Madhya Pradesh. All higher order administrative functions, commercial center, educational, medical and industrial developments of BHEL Township etc. are located here.

The city's population increased from:

2.23 lakhs in 1961 to 3.65 lakhs in 1971 with decadal growth rate of 72.63% then to 6.67 lakhs in 1981 with a 74.51 % decadal growth rate and to 10.63 lakhs in 1991 with 58.51% decadal growth rate. Its present population is 15 lakhs (2001 census).

Like other Indian cities, where the planners have grossly neglected the urban fringes, Bhopal is no exception. Successive development plans were prepared, only for the main and contiguous mass of land, which was left surrounded by a large belt of agricultural land (as was then the practice denote as green belt) to be available for future expansion of the city.

Hence, the fringe areas remained devoid of legal planning inputs and the potential (both for use and misuse) they represented, escaped the attention of planners.

AFTER 1956 BHOPAL HAS EXTENSIVELY GROWN IN ALMOST ALL DIRECTIONS EXCEPT IN THE WEST.THE GROWTH HAS BEEN VARY FAST IN THE SOUTH EASTERN DIRECTION BECAUSE OF BETTER ROADS AND RAIL TRANSPOTATION FACILITIES AND CLOSE LOCATION OF MANDIDEEP INDUSTRIL CENTRE.THE NEW CITY HAS EXPANDED OVER THE AGRICULTURALLY RICH BLACK SOILS OF THE MALWA PLATEAU.

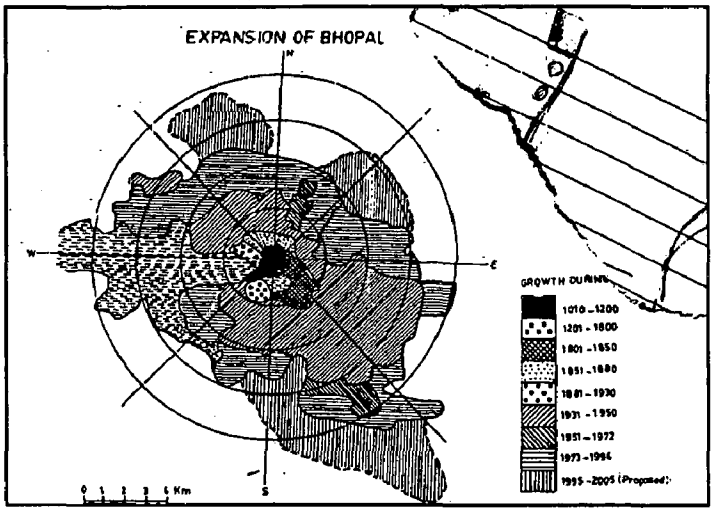


Fig. 1.1 Expansion of Bhopal city in all direction.

The Bhopal development plan (1971 to 1991) was the first-scale plan and as such a crucial planning exercise for the city. It estimated a population growth from 3.65 lakhs to 10.00 lakhs (27.4%) in the year 1991 and provided land areas accordingly, but about 1500 to 1650 hectares of this land was blocked and was never available because

a) The urban land ceiling act came into force in 1976
b) The roads and necessary infrastructure was never development by the agencies as per plan provision.

The government machinery could not process, acquire and deliver this to the masses and there was no private mechanism in place. The pressure for land, especially residential land, started increasing and spilled into the fringe areas of Bhopal.

Thus the fringe areas started gaining importance. They cater to the forces of urban dispersal, rural urban migration and housing for elite and urban poor.

Urban fringe have become the focal point of urban forces unleashed by unbridled greed of the builders, urgent need of residents of the city, and failure of plan to provide adequate land. It exhibits and uncoordinated and haphazard appearance because of lack of control. The development becomes a morbid spot on the city's landscape. In the absence of proper development becomes a morbid spot on the city's landscape. In the absence of proper development control and the controlling agency, the problem of urban fringe is getting worse and aggravated due to non-confirming land use, sub standard service, and consequent environment and landscape problems etc.

- In the fringes of Bhopal the continuous conversion of agriculture land for urban activities is taking place ,which if considered fully seems to be haphazard with unprecedented growth of housing.

- The state government has also been encouraging Industries and other investors by making agricultural land available for commercial purposes.\

- Because of the socio-economic and speculative forces imposed on villages in the periphery of Bhopal, massive transformation in their physical form and socio- cultural set up is taking place, disrupting their age old healthy relationships.

- Because of the Institutional infrastructure on the periphery of Bhopal, large scale fringe development is taking place but in an unplanned manner.

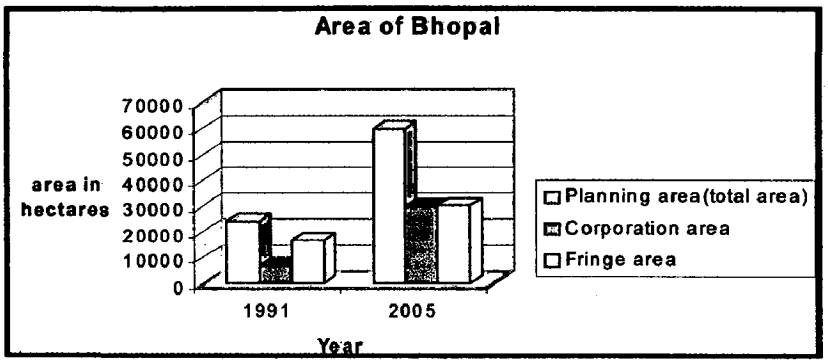


Fig. 1.2 Area of Bhopal

Thus, it is necessary to study in depth the characteristics and process of urban fringe development of Bhopal and its management aspect, to regulate/define this expanding zone of transition because today's urban fringe will be tomorrow's city.

1.3 AIM AND OBJECTIVES

Aim: To study the growth pattern of fringes of Bhopal and to suggest the suitable planning strategies to counter the undesirable consequences of unplanned fringe development of Bhopal.

Objectives:

- To define the concept of urban-fringe and its transformation due to urbanization.
- To analyse how local and external factors determines land-use patterns.
- To asses the character of development taking place in the fringes of bhopal and the factors governing it.
- To identify the drawbacks of present urban fringe development of bhopal with respect to land use changes and infrastructural facilities.

- To suggest suitable planning strategies for a systemetic development of fringe areas of bhopal.

1.4 SCOPE AND LIMITATION

The thesis will focus on formulating planning strategies for the development of fringes of Bhopal considering land-use pattern and physical infrastructure.

Due to time constraint my study will be limited to 5 villages along Kolar road and proposals will be of schematic and general in nature such that the same may form guideline for planning initiative in future.

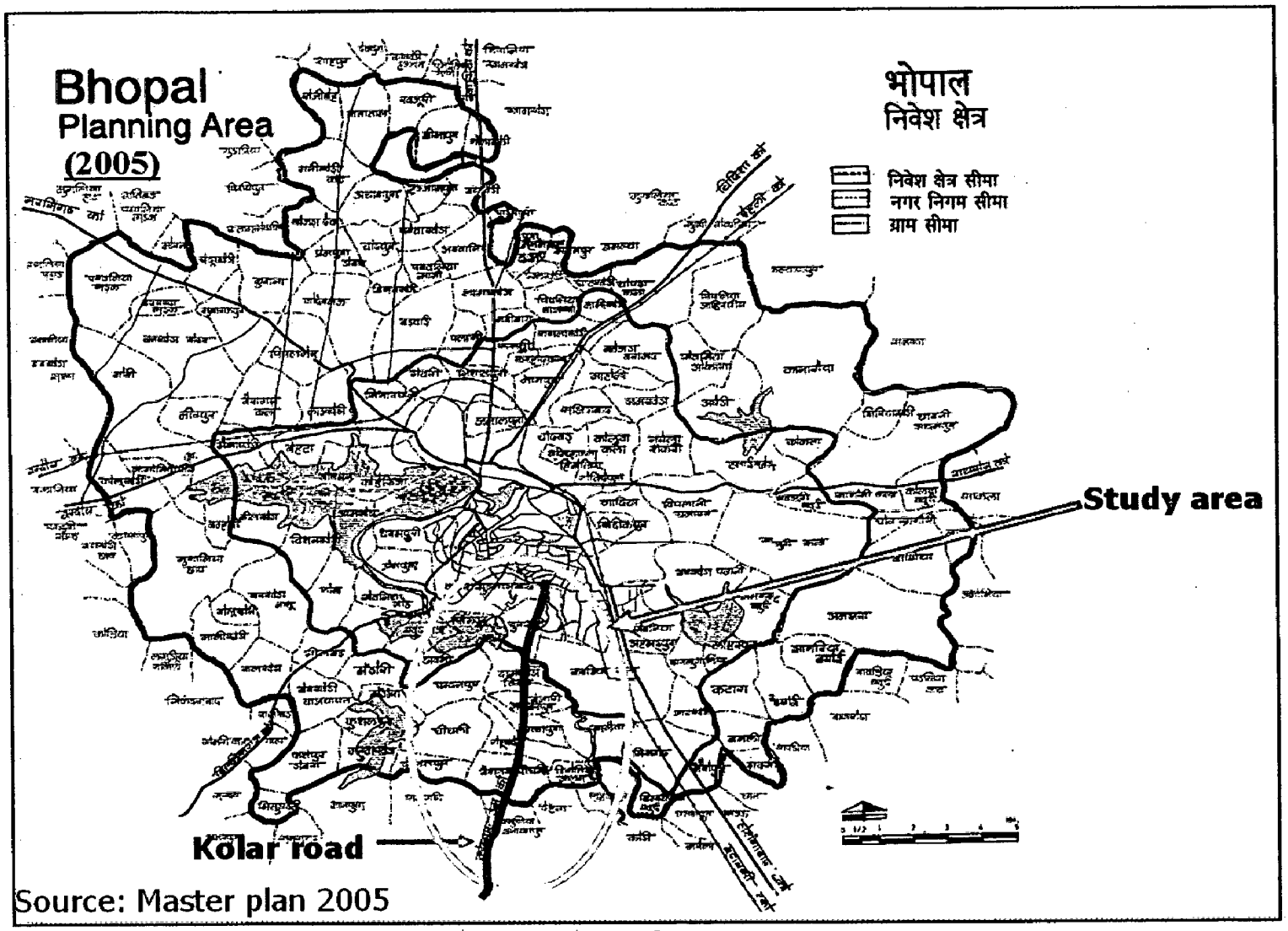


Fig. 1.3 Map showing study area

Limitation

- Due to time constraint I will be mostly dependent on secondary data.

- Due to limitations in carrying out detail survey and collecting data from primary source at individual level, the study has been based on personal observation and information along with some data collected during course of informal discussions with residents, citizens and development officers of the area.

1.5 METHODOLOGY

To achieve the formulated objectives, the following methodological sequence is adopted:

Stage 1:

- Literature Review based on Urban fringe.
- Study of Literature based case studies (Indian and western context).
- Physical survey of the study area.
- Data collection (Relevant data of the selected city and the study area)

Stage 2:

Analysis of data is done for establishing the relationship between the city growth and fringe and identification of problems, constraints and potentials considering following aspect:

- Physical Aspect
- Demographic Aspect
- Socio-economic Aspect
- Legal Aspect

Stage 3:

- Identification of issues and potentialities related to the fringe area planning and development
- Formulation of planning strategies and recommendations.

METHODOLOGY

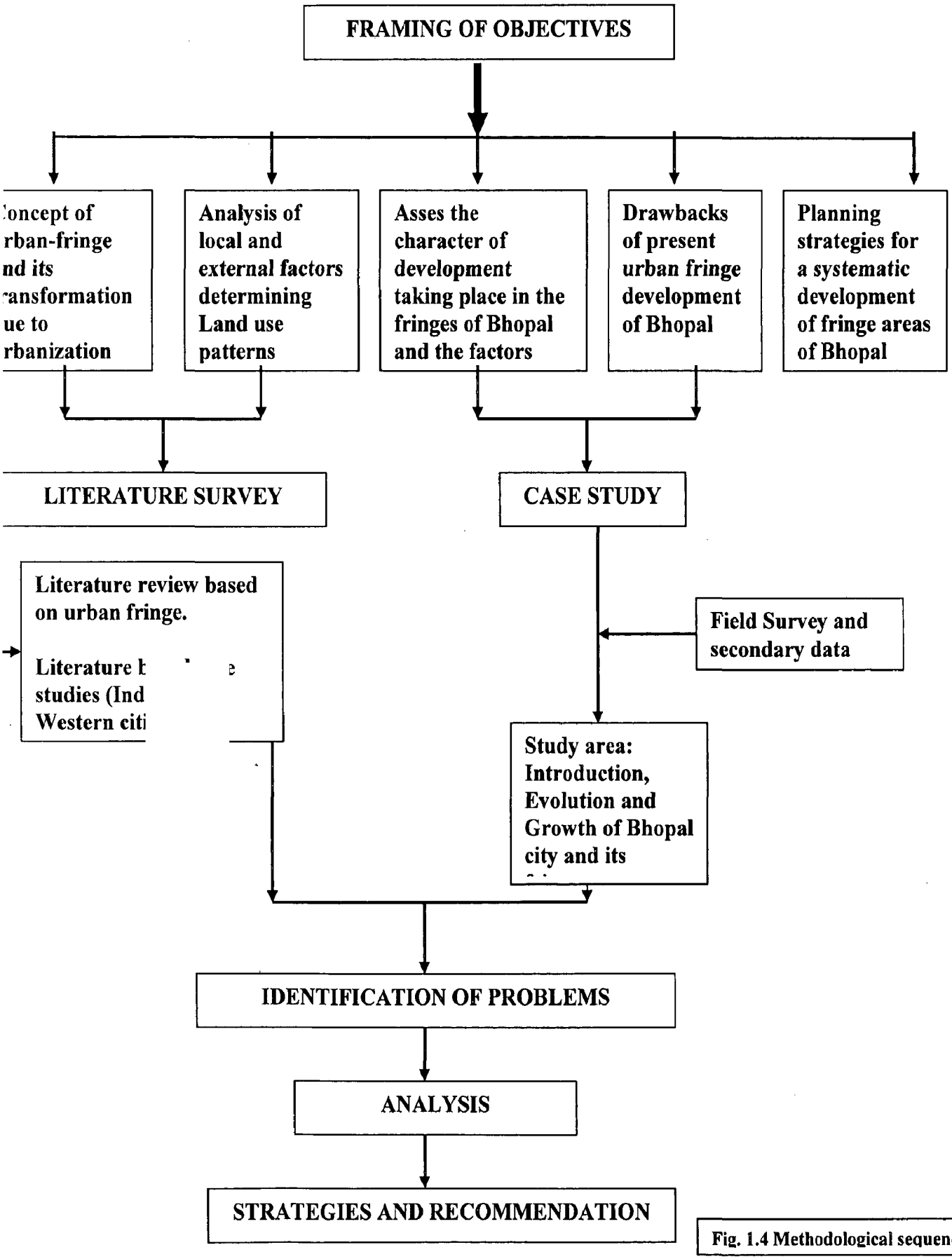


Fig. 1.4 Methodological sequence

CHAPTER 2: LITERATURE REVIEW

2.1-INTRODUCTION

Land is the means of life without which man could have never existed and on which his continued existence and progress depends. This scare resource is subject to competing claims for various land use and plays the most significant role in the process of urbanization. The process of urbanization involves the spatial expansion of cities due to phenomenon of natural growth of human population, which is an inevitable process. The demand for land starts from the core of city and moves over the period of time towards the peripheral or fringe areas. It is accentuated by functional disposition of land in these areas and is manifestation of the ever expanding urban sprawl.

The net effect of the socio economic processes has an impact upon the lifestyle of citizen influencing inter relationship of journey to work, access to facilities, etc and is most tangibly revealed in patterns of land use. This change, on the edges of cities is of great importance.

The physical changes that occur at urban fringe areas are associated with transfer of land from rural to urban purposes.

It could be considered as fundamental alteration that land use changes are accompanied by sharp increase in land values. The change at the urban periphery denotes different phenomenon of urban growth. Accordingly, the growth of peripheral areas has achieved strategic locations in terms of residential use. Thus the phase wise development of the fringe areas developing upon the impact of urban centre had become as integral part of physical structure of growth of cities. The urban fringe which is the first phase of development in the fringe in terms of nearness to the urban fabric and impact of urban centre has key role in this phenomenon a sit is under a process of urbanization undergoing transition from rural to urban.

2.2-URBAN FRINGE

Urban-Fringe may be defined as that area outside the central city that has a strong, functional, economic and social linkage with the central city and is characterized by higher degree of interaction between the city and the surrounding areas.

It is a transitional belt around the main urban developed area where both urban and non-urban characteristics functions exist side by side.

The term Fringe 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 phenomenon, where the process of sprawling has started to taken place.

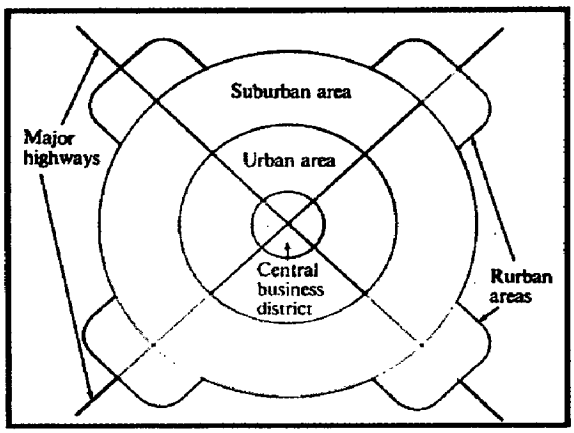


Figure 2.1- Growth of a city

Located well within the urban sphere of influence the fringe is characterized by a wide variety of land use including dormitory settlement housing middle-income commuters who work in the main urban area. Over time the characteristics of the fringe change from largely rural to largely urban. Suburbanization takes place at the urban boundary of rural-urban fringe.

"It is this countryside, the green belt or rather the green belt, where the farmer sells land rather than crops, where the developer takes the public resource of the city's hinterland and subdivides to create a private profit and a public cost! Certainly, here is the area where public powers are weakest eight absent or elastic where the future costs of streets, sidewalks, sewers, schools. Police and fire stations are unspoken."

Fringe area in its broadest sense is the transitional zone where the city expands in near future, which shares the rural and urban characteristics with a lower economic status than the urban centers.

The urban and rural settlements, however, small or large interact with each other ideally in a two way process. Space use in the urban fringe can be characterized as a continuously changing pattern where rapid residential expansion with low to average destinies is observed. A supply of infrastructure and services that tries to keep pace with the inhabitants but is still unsatisfactory can also be seen. The term 'urban fringe' is used as co terminus to preriphey of towns and cities where the process of sprawling has

started or taken place. It refers to an annular belt adjoining a city, which is in the process of conversation to urban area.

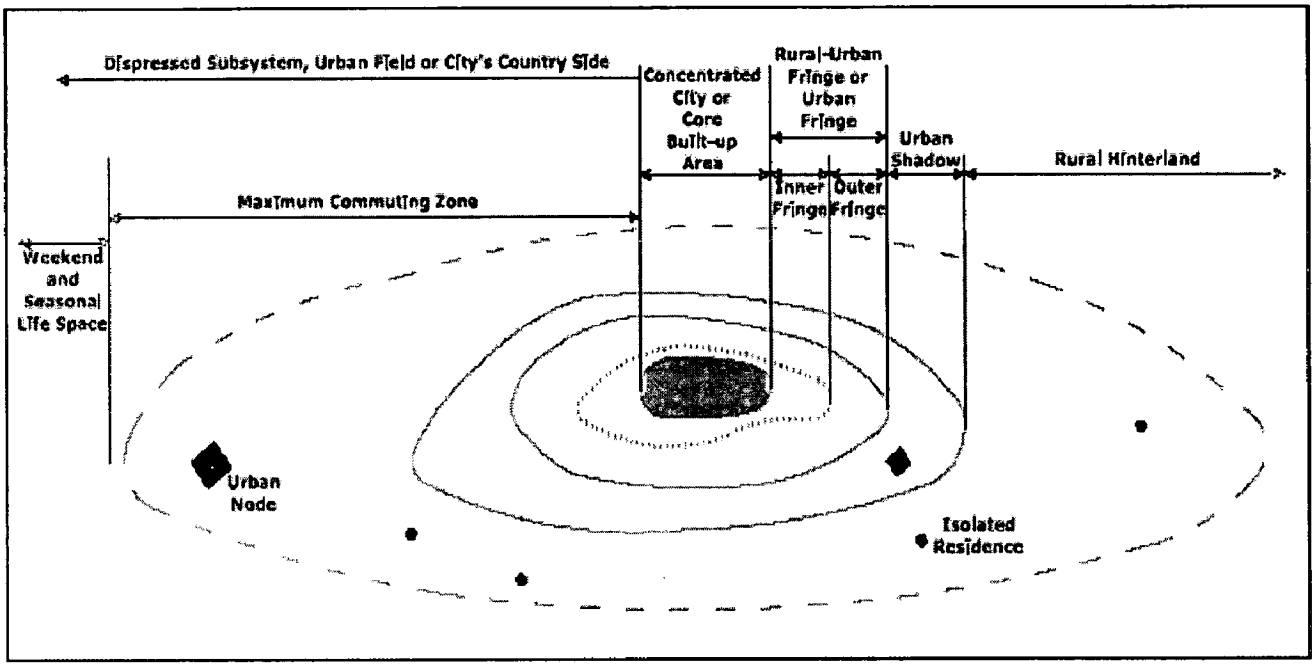


Figure 2.2- The form of a regional city

2.3-THE CONCEPT AND THE PROBLEM

Urbanization in India is, by and large, still a fringe phenomenon. It is a fringe phenomenon in the sense than in its size, spread, impact and role in the processes of social transformation; it remains a smell, limited and weak phenomenon. It is a factor associated with the limited development of industries and modern social-economic processes reflected in the persistence of a multistructural society. Owing to a complex of such factors and embodying their consequences, urbanization has not evolved into a decisive, dynamic phenomenon; it remains one of those incomplete, un integrated developments which India's intimate relationship with more advance capitalist world and the halting and lop-sided process of modern economic development foisted on her. It is in this sense that urbanization can be considered a fringe phenomenon in India.

Such a fringe character of urbanization itself is major factor in the emergence of 'urban fringe'. At the most general level it can be said than one of the consequences of urbanization being a fringe phenomenon is seen in the existence of 'urban fringes' a kind of partially integrated, semi-urban, slum-squatter, stagnant settlements the periphery of large urban, metropolitan centers.

Urban fringes are also a result of rural urban interaction in a situation in which the urban sector does not possess adequate capacity to absorb and integrated the cast-offs from the rural sector. Additionally, processes of historical neglect or urban housing and the grossly inadequate provision of urban infrastructure and civic amenities also contribute to the emergence of urban fringes.

The concept of an urban fringe is not new one in urban geography. For example 'Per Urban land' and 'fringe area' more or less interchangeably refer to land lying within two or three miles from the existing town boundary. At times a fringe areas are taken to be 'a particularly problematic areas quite close to a given city boundary,' which "for all practical purposes is an integral part of the core city." Elaborating on this formulation, it is said that an urban fringes "is a transitional or twilight zone situated in between well-recognized land used of the city and agricultural tracts of the village. It is, generally speaking smaller than the commuting trade area of a city and can be distinguished in term of peculiarity of land uses. In fact, most of the land uses in the fringe are in a flux where industries, residential quarters, commercial places, streets, drains, shacks and slums jostle in space."

The transitional, flux character, combined with lower and inadequate level of integration and development of the urban fringe, with consequent concentration of worse-off sections in its boundary is the major source of the problems facing urban fringes.

In this sense, fringe area is a problem area. It has been suggested that 'not every fringe, however, can be considered a problem fringe. This, it is argued, follows from the fact that every town or a city has a fringe. But if the core city or town is a slow growth area, its fringe does not become a problem area. Thus it is apparent that the above formulation relates problem fringes to rapidly growing towns and cities only.

It stands to reason to hypothesis that there are some serous differences in the natural and character of fringes located on the outskirts of growing urban centers from those associated with slow growing or stagnant urban areas. For example, in the former case unemployment or underemployment would be associated with increasing immigration, while in the latter case, unemployment and underemployment would co-exist with emigration. However, as far as the processes of development, generation of income and employment opportunities, creation of production capacities, provision of civic amenities, etc., are concerned, they may be wanting or be inadequate, unbalanced and socially very costly in both the types of urban fringes. Hence, it will not be correct to

say that while growing cities have problem fringes, the stagnant urban centers do not have problem fringes. In reality, both the situations generate problem fringes; the major difference concerns the character of problems facing the two and not their absence in one case.

The urban fringes may or not be administratively integrated with the core city. Administrative inclusion of urban fringes in the main city does not necessarily contribute to the solution of the problems of urban fringe. In fact, it may produce counter effects. As a result of not taking note of such possibilities, it is not uncommon to come across writings which express a certain amount of core-city-centered concern over the inclusion of urban fringes in the territorial jurisdiction of the main city. For instance, it has been argued that, "In most cases the fringe area becomes a problem area for the city because of its location right at the periphery of city. This area is marked by haphazard and unregulated growth, overcrowding, slums ribbon development and traffic problems, unsanitary conditions and chaotic use of land."

It has also been argued that "free movement between the fringe and the city places the city at a disadvantage. Its services and amenities are freely used by the residents of the former without caring to pay anything to the municipal coffer. Thus the fringe is looked at as the Mecca of the tax-dodgers."

The arguments seem to be running at two parallel levels. While at one stage, it is suggested that 'annexation' of the fringe by the core city has at times averted the fringe problems, it is suggested, at another stage, that the existence and conditions of urban fringes create problems for the main cit. the argument is based on the pattern of socio-economic flows between the fringe and the core, which enable the former to cause some 'outflow' (like use of services and amenities) from the latter, without may compensatory inflows (in the form of payment for civic services).

It is easy to see that the social and economic outflows from the fringe in the form of cheap labor, demand for products, support for getting into positions power, and other skilled and unskilled services are not taken into account in the above argument. Then, the concern is exclusively with payment for the use of municipal services. It is also taken into account that while by bringing in the fringes within the municipal boundary the problem of tax-dodging can be averted the differential allocation of civic amenities heavily weighed against the fringe is very difficult to rectify owing to power and privileges vested in the core city.

If the social and economic flows between the fringe and the city are taken into account, it is our hypothesis that the fringes are the net losers. Generally, their share in the allocation of civic facilities is comparatively small. While both the problems of the fringe and the city may owes heavily to outflows extracted from them by core.

In sum, the factor which distinguish an urban fringe from other slum-squatter settlements, so characteristic of incomplete, anarchic and a socially determined processes of urbanization in the third world countries like India, are their segregation in various ways from the main city and the net outflow of various resources from the fringe to the core city - both its central areas and its well – serviced suburbia. Thus one has to understand an urban fringe as a suburban, semi – urban area in habited by relatively low income, marginal groups with consequent emergence of slum – like conditions in their midst.

To the extent that such settlement and their manifold problems result from broader macro - level social - economic processes, it is only trough the operation of such broader forces that their problems will be taken care of. However, it does not follow from the above that micro – micro level intervention and planning has not role to play in dealing with the short – run and long – run problems which make life a difficult drudgery for their helpless denizens. Provision of amenities, enforcement of humane municipal regulations, micro-level efforts at resource mobilization and utilization not add to social consumption but by creating income – earning opportunities add to material wellbeing as well. of these civic amenities, those in the field of education and public health posses a great deal of potential in term of its subsequent spread effects in many directions.

This micro intervention need not be at the initiative and behalf of the government alone. A lot can be expected and done through voluntary effort, provided it gets initiated through some external factors/agencies. There is often a good deal of talk about business organizations initiating such voluntary efforts. Though there is nothing in such effort which goes against the enlightened self interest of business, one cannot say how far such efforts will be forthcoming and be free of direct business motivation. Business units like those providing luxury class hotel facilities in the midst of slums have every enlightened reason to contribute towards improvement of the conditions of the area in which they are located, if for no other reason than to make the luxuries they are providing a little less offensive and vulgar. In sum, to the extent such voluntary efforts are available; they can give a proper action plan, play a useful role. The long experience of stagnation and poverty has deprived the residents of such urban fringes of the capacity too initiate, let

along, and take to fruition, processes of self improvement through spontaneous, cooperative, collective, voluntary efforts.

However, it is equally true that purely exogenous efforts, without the involvement of the local population, hardly stand a chance of succeeding, and if somehow are persisted with, can hardly prove beneficial to the local people.

It should also be pointed out that such micro effort at local level improvement have very significant implications for the broader processes of social mobilization for making an impact on the network of social relations extending beyond the local scenario. To the extent that life becomes a little more livable, to the extent that such processes re locally grounded and palpable enough to be seen and understood by people who have undergone long period of inertia, to the extent that such processes are obstructed by the vested interests and enable the poor to recognize and fight the vested interests in an organized manner, to the extent that such experiences create a higher level of consciousness and enable them to relate the political processes with concrete interests and gains, such micro level voluntary efforts at improving the immediate habitat have wider and long run significance.

2.4-STRUCTURE

The urban fringes lies between the continuous built-up area of a city and the urban shadow and ecologically it can be viewed as an area of invasion in which population density is increasing rapidly and land values are raising.

The fringe consists of an inner fringe (fig. 2-2) (Sometimes called the urban fringe) which is characterized by land in an advanced stage of transition from rural to urban land use. In this area new construction is taking place, which approved or planning permission granted by the authority.

The second area in the fringe is the outer fringe (sometimes called the rural fringe) which is an area in which rural land use continues to dominate the land use but there is infiltration by those urban land uses which take up too much land to be easily located elsewhere, for example, airport, cremation, sewage, work, etc.

The fringe area tends to increase along transportation lines. Between such routes, purely rural land may extend city ward.

2.5-LAND USE CHARACTERISTICS

i. There is constantly changing pattern of land occupation.
ii. Farms are small with intensive crop production.
iii. Residential expansions.
iv. Services and other public utility facilities are inadequate.
v. Speculative building is common.

2.6-SOCIAL CHARACTERISTICS

2.6.1 Segregation

Newly built private housing in villages built by elite developers is often expensive. It is brought by relatively high wage earners for whom it is either more attractive or less expensive than city centre accommodation. However, local people who have the first claim on public housing will be physically segregate from these new developments. Similarly, the rural urban fringe is often regarded as a 'Greenfield site' (undeveloped sites outside the existing built up urban area) which are favored by large firm/organization seeking location for new developments such as headquarters, offices, housing and industrial estate. Greenfield sites have the advantage of being virgin sites uncluttered by any previous development and are normally available as extensive tracts in single property deal so facilitating land acquisition. It is possible, therefore, for planner to allocate land for schools, light industry and housing, so that there is functional as well as social segregation of land use.

2.6.2 Selective Immigration

The rural urban fringe attracts mobile middle class residents who form a small but powerful and economically important proportion of the city population. One effect of their choosing t'6 live beyond the city is that their financial contribution, in the form of rates, is denied to the city, which they patronize for subsidized service, such as public transport, social services and cultural amenities. Such dormitory dwellers, while retaining strong social linkages with the city which provides their income, may opt out of the problem of urban change and decay.

2.6.3 Commuting

People living in fringe areas commute daily to their place of work, this creates the dual problem of traffic congestion in the city and total inactivity during' the day in dormitory villages. The city government is faced with the task of providing transport services capable of handling peak (rush hour) load. However, these services remain under utilized for the rest of the day.

2.6.4 Collapse of Geographical and other Hierarchies

With the population partly directed towards other parts of the city for certain services, the service content of the fringe settlements becomes modified. They do not need to carry an array of goods and services commensurate with the population they serve but can become specialized in particular direction. Instead of rounded bundles of functions at particular hierarchical levels collected at appropriate nodes the various functions are being dispensed in specialized or segregated bundles, the whole process being precipitated by the mobility of the population. Likewise, the aggregation of incoming groups with their links back to the city reflects the traditional social hierarchies of the rural area.

2.7-STAGES OF TRANSFORMATION OF VILLAGES

Chronological Process

1. **Rural :** land use and occupations are dominated by agricultural orientation
2. **Occupational change :** high proportion of non-agricultural occupations (of whom there are many commuters)
3. **Increasing urban land use :** urban land-use types start to dominate
4. **Urban:** the land is almost entirely urban

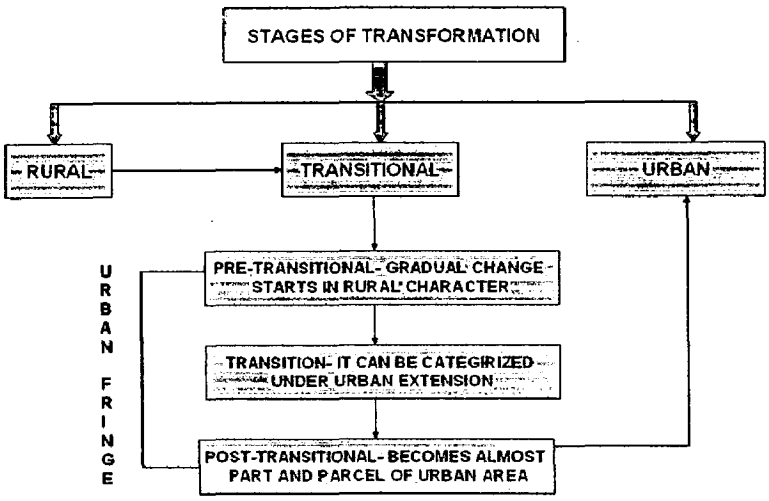
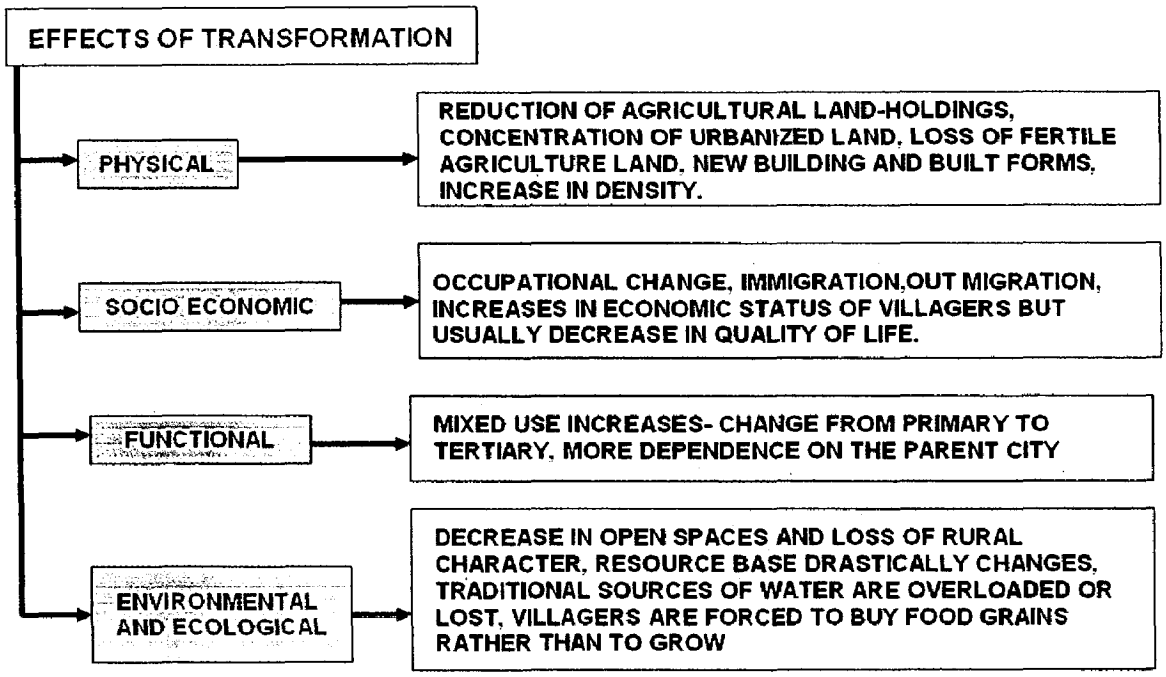


Fig 2.3 Stages of transformation



2.8-PROBLEMS OF RURAL-URBAN FRINGE

The rural-urban fringe is an area of rapid change in land use and population characteristics. This gives rise to multiplicity of problems. Most of the problems are related to the inherent weaknesses of our present administrative framework and its inability to cope with the rapidly changing landscape of the rural-urban fringe.

2.8.1 Land Use Problems

The rural-urban fringe is often used for dumping garbage and sewage of the city, for the relocation of city's slums and location of industries emitting noxious gases and generating chemical effluents. The fringe is a zone of haphazard industrial and residential development. This happens when the rural people lured by attractive prices sell their land to developers who are primarily concerned with profits, do not really develop the lands before they are sold, and the people who buy land from them have to wait for decades to obtain basic urban amenities.

Additionally, the fringe areas suffer from concentration of land ownership, speculation on land and rapidly rising land values.

2.8.2 Urban Amenities and Services

The fringe villages lack most of the civic services that are found in the city proper. Primary urban facilities, such as water supply, sewerage, etc. are, for the most part, not available because the city provides these services only to place within the municipal limits. Outside the municipal limits, the small towns and revenue villages lack the necessary administrative infrastructure and the finances to provide these basic amenities. However, the people in the fringe areas manage to live without most of the services as they can obtain water from hand pumps, tube wells or ordinary wells and septic tanks can be Used as an alternative to sewage system. Besides, people are able to adjust themselves to the poor quality of local medical, education, postal and transport facilities. The fringe area is generally served by poor public transport facility.

2.8.3 Administrative problems

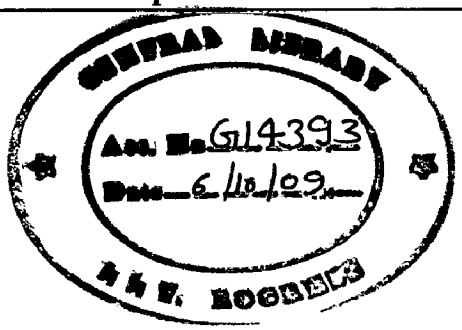
The rural-urban fringe is a problem area for administration. The Indian territorial administrative system was designed at a time when the phenomenon of rural-urban fringe was unknown. When the institution of municipal administration was established in 1860, the city ended abruptly and their boundaries over decades were relatively static because of static population between 1872 and 1930. After independence, the situation changed dramatically. The city started expanding very rapidly and generated a transition zone with rural and urban characteristics. The administrative system has remained static and even the municipal acts of 1860s has remained unchanged. The gram panchayats are a cosmetic substitute for local self government and they are administratively and financially weak and powerless. For all these reasons the rural-urban fringe suffers many

administrative problems and there is no responsible authority for the management of complex problems.

2.9-FRINGE CONTROL CONCEPT/ GREEN BELT:

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

THUS The fringe area under green belt should be properly managed otherwise it will be encroached by slums or unplanned and unauthorized linear ribbon development because of low land prices, availability of land ,non applicability of municipal building bye-laws and no taxes being charged as development in the fringes comes outside the municipal limits.



CHAPTER 3: LITERATURE BASED CASE STUDIES

3.1 STUDY OF URBAN SPRAWL AND RIBBON DEVELOPMENT OF INDORE CITY

3.1.1 Why Indore ??...

5 Metropolitan cities of Madhya Pradesh includes Indore, Bhopal, Jabalpur, Gwalior, Ujjain.

POPULATION 1,994,909 (2008)

AREA- 214 SQ KM (2001 CENSUS)

It is the largest city and commercial capital of Madhya Pradesh and home to the M.P Stock Exchange. Bhopal is the second largest city of M.P after Indore and 188 km away from indore. Study of Indore urban sprawl can help in issues identification that requires proper consideration as Indore and Bhopal both are facing rapid urbanization in the state.

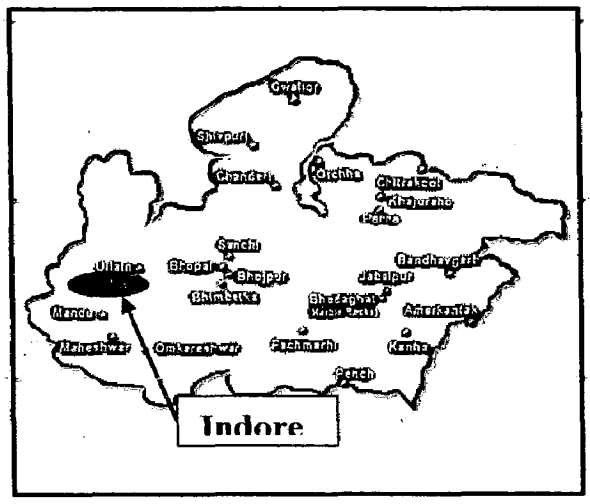


Fig 3.1 Location of Indore

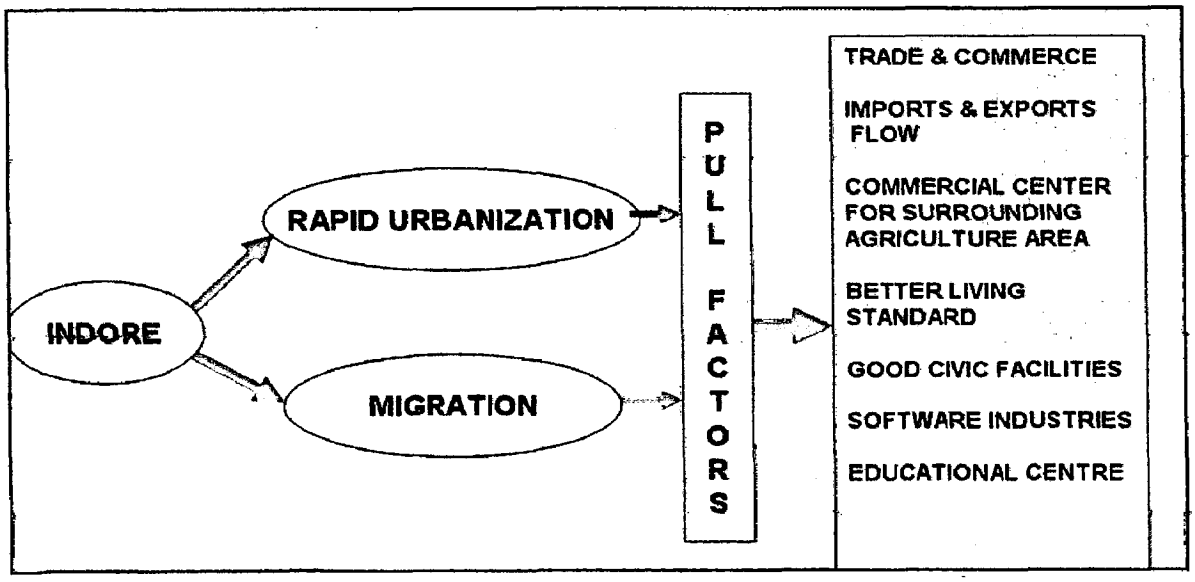


Fig 3.2 Pull Factors

INDORE

- REGIONAL BOUNDARY - 4898 SQ KM
- PLANNING AREA BOUNDARY - 898 SQ KM
- IMC BOUNDARY - 214 SQ KM

SOURCE : TOWN AND COUNTRY PLANNING INDORE

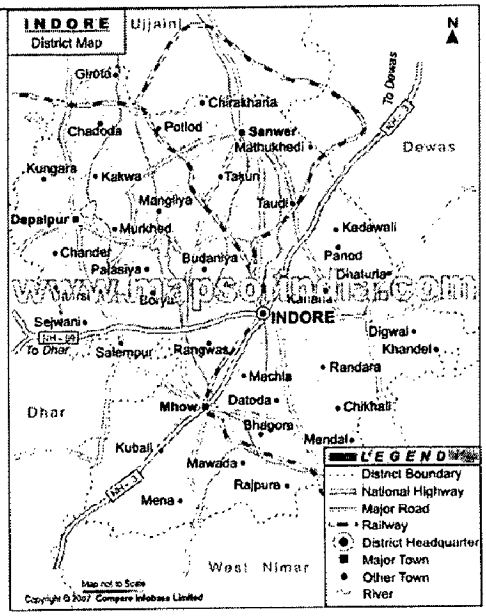


Fig 3.3 Indore city

The study area covers the Indore district of the central province (M.P.) of India. Indore is also called as the commercial capital of Madhya Pradesh because it is a prominent business centre and at present it is spread on about 19325.5 ha of land. Two to three decades back it was spread only on 2482 h. similarly, the population of Indore City has increased about 28% in the last two to three decades.

3.1.2 Urban sprawl

This continuous influx acts as a catalyst in the expansion of urban city limits which is afterwards termed as urban sprawl. There are many small towns and villages which are impounding great amount of pressure on Indore city and bringing into force the economics of scarcity. Indore is being driven mainly by an influx of people from rural villages seeking employment.

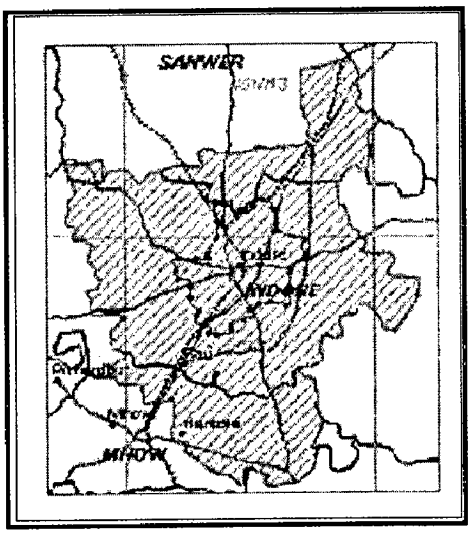


Fig 3.4 Urban sprawl: Indore

The degradation of agricultural land is not only confined around the city, but it is upcoming very fast on and around the national and state highways.

- Dewas is a district headquarter and is famous for its big Industrial Setup, situated about 36 Km from Indore city on NH-3 in the North-Eastern direction.

- Mhow another district headquarter is also situated 21 Kms from Indore on NH-3 in South-West direction.

- Indore being the centre of these two districts receives maximum influx of population, which migrates in search of better living standards and good civic facilities.

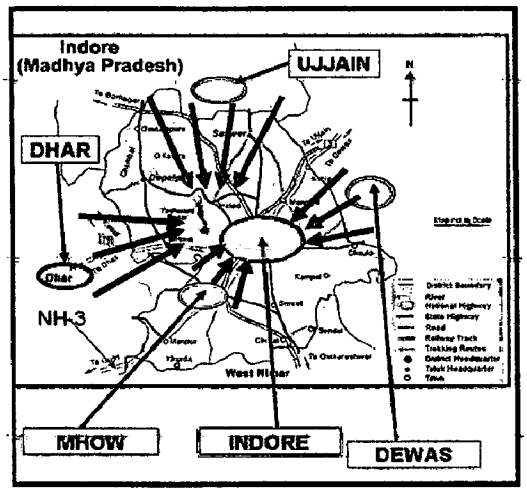


Fig3.5 Pressure on Indore city

As the study area is surrounded by the big industrial areas, it has a greater impact of urbanization, concretion, population influx, industrialization, loss of agricultural land, increase in traffic density etc. has caused serious environmental problems to the in habiting population.

Otherwise also Indore is called as the commercial capital of State and is the most urbanized district. It bounded by Ujjain in the North, Dewas in the East and Dhar (Pithampur) in the West. Being the central part of the above named industrial sector, the study area receives heavy influx of population. The commercial centre, Indore, was spread over an areas of about 2,482.5 ha., out of which 2,182.5 ha. was under residential units and 300 ha. under industrial units in 1965. (Ref IDA Report 1965). But in the last two to three decades the study area expanded to the extent of 19,325.5 ha. out of which 17,787.5 ha. lies under residential and 1,538 ha. under industrial units.

Dewas, the district headquarter of the Distt. Dewas in the North of the study area on the NH-3 was a usual town spreading over an area of about 852.5 ha. in the early 60's. The industrial area was only about 277.5 ha., whereas the residential area was about 575 ha.

In the era development from 1970 to 1985, in the span of 15 years, Dewas expanded exponentially, and heavy industrialization took place owing to the subsidy provided by the State Gov. under the rural area of upliftment scheme. As a result of this by the year 1990-91, this area developed into a prominent industrial state, spreading over an area of about 3,357.5 ha. With the rapid industrialization and urbanization the population of Dewas city increased by 116% per decade and in the last two decades about 2,505 ha. of fertile agricultural land was lost Similarly, in the mid 60's to early 70's, Pithampur, Sagore and Bagdun were the well known villages in the Dhar district with a population varying from 1500 to 2000. In the mid 70's the Govt. of M.P. plan to develop industrial estate for the automobile industries, in a view to create a DETROIT IN INDIA. For this, Govt. provided the subsidy to the industrialist coming forward.

Further, in the span of 15 years, i.e. in mid 80's Pithampur industrial estate partly developed and spread over an area of about 2,530 ha. In the last 5 years i.e. from 1985 to 1991, Pithampur has shown rapid development of industrialization and is finally spread over an area of 52,825 ha. This increase in industrialization and its impact is directly born by the fertile agricultural land which got converted. Likewise the other district Ujjain has also grown exerting the pressure on the study area. The degradation of agricultural land is not only confined around the cities but it is rapidly consuming the land on either side of the National as well as the State Highways giving rise to urban sprawl. During the normal course of development of urban settlements, the rural settlements continued to merged with them. Likewise there were 27 villages in the vicinity of study area and all of them merged and are now under the municipal limits with an area of about 158.20 sq. kms. Out of which 140 sq. km. was the fertile agriculture land. With this the total study area covers about 214 sq. kms. which is totally accountable as urban sprawl

The city planning area grew 46.87 percent from 1971 to 1981, another 33.82 percent from 1981 to 1991, and an additional 48.98 percent from 1991 to 2001.

Future projections indicate that Indore will probably have a population of about 2,713,000 in 2011.

It has been calculated that the city of Indore will need as much as 5,910 additional hectares of land by 2011, based on a population density averaging 150 persons per hectare.

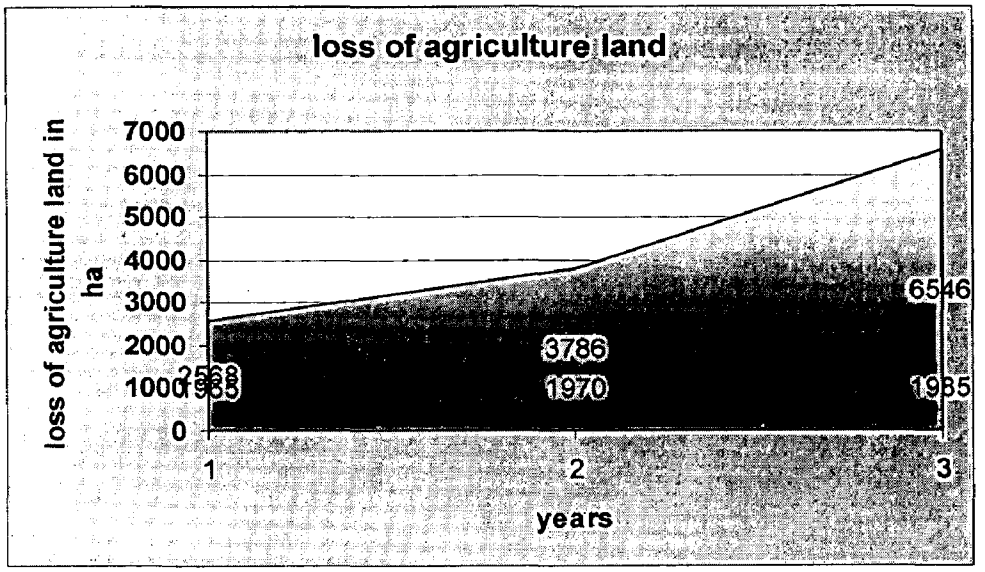


Table 3.1

Loss of agriculture land

IMPACT

s. no.	year	Loss of agriculture land
1.	1965	2568 ha
2.	1970	3786 ha
3.	1985	6546 ha

IDA Report, 1990

Fig 3.6 Loss of agriculture land : Indore city

3.1.3 Urban transformation

As the study area is surrounded by the big industrial areas, it has a greater impact of urbanization, concretion, population influx, industrialization, loss of agricultural land, increase in traffic density etc. which has caused serious environmental problems to the in habiting population.

On the other hand Indore is called as the commercial capital of State and is the most urbanized district. It is bounded by Ujjain in the North, Dewas in the East and Dhar (Pithampur) in the West.

Being the central part of the above named industrial sector, the study area receives heavy influx of population.

With increase in the urban sprawl, linear development (specially commercial, residential and institutional) can be seen in the fringes of indore city along the transportation corridor.

Though proper infrastructural facilities are provided by private developers, there exist other problems like long commuting distance is putting additional load on transportation network in turn resulting in congestion and pollution in the city.

Also heavy concretion is destroying the green belt , resulting in the increase of temperature of the city as well as destroying its environmental and ecological character.

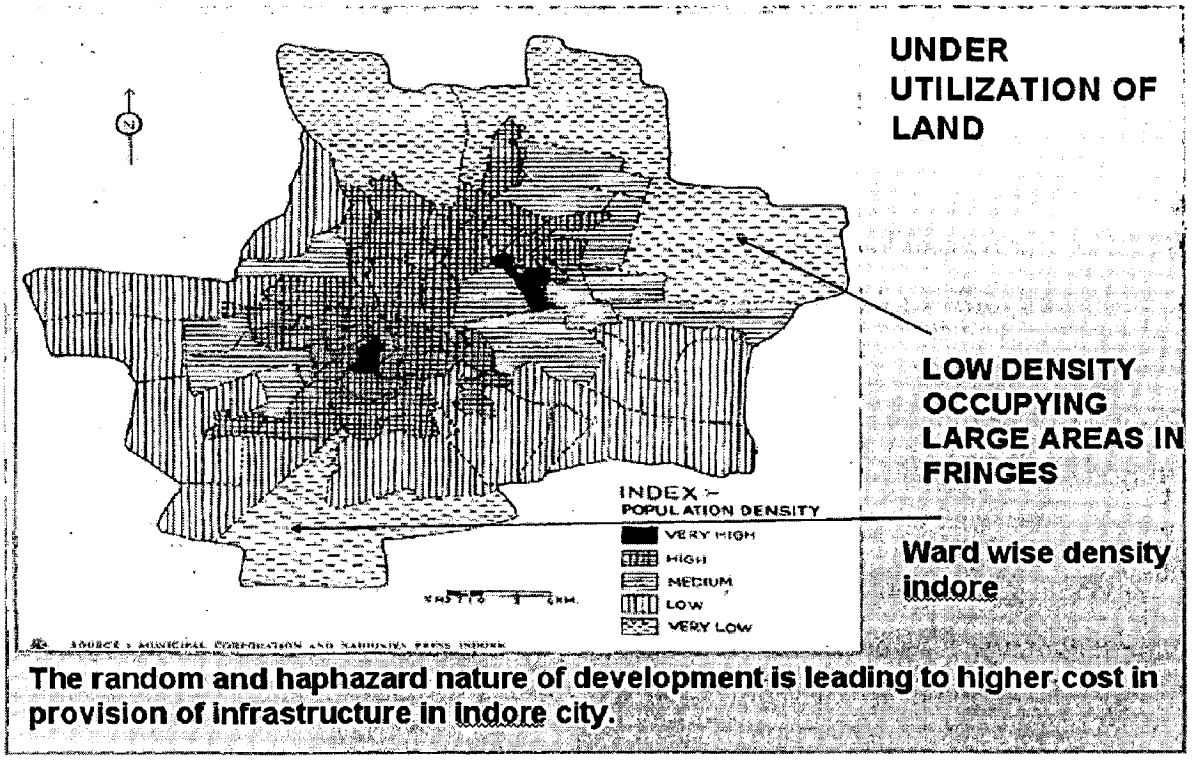


Fig 3.7 Population Density: Indore city

- On the other hand congestion due to increase in population is resulting in slum formation and un authorized colonies in the fringes of indore.

- Some areas at the fringes of Indore are treated as the garbage and sewage dump.

- The rapid development of Indore has led to traffic congestion, lack of sanitation, high rates of solid waste generation, and inadequate public services.

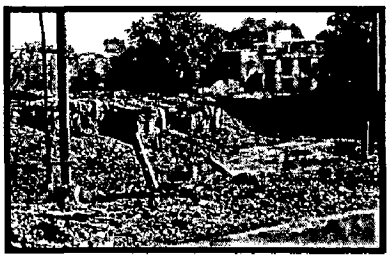


Fig 3.8 Indore slums

3.1.4 Inferences

The urban area in Indore has extended well beyond the present municipal limit and the growth trend is observed mainly along transportation network.

Rapid commercial / Residential / Institutional development has caused encroachment on productive agricultural land and thus the agriculture land in the surrounding villages of Indore planning area was terribly lost.

Indore is being driven mainly by an influx of people from rural villages seeking employment. Industrialization has also accelerated the loss of green space and has contributed to pollution.

The location of Indore, centre for trade and commerce, business district, large no. of industries, large no. of education institutes, IT parks, special townships makes it ideal destination for more investment.

SEZ Projects, other industries shall very soon come up here. Hence its peri urban area need to be treated as a separate entity with proper linkages from the mother city.

3.2 IMPACT OF URBAN FRINGE DEVELOPMENT ON PUNE CITY: RURAL TRANSFORMATION.

The Pune metropolitan region with about 3.2 million population is located 160 km to the south east of Mumbai at an elevation of 580 m.

3.2.1 Why Pune ??

Pune is the second largest city in the state and educational as well as industrial centre. Also the city is facing rapid urbnization and rapid population growth in past few years.

POPULATION – 3.2 MILLION

AREA – 700 SQ KM

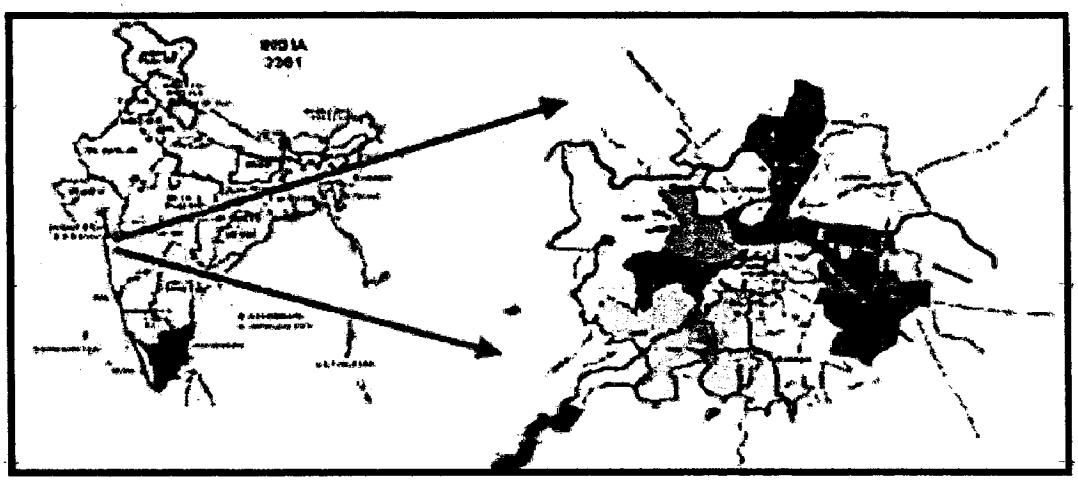


Fig 3.9 Location of Pune city

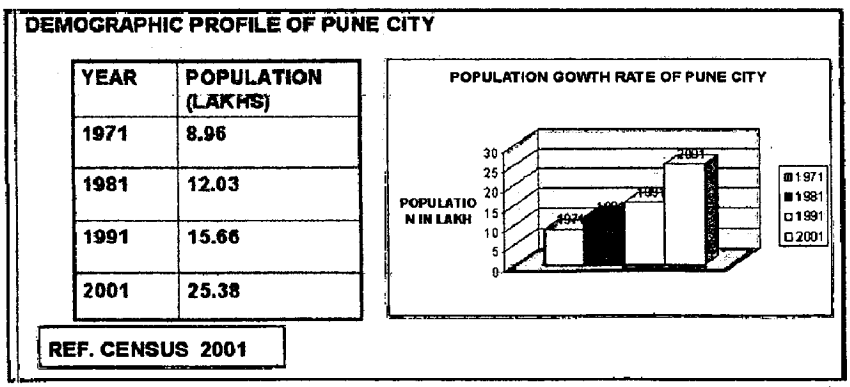


Fig 3.10 Population growth rate: pune

Demography_– Now Pune city hosts 3.2 million people in an area of 700 sq. km i.e. approx 4570 -persons/ sq. km.

3.2.2 Study Area

The study area the Pune city lies between latitudes 18°25'N and 18°37'N and longitudes between73°44'E and 73° 57'E and cover an area of 243.96 sq km. Pune is located in a saucer shaped basin at an average altitude of 560m from mean sea level and surrounded almost on all sides by hills at different altitudes. The ground slope rises gradually from the river, with RL 530 metre (1,750ft) towards the hills with the highest RL 697 metre (2,300 ft) at the Vetal Hill. The slopes become steeper close to the hills.

The city is very fortunate in having in addition to the beautiful hills a number of rivers flowing through it. The Mutha River enters the city from southwest, the Mula River from northwest and the Pawna River from the north. After their confluence to the west of Dapodi, the Mula and the Pawna join the Mutha River near the Sangam Bridge and these rivers then take an almost eastward course and leave the study area on the east of the Mundhawa village. The climate of Pune is typical monsoon. The temperature ranges from 15°C to 35°C. The average rainfall is 70cm with more rain during southwest monsoon period. Pune is one of the fast developing urban agglomerations in Asia and ranks eigth at national level (census 2001). It has grown quite haphazardly. The present growth is due to various factors such as industrialisation, location of various Central and state Government establishments.

3.2.3 Land use changes in Pune(1967-1998) :

- The area under settlement has increased 2-4 times during last 30 yrs.
- The area under Agriculture and Grassland-Scrub has decreased by 31% and 39% respectively.
- The area under 'Hills and Forests' and water sheets remain apparently same, though there are some encroachments over some hill slopes.

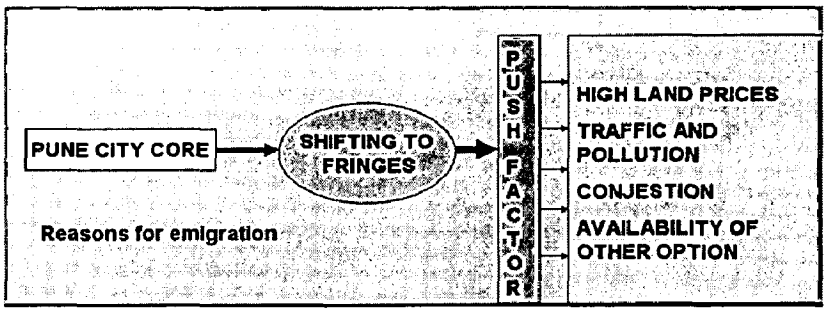


Fig 3.11 Push Factors (Pune city)

Existing land use analysis of the fringe areas of Pune-

- About 52.71% of land is under agriculture / open. (34.74% under agriculture and 17.97 as vacant land)
- A large chunk of land i.e. 13.05 % is under defense use mainly national defense academy (NDA) where no planning by PMC is to be intervened.
- The land use in the form of purely commercial use is negligible i.e. 0.05 % but the mixed land use is .27% which is substantially high.
- Industrial development is .52% of the total land.
- 3.68% area is under public and semi public use for institutional areas like sports complex etc.
- The actual area obtained as hill and hill slopes works out to be 9.8% of the total area.

3.2.4 Rural Transformation

Fringe areas of pune:

The entire fringe 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. The area of 36 villages that are newly added to PMC limit is 230.4 sq km.

To study the changes taking place in village a case of Manjari budruk is taken here. It is located on the east of PMC limits. The main feature of this village is sugar institute. It is located on the bank of Mutha River. The village is mainly rural in character.

Development can be seen on the main road connecting the village to the city.

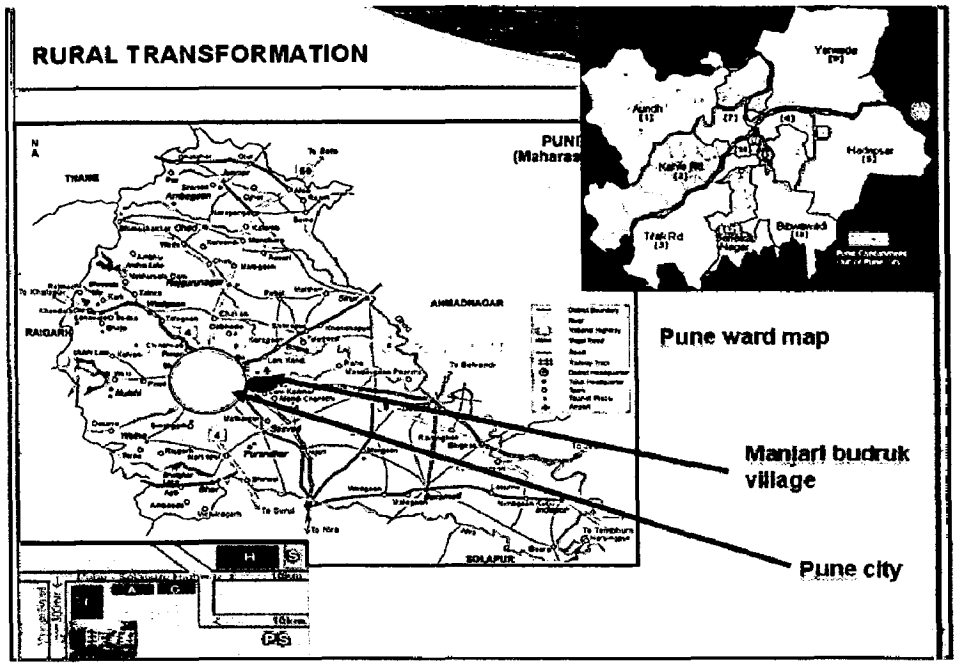


Fig 3.12 Location of Manjari budruk

Major portion of the village is under agriculture use, now very few farmers are taking interest in agriculture. Most of the time the land is kept as it is untill it gets good price. Then farmers sell it to private developer

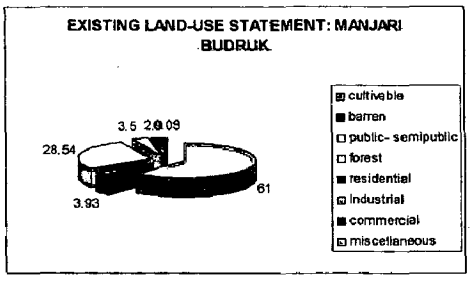


Fig 3.13 Land use breakup

Table 3.2 Land use breakup

S. NO	LAND-USE DESCRIPTION	AREA IN HA.	% AREA
1	CULTIVABLE	1195.72	61
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	.05
7	COMMERCIAL	1	.05
8	MISCELLANEOUS	0.69	0.03

3.2.5 Land Transformation

People generally construct their house on agricultural land or green belt area without taking permission from the authority.

After the period of time this area is declared as residential zone after the payment of fine. Because of these practices there is no zoning of any kind in fringe areas. Thus agriculture and green belt in fringe areas is diminishing rapidly.

Destruction of natural cover in the vicinities of Pune and manjari has caused tremendous loss in fertile soil, as forest area is only 3.5% in the village.

Fig 3.14 Residential Development in the village Manjari budruk

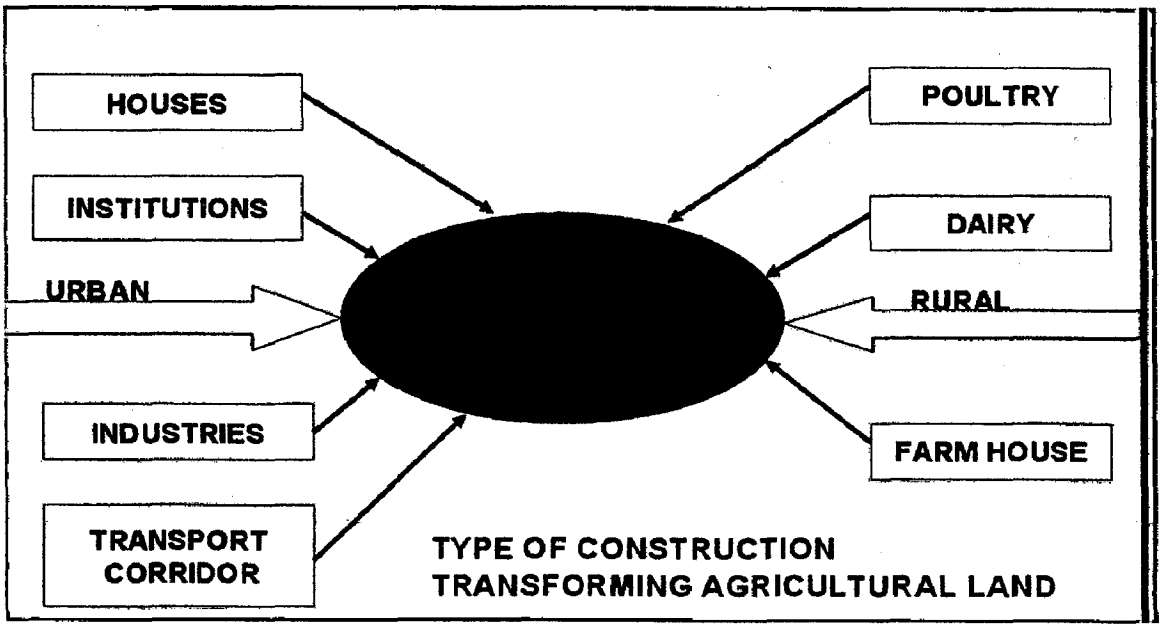


Fig 3.15 Type of construction transforming Agriculture land

Natural drainage

Hill slopes have natural drainage made up of small streams. A proper urban development plan should take into account such drainage and not allow constructions to block these streams.

Natural drainage everywhere in Pune including fringe has been built upon, simply by filling up these streams. Since during monsoons, water does not find a natural drain, this results in sheet flow of water onto the roads.

The erosive power of this water is quite significant, resulting in the famous pot-holes of Pune.

3.2.6 Inferences

Expansion of the city is obvious, but the issue is this development should be in systematic manner. there should be zoning regulations. Planning of small CBDS can be one of the solutions to reduce the pressure on the main city.

This rapid urbanization has exerted a great pressure on the ecology and the living environments as well as on the natural ecosystems of the study area. The increased interference in the natural ecosystems has caused undue, unnatural calamities and hazards to the human life. Specially in the study area the fact of environment development has been neglected just to keep the personal gains at first preference.

If the "Phenomena of development without destruction" is followed during the development of the healthy environment along with the urbanization, the environmental and its related problems can be solved to a great extent.

3.3 STUDY OF FRINGE AREA ACTION PLAN FOR THE CITY OF AMES

Ames is a city located in the central part of the U.S. state of Iowa. Ames is the largest city in Story County.

AREA- 51.9 SQ KM

POPULATION- 62,000

DENSITY- 1194/ SQ KM

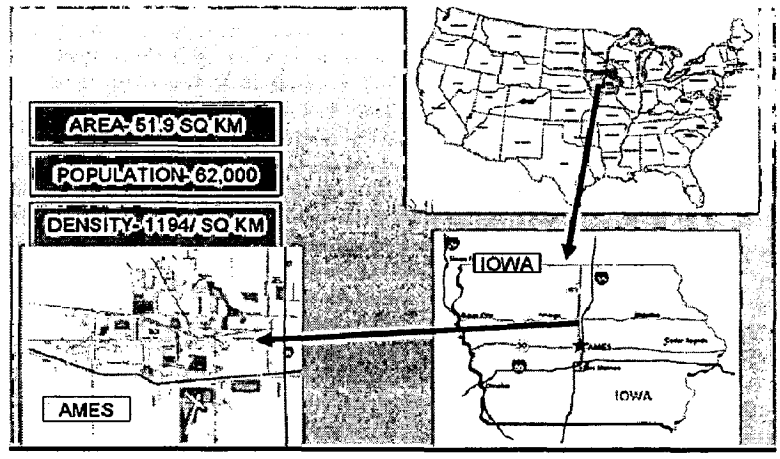


Fig 3.16 Location of Ames city

3.3.1 Why Ames??

- THE LARGEST CITY ATTRACTING POPULATION IN THE STORY COUNTY
- RURAL- URBAN ISSUES ARE QUITE SIMILAR TO INDIAN CITIES
- DETAILED AND WELL FORMULATED REPORT
- THE CITY IS A BUSINESS DISTRICT AND EDUCATIONAL HUB FOR SURROUNDING ANRAS.

Demographics

Since 1970, population growth in the Ames Urban Fringe has been greater than the total unincorporated, rural population growth in Story County. The decade of 1970 to 1980 saw a significant population loss for rural Story County and gains in the fringe area.

The decade of 1990 to 2000 saw an increase in population growth for unincorporated Story County but the Ames Urban Fringe population grew at a rate two to three times faster than the total population for rural, unincorporated Story County.

The area within two miles of the City of Ames is located mostly within western story County and partially within the eastern part of Boone County. It also overlaps areas within two miles of the city boundaries of Gilbert and Kelley. The areas surrounding the City of Ames (including areas around the City of Gilbert as well as the City of Kelley) are subject to the land use regulations of Boone and Story County as well as subdivision review by each affected community. The City of Ames has exercised this subdivision review authority for many years to regulate the division of land within Story and Boone County.

The Urban Fringe around the City of Ames has historically been one of the major rural"growth" areas of unincorporated Story County. When the Land Use Policy *Plan* (LUPP) was adopted by the City of Ames in 1997, the City identified a planning area extending two miles from the City's boundary recognizing the need for cooperative planning efforts. Gilbert, as well, in the Gilbert Comprehensive Plan adopted in 2003, identified both a Study Area and a Planning Area extending into the area within two miles of the Gilbert city boundary (also crossing into the Ames' two-mile boundary). Story County further identified the need for cooperative planning among the various overlapping jurisdictions in the Story County Development Plan – Land Use Framework adopted in 2003. As all jurisdictions update and adopt new regulations, it becomes clear that shared and consistent planning objectives need to be identified to manage development in and around communities.

The Ames Urban Fringe Plan is a shared land use plan cooperatively developed by Boone County, Story County, the City of Ames and the City of Gilbert. The Plan provides guidelines for developers and the general public for understanding and predicting future land use planning for the area. The Plan consists of written principles and policy statements, along with a Land Use Framework Map, which, together, establish guidelines and locations for areas of growth, agricultural land preservation, and natural areas protections.

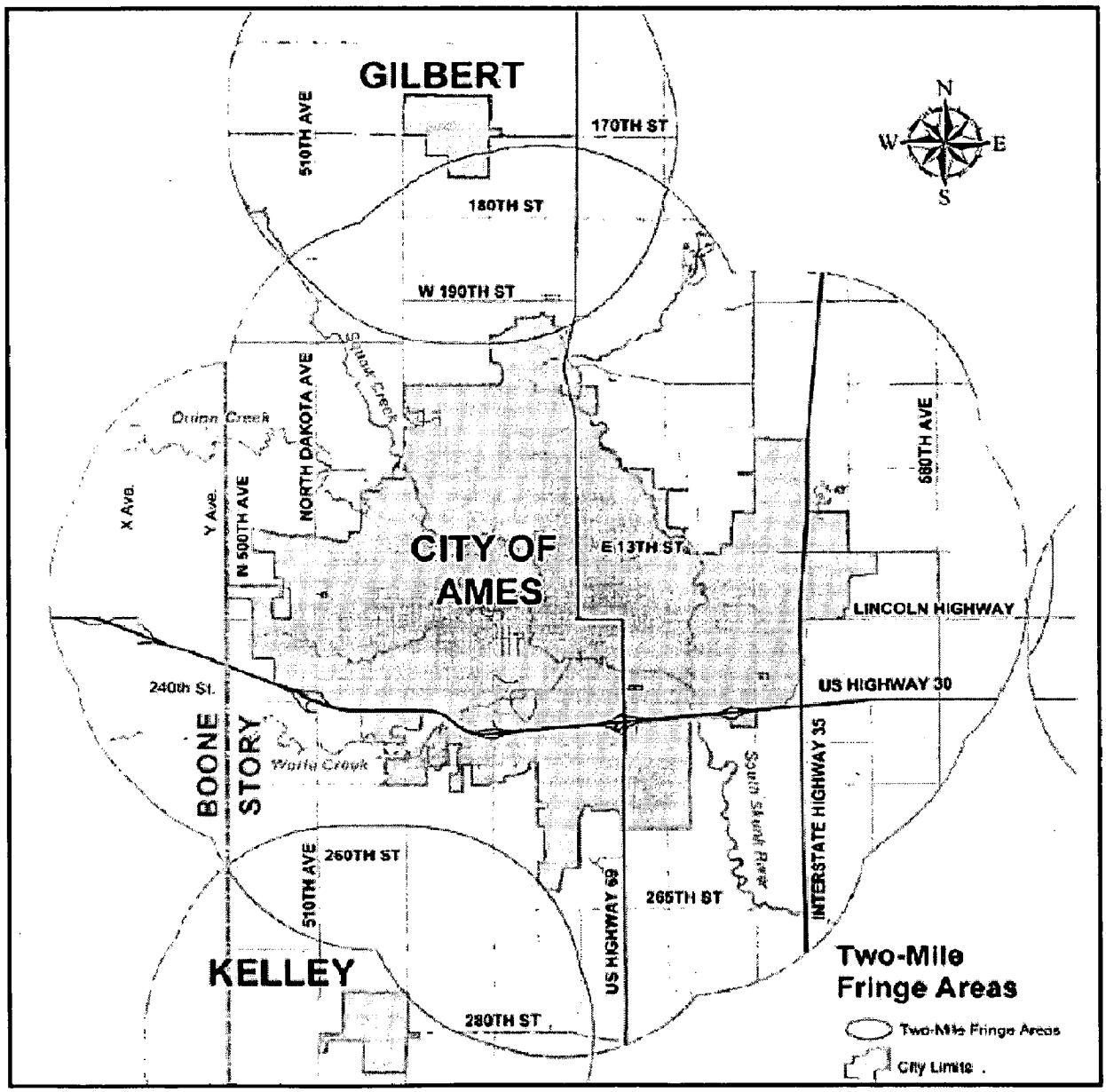


Fig 3.17 City of Ames: Two miles Fringe Areas

3.3.2 Purpose of planning in the Ames urban fringe

• Overlapping regulations of different local governments;

• Inconsistencies among different land use policies; and

• Impacts of development on rural/agricultural activities.

Overlapping regulations of different local governments

There are many different stakeholders in the identified planning area, each with unique purposes, powers, plans, and priorities for development.

Service providers and governmental units include school districts, rural water districts, drainage districts, fire districts, law enforcement agencies, ambulance and emergency service providers, and environmental stewards.

Different land use policy plans, subdivision regulations, permitting standards, and zoning criteria overlap in the Ames Urban Fringe.

Layer upon layer of service providers and governmental organizations impose their own respective polices, regulations and practices upon private property owners. Private property owners receive inconsistent direction regarding what is and what is not acceptable. This is difficult and frustrating for landowners who are trying to preserve, improve and/or maintain their property.

Inconsistencies among different policies on land use

- Lack of coordination hinders each government's ability to effectively accomplish its own land use goals.

- The regulations and policies of one county, city, or other related agency may undermine or hinder the regulations and policies of others.

- Lack of coordination and cooperation could lead to poor land use decisions. Such inconsistencies and potential for conflict and increased public costs demonstrate the need for shared vision and planning.

Impacts of development on rural/agricultural activities

ENVIRONMENTAL QUALITY

- Development encroaching upon stream corridors, wooded areas, natural vegetation areas, and the like reduces the quality and extent of these areas for wildlife habitat and the other environmental benefits they provide.

- This impact can be direct, as in removal or altering the habitat itself, or indirect, such as increased human activity, decreasing vegetation species diversity or increasing predator animal species.

- Identifying such resources and cooperatively planning in order to sustain the natural areas within the planning area helps mitigate the negative affects of growth and development on these areas.

3.3.3 Transportation Facilities

Because of their convenience, safety, and speed of travel, roads along the rural area attract development in the Ames Urban Fringe. As suitable sites become less available on paved roads, development also occurs on secondary roads with rock surfacing.

As traffic increases on secondary road networks, road rebuilding and surfacing becomes necessary, as well as widening existing lanes, adding lanes, increasing shoulder widths,

or more capital-intensive improvements such as bridges, improved intersections, and other traffic control mechanisms.

This, in turn, encourages more traffic, creating a cyclical effect encouraging more dispersed development patterns, again increasing traffic demand. As a result, costs of maintaining road systems also increase.

The more residential structures are dispersed, and the development of non-urban street facilities increases, may result in increased transportation cost.

3.3.4 Agricultural Production

The Urban Fringe contains high quality soils and land conditions ideal for agricultural uses. As the fringe is developed, dispersed non-agricultural residential development can conflict with agricultural operations and facilities.

Agricultural production activities, such as spraying, harvesting, manure spreading, odorous activities, and other operations may conflict with residential development.

As land values increase due to adjacent residential development, new farmers meet cost barriers that hinders in establishing new farming or expanding existing operations.

3.3.5 Opportunities from planning in the urban fringe

- Preserve and enhance environmental assets and ecological services;
- Efficiently provide infrastructure facilities and services; and

- Meet need/demand for certain types of lifestyle/housing choices.

3.3.6 Vision for the urban fringe

Growth pressures around the City of Ames bring challenges to the City of Ames, City of Gilbert, Boone County, and Story County. The following issues, identified in the planning process, bring challenges addressed by policies and strategies embodied in this Plan.

3.3.7 Environmental Issues

- Protect properties from flood damage
- Preserve prime agricultural land
- Protect groundwater, river and stream systems, and potable water quality
- Ensure non-agricultural land uses/development adequately addresses constraints from steep slopes and bedrock
- Preserve and protect (managed) watersheds
- Mitigate the negative affects of storm water run-off

3.3.8 Growth Issues

- Manage residential growth in agricultural areas
- Promote sound economic development and diversification
- Manage impacts from residential, commercial, and industrial growth
- Foster efficient growth patterns and land uses
- Facilitate intergovernmental coordination between Story County, Boone County, City of Gilbert, and City of Ames
- Establish a common growth strategy that includes a shared vision for the location, type, intensity, and timing of growth
- Reach agreement on the type of services and facilities that should be provided for urban and rural development
- Support the agricultural industry

- Reduce commercial leakage
- Support health and welfare of all citizens
- Identify the necessary amount and appropriate areas for growth
- Encourage residential growth where services can be efficiently distributed

3.3.9 Community Facility Issues

- Plan for the provision of adequate public facilities and services (e.g. streets, utilities, storm water facilities, fire services/stations, etc.) to serve planned growth
- Protect transportation corridors
- Provide and maintain an efficient road system
- Minimize conflicts between agricultural and non-agricultural traffic
- Coordinate roadway and land use decisions
- Establish appropriate levels of service
- Establish equitable responsibilities for public improvements and services

3.3.10 Regulatory Issues

- Ensure that Story County, Boone County, City of Ames and City of Gilbert land regulations are consistent with each jurisdiction's land use goals and objectives
- Develop consistent and appropriate regulations addressing the unique needs of urban and rural development

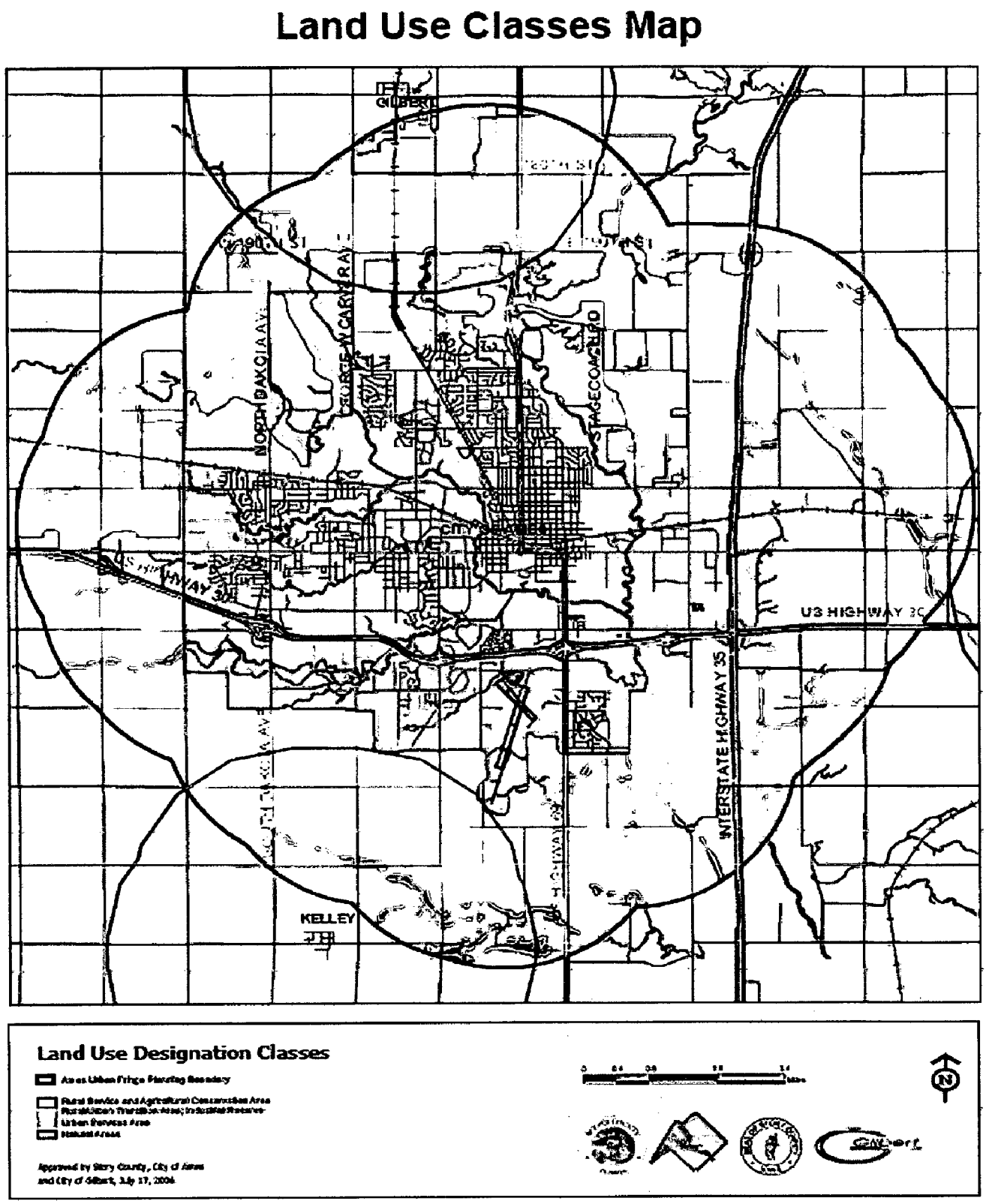


Fig 3.18 Ames: Land use designation

3.3.11 Goals for Land Use Classes

Common Goals for All Areas

Six principles will guide the cooperation to plan and manage land uses in the Ames Urban Fringe, including intergovernmental coordination, high-value agricultural land preservation, targeted growth, growth management, transitional land uses, and environmental protection.

These principles are embodied in the following goals for the Urban Fringe.

Goal 1

To provide a balanced mix of land uses that is arranged to avoid conflicts and to maximize efficient delivery of municipal and county services and facilities.

Goal.2

To prevent premature development and preserve the most high value farmland in appropriate locations.

Goal 3

To provide a variety of housing opportunities in the Ames Urban Fringe in appropriate locations.

Goal 4

To provide adequate opportunities for commercial and industrial development in appropriate locations.

Goal 5

To coordinate development decisions with the efficient provision of public facilities and services.

Goal 6

To protect and preserve sensitive natural resources, including floodplains, woodland areas, wetlands, and other sensitive natural areas.

Goal 7

To secure a system of public and private open spaces throughout the Ames Urban Fringe that serves as a visual and recreational amenity.

3.3.12 Goals for Rural Service and Agricultural Conservation Area

Goal 1

To maintain the rural character of the countryside.

Goal 2

To maintain the county road systems in areas designated to remain rural to minimize long-term costs while providing adequate access.

Goal.3

To protect and preserve sensitive natural resources, including floodplains, woodland areas, wetlands, and other sensitive natural areas.

Goal 4

To secure a system of public and private open spaces throughout the Ames Urban Fringe that serves as a visual and recreational amenity

Goal 5

To prevent premature development and preserve the most productive farmland.

Goal 6

To ensure that all areas have safe and adequate water and wastewater service.

Goal.7

To maintain the identities of both Gilbert and Ames as separate and distinct communities.

3.3.13 Goals for Rural/Urban Transition Area

Goal 1

Provide for strategically-located development in portions of the Urban Fringe that will not be served by the City of Ames or City or Gilbert in the time horizon of the Ames Urban Fringe Plan.

Goal 2

To prepare non-agricultural development for efficient rural-to-urban transition.

3.3.15 Land Use Framework Plan

Land Use Designations for Rural Service and Agricultural Conservation Area

- Agriculture and Farm Service
- Ames/Gilbert Agricultural Preservation Area
- Rural Residential
- Parks and Open Space
- Rural Enterprise

Land Use Designations for Rural/Urban Transition Area

- Rural Transitional Residential
- Priority Transitional Residential
- Gateway Protection.
- Highway-Oriented Commercial
- Watershed Protection
- University-Affiliated
- Government
- Airport Protection Area
- Transportation Corridor Protection Area
- Industrial Reserve
- Natural Resource

Land Use Designations for Urban Service Area

- Urban Residential
- Community Commercial Node
- Convenience Commercial Node
- Planned Industrial

- Regional Commercial

3.3.16 Policies

Some policies statements are organized based on the goals listed and the land use designations of the Land Use Framework.

- To provide a balanced mix of land uses that are arranged to avoid conflicts and to maximize efficient delivery of municipal and county services and facilities.

- To provide housing opportunities in the Ames Urban Fringe only in appropriate locations.

- To provide adequate opportunities for commercial and industrial development in appropriate location.

- Allow existing commercial and industrial uses to be maintained, expanded, or redeveloped. Promote new commercial and industrial development in designated areas under the following conditions:

    1. Adequate roads;

    2. Adequate water and wastewater disposal facilities

    3. Proposed development will be compatible with surrounding land uses.

- Encourage commercial development serving regional commercial needs to locate within city limits where existing zoning regulations and established adequate public facilities and services for such levels of development exist.

- Encourage orderly, efficient, and aesthetically-pleasing highway commercial development at entry locations into the City of Ames.

- To coordinate development decisions with the efficient provision of public facilities and services.

- To protect and preserve sensitive natural resources, including flood plains, woodland areas, wetlands, and other sensitive natural areas.

- To secure a system of public and private open spaces throughout the Ames Urban Fringe that serves as a visual and recreational amenity.

- To prevent premature development and preserve the most productive farmland in Agricultural/Farmstead rural areas.

- To ensure that all areas have safe and adequate water and wastewater disposal service.

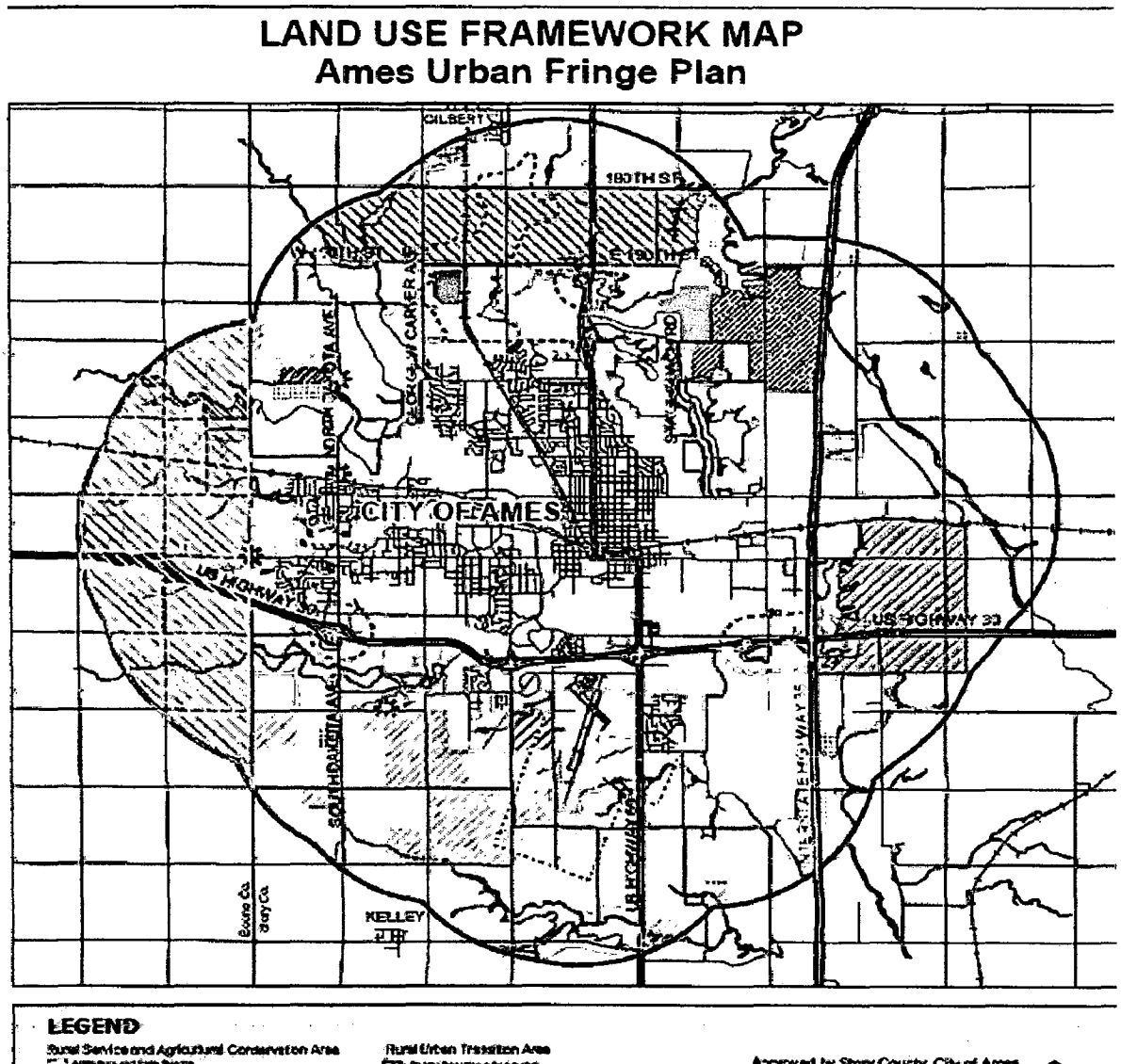


Fig 3.19 Land use framework map

3.3.17 Inference

The Ames Urban Fringe Land Use Framework Map is intended to serve as a guide for public and private development and land use decisions.

A minute and detailed analysis is required in developing policies and draft plans.

CHAPTER 4: BHOPAL CITY

4.1 INTRODUCTION

Bhopal is one of the fastest growing cities in the country. As per 2001 census, the population of Bhopal district is 18.38 lakhs out of which 14.35 lakhs live in Bhopal city, in 66 wards, covering a gross area of 285 sq. km. including the lakes and hills. This makes it a low-density city of 50 persons per hectare gross and 63 persons net if the lake area of 38 sq. km. is deducted. Even if the areas of steep hills are discounted, the density on habitable land remains low at 80 persons per hectare. Essentially Bhopal is a city of inhabited pockets with open areas and natural barriers in between.

Bhopal district is almost 80% urbanized with most people living in the city of Bhopal. As the principal city of the region, it serves all towns and districts around, the nearest large city of Indore being about 180 km. to west.

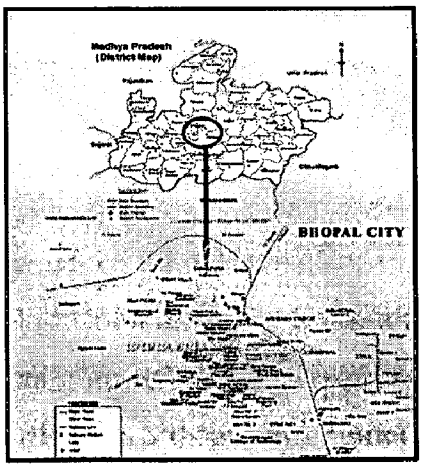


Fig 4.1 Location of Bhopal

4.1.2Location and Linkages

Bhopal is located on hilly terrain within the Malwa Plateau (23 16'N, 77 22'E). National Highway 12 (Beora – Jabalpur road), which links the city to many large cities in the north – west and the south – east. State Highways connect Indore and Sagar. The city is connected by the broad gauge railway line to Nagpur, Chennai, Delhi and Mumbai. The city is also served by regular air services to Mumbai, Delhi and Indore.

4.1.3 Physical and Geographical features

Physical Features

Hillocks of different altitudes are situated along the southwest and northwest parts of the urban area, forming a continuous belt from the Singacholi up to the Vindhyachal range, to an elevation of 625 meters. The general ground level is between 460 and 500 meters along the city. The unusual topography has always provided unique attraction to the city.

There are 14 water bodies in and around Bhopal includes the two large lakes Upper and Lower lake in the east. T.T. Nagar and its extension being developed on the southern side are separated by the old city by Upper Lake and Lower Lake. BHEL Township is separated from the new town as well as the old city by the railway.

Climate

The city enjoys a moderate climate with the temperature varying between 50 and 104 F. The average rainfall varies from 50" to 60" and is mostly concentrated in July, August and September. Westerly and South westerly winds are predominant and their velocity ranges from 4 km to 9 km/hr. But still due to topographical features the micro-level climate varies from one zone to the other.

Soil

The Red state stone strata of Malwa plateau characteristics the city area. The top portion of various hillock and the slopes has red soil mixed with boulders. Black cotton soil in depths of 1 to 2.5 meters is prevalent on the north-eastern and southeastern part of the city, although some valley portions in capital project area also contain black cotton soil to the depths 1 to 2 meters. Comparatively better agricultural land is situated on the northern and north-eastern side that is on Berasia and Salamatpur roads.

Thus, due to the existing climatic conditions and nature of soil the city acquires a green scenario in rainy season but in summer most of its becomes dry and barren affecting the spatial scape of city.

Topography

The city is situated on a hilly terrain which slopes towards north and south east hillocks of different attitude along the south-west and north-west portion of the city from a continuous belt from singarcholi in the north-west to the Vindhyachal ranges to the south. The remarkable topography of the city provides enchanting and panoramic view of the city and of natural beauty. Large portions of city areas and new townships are separated by hillocks and lakes which act as barriers in social and cultural integration of the city as a whole.

The present city stands segregated distinctly in three parts. The capital project area is separated from the old core by two lakes the upper and the lower. The BHEL township is separated from the old core and the capital project area both, by the broad gauge railway line. Because of the peculiar topography of Bhopal an area of 5024 ha is unusable, out of planning area of 24702 ha. owing to excessive slopes and heights falling within the planning area.

Natural Drainage

The natural drainage of the city is provided by three main streams, which are, joined by Nallahs and rivulets. On the north-eastern side, the drainage is provided by the river Nalali and on the south eastern side by River Kalisoat which is later named as Betwa. On the south-western side, the drainage is provided by kolar river which is a tributary of Narmada. The city boasts of as many as seven lakes, two of which are large in size, the upper lake, created by Raja Bhoj, covers an area of 16 sq.km and the Hathailkheda Reservoir, recently constructed covers an area of approximately 10 sq.km. Thus, all the major open spaces are directly affected by this drainage pattern and mostly surround them.

4.1.4 Regional Setting and Growth Pattern

Planning for Bhopal, which is one of the most beautiful million plus city, cannot be limited within its planning area. The developments taking place in the State Capital are considerably influenced by the socio-economic linkages, which are continuously

changing and evolving in secondary and tertiary settlements system around Bhopal. Agricultural, forest, mineral and other produce supported by the State Capital Region, population holding capacity of the natural resource base of the sub region, national transport network and accessibility levels obtaining in the region and the sub-region, are some of the important factors which have to be taken cognizance of, in defining the role of Bhopal, in its regional and sub-regional context.

The employment opportunities offered by the state capital as well as similar opportunities which can be pre-empted through various fiscal policy measures for economic development in various nearly cities and sub-cities viz. Sehore, Vidisha, Hoshangabad and Itarsi around the mother city, Bhopal would determine the future distribution of population in and around Bhopal. Bhopal being the State Capital is growing relatively at a rapid pace and is likely to promote increasing urbanization in and around it. The regional and sub-regional infrastructure will have to be strengthened to support increased urban productivity in manufacturing and supporting services.

Bhopal which is growing at a rapid pace due to increasing migration not only from within the State but also from neighboring seven states, calls for more pragmatic policies to absorb the population flow in a balanced manner. In the large context and longer perspective, development policies will have to consider the role of secondary cities and sub-cities described above to support the economic growth-taking place in the State Capital Region. It may be necessary to channelize the growth into other neighboring cities and sub-cities to maintain the quality of life in the mother city, as well as in the region, as a long-term measure.

Growth Pattern

From the table it is evident that maximum growth has taken place in the southeast direction along the Hoshangabad Road. The level land, ease of transportation and nearness to Habibganj Railway station are major factors responsible for the southward growth of the city. It is to be noted that vast expense of the Upper Lake could not encourage the Westward growth of the city.

Table 4.1 Growth of the city in different direction from center:

Direction	Growth in Km.
North	4.5
Northeast	4
East	8
Southeast	10
South	6
Southwest	5
West	1
Northwest	6
Source; Bhopal Development Plan 2005	

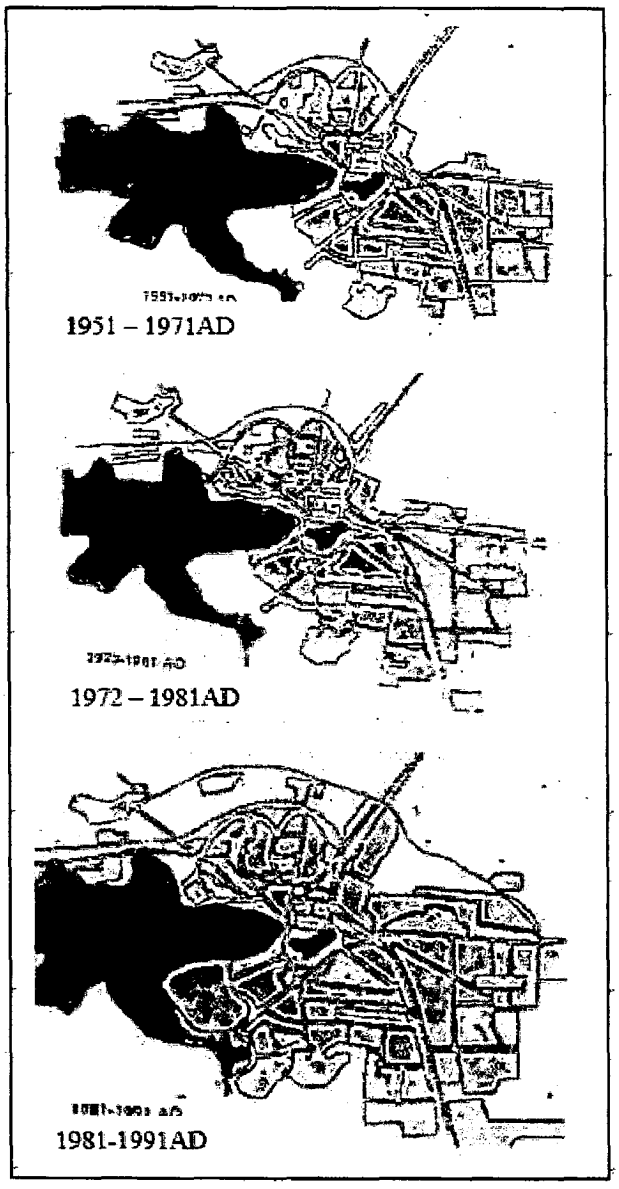


Fig 4.2 Growth of the city and direction of growth Sprawl period and area

4.1.5 Population Growth Trends

During 1951-61 the population growth was nearly 120%. In the decade of 1971-81, the establishment of Mandideep industrial area coupled with heavy commercialization, and expansion of Government services further gave impetus to the population, which recorded a phenomenal 74.35% decadal growth. Thereafter also the population continued to grow rapidly before declining to approx. 34.92% during 1991-2001.

Table 4.2 Urban Populations and Decadal growth rate

Year	Population (in lakhs)	Period	Decadal Growth Rate
1941	0.75		
1951	1.02	1941-1951	36.02
1961	2.22	1951-1961	117.87
1971	3.84	1961-1971	72.62
1981	6.71	1971-1981	74.35
1991	10.62	1981-1991	58.38
2001	14.33	1991-2001	34.92
		Source; LEE Report	

There is a clear indication that unusually high growth is now stabilizing and the rate will further slow down in the following decades particularly because the area base has significantly widened.

The growth in the population seems to be significantly attributable to mainly natural growth and Migration. The sample households have lived in the city for the more than 10 year and those that have moved neighborhood have moved from another part of the city.

Table 4.3 Composition of Population growth

Composition of Growth				
Composition	Population Increase during			
	1981-91	% Of total	1991 - 2001	% of total
Natural Increase	307095	45.75	264020	24.85
In – migration	84657	12.51	126980	14.59
Total Increase	391753		391000	
Source; LEE Report				

Movements are more prevalent amongst high and middle-income families. These families are more likely to have moved from another urban area and whilst more poor families than rich move from rural areas, the poor too are more likely to have moved from an urban area.

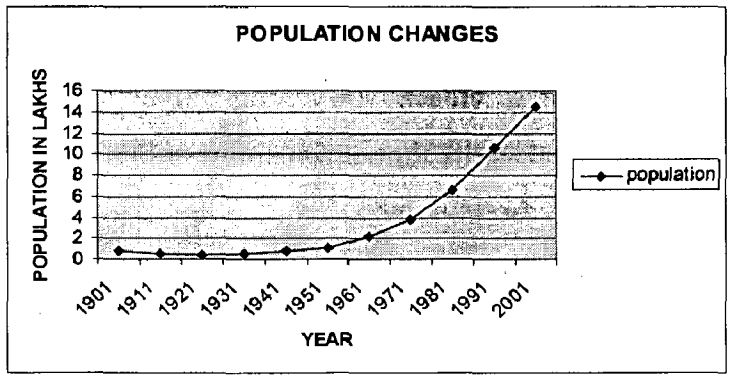


Fig 4.3 Population growth rate

4.1.6 Urbanization & Migration

Bhopal city is the most urbanized districts of the state. As per 2001 census, 80.53% of the district population lives in urban areas, predominantly, in the city. In between 1901 to 1921, the urbanization declined as a result of plague outbreaks. The urban population then rose steadily from its low 30.4% in 1921 to 43.3% in 1951. In 1956, Bhopal was made the state capital and, in the same decade, the industrial township of BHEL was established. This led to substantial population-increase and by 1961 the urbanization of

the district rose to 61.6%. In subsequent decades, rate of urbanization seems to be eventually stabilizing at about 80%.

Table 4.4 Urbanization of Bhopal District

YEAR	% URBAN TO TOTAL POP.
1901	40.80
1911	34.20
1921	30.40
1931	35.20
1941	39.10
1951	43.30
1961	61.60
1971	68.60
1981	74.90
1991	78.80
2001	80.53

Land Population ratio

The share of population of various parts of the city has shown distinct characteristics. As the city growth outwards the share of population of the old area to the over all city have reduced drastically. For example, the population share of the main city was 70% during 1970s, which has now reduced to only 40%. The main gainer of the population is the area named as: Neori (19.30%), Misrod (16.14%) and BHEL extension (16.97%),

4.2 LAND USE

4.2.1Land Use Classification

In the Development Plan 1994-2005 various land use classification categories were industries, commerce, residences, schools, roads etc. in order to comprehend the quantum of land utilization for various uses, their functional Interrelationship, environmental problems etc.

1. Residential
2. Commercial
3. Industrial
4. Public-Semi-Public And Utilities
5. Recreational

6. Transportation
7. Agriculture
8. Wasteland
9. Forest
10. Water Bodies

4.2.2 Existing Land Use 2005

The Bhopal Development Plan 2005 was planned for projected population of 25 lakhs. The Population of Bhopal was not grown up to the expected growth. Today it is estimated that in 2005 Bhopal has population of approximately 17 lakhs population. The implementation of the development plan 2005 has been assessed by field observations. The BDP envisaged around 17500 ha of developed area till 2005 but the actual developed area in the 2005 was 10400.

Tab 4.5 Status of Bhopal Planning Area 2005

Tab 6.1 Bhopal Planning Area 1994		
SR NO		AREA IN HA.
1	DEVELOPED AREA	10400
2	UNDEVELOPED AREA	49706
	TOTAL PLANNING AREA	60106

Source; Field Observations

Residential

The development plan (1994 -2005) envisaged 8190.00 Ha. of land for residential development which includes area around the city. Nearly 59% of the area proposed was utilized under the same use. Some of the areas like Gehukheda Sankhedi Katara Navibaagh and outer areas of all the zones are not developed.

Commercial

Development plan 1995-2005 envisaged land utilisation rate for commercial use as 0.4 Hectare per thousand person. The land, which was reserved for commercial use, was 650 Hectare distributed under different categories according to the requirement of planning units out of this total 60 percent land of commercial use has been developed.

Industrial

A close appraisal of land use distribution of Development Plan 1994-2005 indicates that except the industrial use proposed along Bhopal Diwanganj road and on the other side of the railway line in village Sajidabad, Maholi and Bhanpur, the other areas proposed for industrial activities in addition to the existing have come up. This forms 75 percent of the total land proposed under the industrial use, while the 25 percent industrial land could not be developed due to non-availability of concession for industrial development from the concerned Depts.

Public and Semi Public

The plan 1994-2005 envisaged 10% percent land for PSP purposes. The review of the plan indicates that out of 1746 Hectares land reserved for this use 1250 hectares land developed under the PSP. The land for PSP use which could not be developed and still available for development [includes areas on Arera Hills and PSP uses in all the ten Planning units have scope of (development for this purpose.

Transportation

Most of the proposed roads in South Bhopal have been developed except few, which could not be developed due to topographical configurations and site conditions.

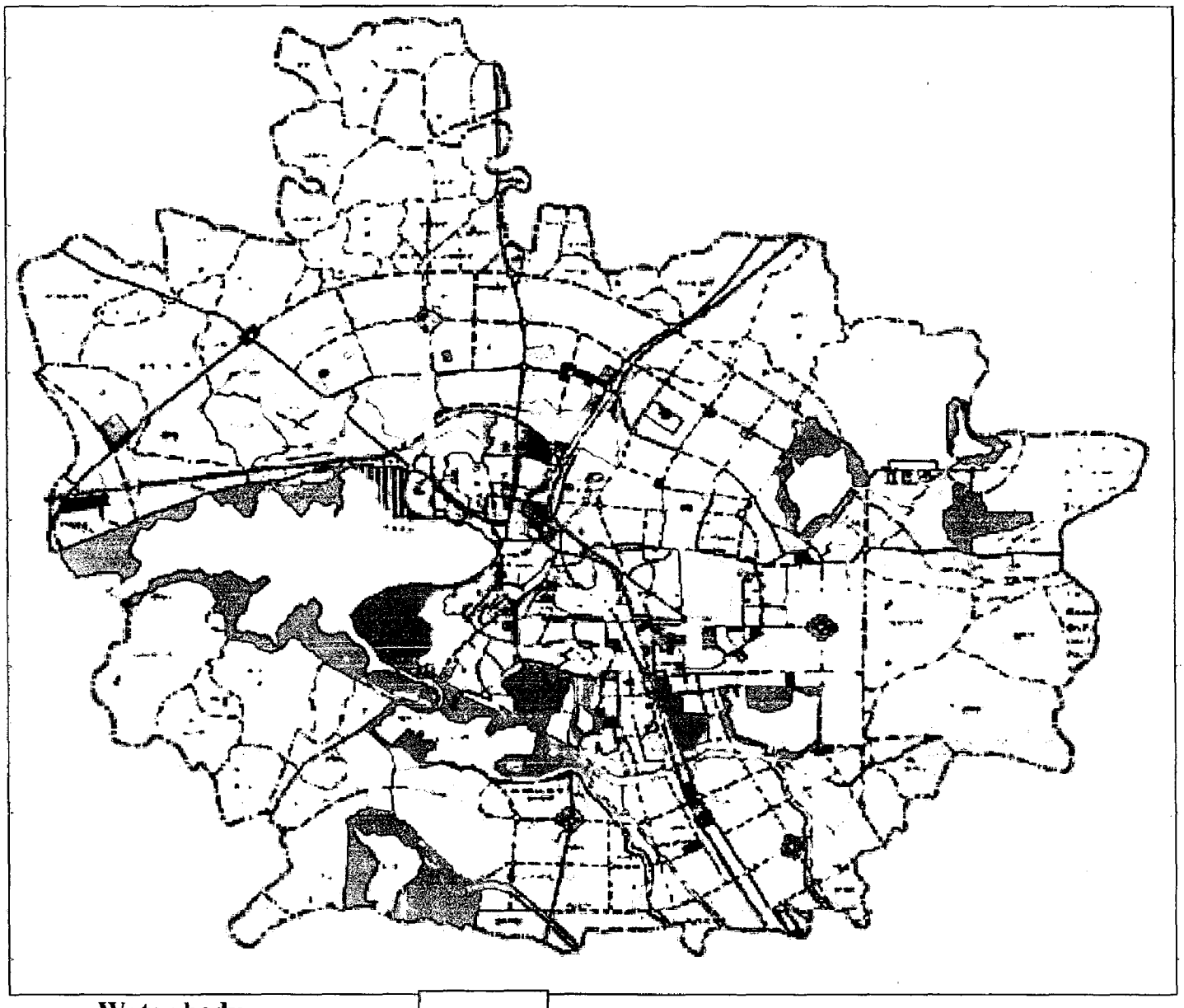
Recreational

The recreational use, which was envisaged in 1994-2005 plan, was of the order of 17 percent of the total purposed land for city development. From the study of the recreational development under the heading lake front development an city parks. It is evaluated that lake front and city park development is of the order of 50 percent of the total proposed area. Areas, which could not be developed as city parks, are near Lalghati junction, near Aish Bagh Stadium, opposite to Vidhan Sabha, adjacent to western Side of Regional College, western [slope of MACT hillock and area around the PHE treatment unit in PU4 near Sai-Baba Mandir.

Tab 4.6 Existing Land Use 2005 and Proposed Land Use under BDP 2005

S N	Category	Existing Dev. Area 05 in ha	05 %	Proposed Dev. 2005 Area in ha.	%
1	Residential	4980	47	8190	46.48
2	Commercial	410	4	650	3.71
3	PSP and PUF	1250	12	1746	9.96
4	Industrial	900	9	1389	7.93
5	Transportation	1350	15	2600	14.85
6	Recreational	1600	13	2925	16.71
	Total	10400		17500	

Source : Bhopal Development Plan 2005.



Water body

Preserved Green

Residential

Proposed Residential

Bhopal master plan 2005

Fig 4.4 Bhopal master plan 2005

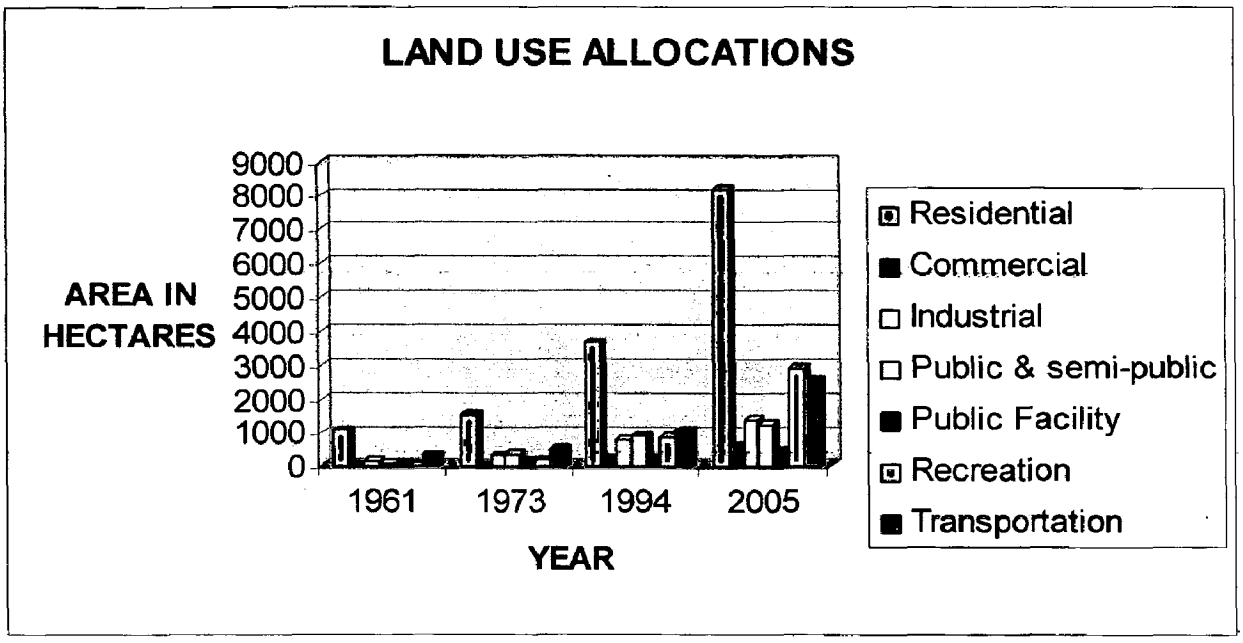


Fig 4.5 Year wise land use allocation: Bhopal

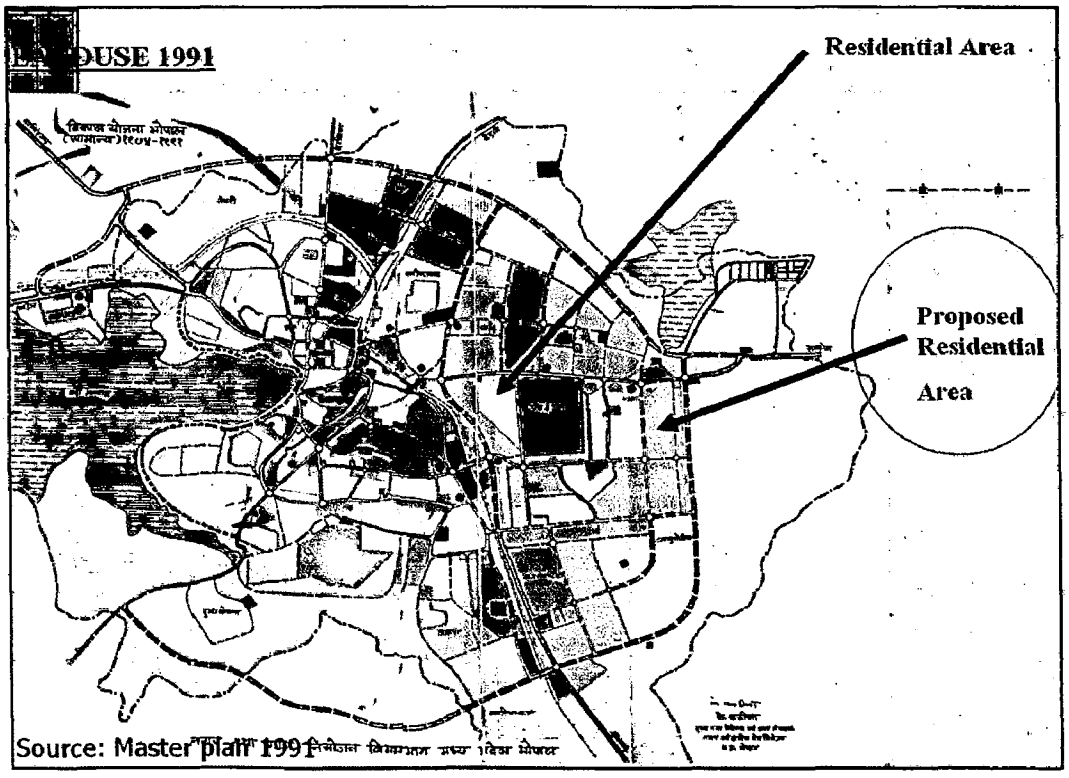


Fig 4.5 Bhopal master plan 1991

4.3 INFRASTRUCTURE

4.3.1 Water supply:

Indian standards have been fixed for water supply for both quality and quantity; Bhopal is almost meeting these standards.

Bhopal can be mainly divided to three zones based on the agencies servicing the area.

- Bhopal Municipal Corporation (BMC) zone. (Consisting of 37 wards viz. 1,15 to 26, 28, 39 to 49;)
- PHED zone (consisting of 13 wards viz. 2, 3, 4, 27, 30 to 38 BHEL zone consisting of 6 wards)
- Establishments; such as Railways and MES, which supply water to their own establishments

The water supply scenario in Bhopal is as below :

Upper lake used to be the major source of water supply till recently. It now gives the city a supply of 10 Mgd of water.

Kolar now occupies the place as the largest water source that's installed capacity it's 34 Mgd. It is presently supplying 22 Mgd. It is located b+ a distance of 35 km from Bhopal in the Southern direction.

Mini source like hand pumps; Bore wells etc., tapping into the underground water table supply 5.5 Mgd during normal conditions and 2.5 Mgd during scarcity period.

Water intake by agencies: BMC draws 15.5 Mgd (45%), PHED draws 12 Mgd (34%); BHEL draws 8 Mgd (16%). During scarcity period the intake is decreased by 15 Mgd, and Kolar water is used extensively during this period.

Table 4.7 Treated water available from various sources in bhopal

SN	Source	Distance From City (km)	Abstraction of Raw Water (MLD)	Remarks
1	Upper Lake	Within City limit	85.5	Rain dependent

				source Generally sustainable
2	Kolar dam	30	135	Rain fed sustainable source
3	Local Groun dwater	Within City limit	22.5	Over extraction – not sustainable

4.3.2 Sewerage:

Bhopal does not have a planned and full-fledged sewerage system. A large area of the city, has no sewage network, either internal or trunk, and the raw sewage or septic tank outflows are discharged into open drains which flow into the watercourses. Ultimately most of the sewage flows into the upper lake and into the nallahs, which eventually flow into the Patra, Halali, and Betwa River.

Bhopal Municipal Corporation (BMC) area has about 210 Km of non-contiguous underground sewers in different catchments, and covers about 28-30% of city population. In the remaining areas of the city, large section of population discharge wastewater into open drains. BMC area has about 210km of noncontiguous underground sewer in three different catchments, with treatment facility of 80 MLD including the BHEL industrial areas.

□ Bairagarh Area – 16km sewer with 2 pumping stations and one 4.5 MLD capacity Oxidation Pond.

□ Old Bhopal Area – 24 km sewer line with 5 pumping stations discharging sewage to Patra nallah and STP's in Bhoj Wet Land Project.

□ New Bhopal Area – 108 km sewer with 6 pumping stations and one 4.5 MLD capacity Oxidation Pond and 13.5 MLD STP.

□ Bhoj Wet Land Project – 61.7 km sewer with 11 pumping stations and 5 STP's of 58 MLD capacities.

Theoretically Sewage generated till date in the Bhopal city is around 118 MLD and around 39MLD (30%) of sewage waste is collected through existing sewerage system and taken to 80 MLD STP and treated Rest of the city is either disposes sewage in septic tanks or people in informal housing opt for open defecation. Many of the septic tanks are in dilapidated condition; the top slabs and pipes are broken. No cleaning of septic tanks has been carried out in many years and as a result direct raw sewage flows into nearby drains. Many of the septic tanks do not have soak pits hence septic tank overflows into the near by storm water drain. Many of septic tanks need cleaning. BMC have mobile vacuum suction and sewer jetting machine for maintenance of the septic tanks, manholes and sewers, but these are inadequate to cater to the needs of entire city. A large number of households of Slum areas still use dry latrines or resort to open defecations.

4.3.3 Storm water drainage

The natural drainage of storm water is reasonably good in Bhopal. In old Bhopal areas, the drainage is provided mainly by Patra nallah which receives flow from number of small channels running across the city, like Gaji Khan ka nallah, Ashoka Garden nallah, Jinsi nallah, Maholi ka nallah, mahamai Bagh ka nallah, kale Bhairon ka nallah etc. Patra nallah after collecting the stormwater from these channels discharges it to the Islamnagar river 18 km from Bhopal, which finally flows in to the Halali river. Large portion of the city in the central region discharges storm runoff to Upper Lake and Lower lake. The entire network of Patra nallah is about 50 kms.

In the New Bhopal area the drainage is provided mainly by katsi nallah, which flows for about 8 km before meeting Shahpura Lake.

Three Major Streams drain Storm Water from Bhopal. On northeastern side River Halali carries the drainage and on southeastern side River Kaliasote carries it, both these rivers drain to the river Betwa. In the southwestern side the drainage is carried by many small nallahs, which ultimately drain in to Kolar River.

The Rainfall of Bhopal is of medium intensity (1200mm average per annum) and with the entire natural advantages there is no severity of inundation in city areas that may affect the public life and business seriously. In view of above, the need for major investment in storm water drainage in Bhopal is not a priority.

4.3.4 Transportation

Bhopal is best strategically located city in Madhya Pradesh It is connected to other cities in the state and country by Railways as well as Roads. The City is connected by broad gauge railway lines to almost all the major cities like Delhi, Mumbai, Chennai and Nagpur.

Road System

Regional Roads

The major regional Road network comprises of NH 12 connecting Hosangabad and Narsingarh and a number of State Highways linking Indore, Sagar, and Jabalpur.

Roads within the City

The total road length of the city is 1020 km of which 66% is managed by BMC. The other agencies involved in construction and maintenance of the city roads are BDA, PWD and BHEL.

The city is distinctly divided into two parts, the old city housing most of the trading and commercial activities and the newly developed area with mainly administrative, institutional and residential activities. The road network in the old city area, with very limited scope of road widening, mainly suffers from very high volume of traffic, heterogeneous traffic mix, and high degree of pedestrian movement and on – street parking.

The average traffic volume around bus stand is 80,000 PCU to 85,000 PCU along Hamidia road and Aishbagh Road. The presence of Bhopal railway station and bus stand in the area adds more problems.

To alleviate the problems of old city and some specific commercial centers like New Market, Bittan Market, No 10 Market etc, traffic engineering and management measures mainly in the form of traffic circulation and Parking plans are already in various stages of implementation. There is restriction on movement of goods vehicles in main city between 9 AM and 9 PM, but in absence of any organized and adequate truck parking facilities, the roads suffers from major bottlenecks at specific locations.

a) The road widths in the northern part of the city, which is basically the old town, are narrower as compared to those in the new development in the southern part
b) The volume of traffic in the old city is higher than in the new city.
c) The time required to reach the city core from south Bhopal areas to central parts of the city is almost the same as that required to reach here from the outskirts on the northern side. This is because of the congestion, poor quality of roads, haphazard traffic conditions, mixed modes of transportation and deterioration of road edges and road widths due to encroachment on road sides.

Thus, we conclude that the perception of people, "that the northern part of the town is more crowded and congested", has a basis on facts.

It can be concluded from the traffic volume and distance & time study; that as far as time is concerned areas on the outer edge of northern fringe are as far as the residential areas in south Bhopal.

Thus, for persons desirous of shifting from the central core of the city

which has high density and mixed land uses and therefore less suitable for residential activities to a purely residential area; south Bhopal presents a better alternative on the distance traveled and time taken scale in personal transport mode.

The result of this type of imbalance is that the road network is acting

As an economic class filter. The economically better placed are migrating I from the city to southern wards and commute to their business place in I the city core. Others

economically impoverished and dependent on public transport, are settling down in the northern fringe.

The quality of roads and the deficiency of road networks, in the northern area are creating an economic divide in the city's population.

4.3.5 Power Supply

Almost whole of the Bhopal is provided with power supply whose is 306 sq.Kms. Chambal sub-station receives the 220 KV supply and steps it down to 33 KV and supplies to 21 sub-stations all around the city whose total capacity is 187.8 MV A. 224.59 Km. run of 33 KV line, 54.5 Km. 11 KV line of 1844.5 Km of LT line are running all along the city there are 107 HT consumers and 161686 LT consumers whereas the total number of occupied residential houses in Bhopal are 192726 and the difference of 31040 household connections is attributed to foul connection. Slums and jhuggis are also connected in the single point connection under the scheme 'Grihjyoti' at a nominal cost.

4.3.6 Facilities and Amenities

Educational

Bhopal offers excellent educational facilities for both general and technical education. The city has a university, a technical university, a medical college, one regional engineering college, and three state engineering colleges and other technical/professional institutions. Apart from these, there are 9 colleges. The city has 95 higher secondary, schools. 98 middle schools, 132 primary schools, and more than 150 pre primary schools. Apart from the above, there are a number of private schools offering educational facilities to city. Indian Institute of forest management (IIFM), Judicial Academy, National Law institute, WALMI, TTTI hotel management Institute, etc are institutes at the national level and the pride of Bhopal.

An overwhelmingly large number of these educational facilities have come up on the southern side of the upper lake – lower lake axis. The main reason for this was that land in the required size was available only in southern parts. Some of these institutes

have been placed on hillocks. Is way they preserve the green character and serve as lung to the city.

Cultural and Recreational Facilities

Bhopal has good recreational facilities. Bharat bhavan is a unique cultural centre. The city has 6 public auditoriums, 5 museums, 7 public libraries, 30 reading rooms and 9 community halls. Apart from there are 18 cinema halls all around city. Upper lake and lower lake have boating facilities and are good recreational centers. Bhopal has 50 publics parks some are well maintained but a few have fallen prey to encroachment and neglect by the municipal authority except for a few, an overwhelmingly large number of these parks, marriage halls and gardens, auditoriums and cinema halls lie to the southern side of the upper lake lower lake axis.

Health

The city is regional center for health facilities. The city has 10 major hospitals. These together with nursing homes offer about 3000 beds, this gives a ratio of 2.5 beds/1000 persons. In addition to these hospitals, there are five allopathic and three unani dispensaries. The city has three homeopathic colleges. As many as 880 practitioners are serving in the city. Health is the only facility, were a geographical imbalance does not exist. After the union carbide gas tragedy, a new hospital has been set up the northern fringe. Many diagnostic facilities and clinics, nursing homes and private hospitals have come up near hamidiya hospital forming a sort of health node in the city. The southern side of the city has a public hospital and large number of private clinics, nursing homes and hospitals.

4.3.7 Housing scenario in Bhopal

Bhopal urban area at present, accommodates nearly 2.8 lakh households spread over sub city zones, in the shape of various housing typology, such as individual housing on plotted developments, flats, slums and squatter resettlements, unauthorized colonies traditional housing areas in old part of the city and village settlements.

Table 4.8 No. of Household

S. No.	District	No. of household	Total no. of census house	House hold	Total population
1	Total	350061	442214	5.3	1843510
2	Rural	62891	82278	5.7	360792
3	Urban	287170	359936	5.2	1482718

Source : census 2001

Housing Shortage

Housing shortage at present it estimated as about 1.2 lakh units taking into consideration the poorly sheltered informal sector in jhuggies, squatter settlements, families sharing accommodation and old dilapidated houses requiring replacement during the plan period up to 2012. Adding additional housing requirement to the tune of 3.2 lakh units to the present housing back log, efforts shall have to be mobilized to generate the housing stock as under:-

Table 4.9 Housing shortage

Year	Housing shortage (Dwelling Units)	Additional Housing need (DU's)	Overall (DU's)
1	2	3	4
1995	1,20,000	50,000	1,70,000
2001	-	1,20,000	1,20,000
2005	-	1,50,000	1,50,000
Total	1,20,000	3,20,000	4,40,000
Note: The population of Bhopal Planning area, as per 1991 census was 10.62 lakhs.			
Source; Bhopal Development Plan 2005			

4.3.8 Slums in Bhopal

It is well known that a large percentage of population in any Indian city belongs to the lowest economic strata i.e. economically weaker section. Majority of this urban poor Population belongs to people who have migrated from the nearby rural areas in search of work, employment. Due to the dwindling land resources and increase in the population the land holding of any family in the rural region is no longer able to support the entire family. This encourages the exodus of rural population to the nearby city. Most poor immigrants to the city can find access to shelter only by squatting on public or private land. These squatters over the period of time continue to come and settle on this land thus creating a neighborhood, more generally called as a SLUM. But in the format of Housing development, the above vital factors for creating harmonious symbiotic and self sustainable communities at optimal location are generally ignored and in fact in many cases no provision of habitat is made for such population in the planning of housing development. This deficiency in the formal planning leads to development of **Slums and Squatter Settlements** to assimilate such population.

Table 4.10 slum population over a period of time

YEAR	CITY POP	SLUM POP	% SLUM	SLUM GR %
1,961	222,948	9000		
1,971	384,859	19,050	4.9	111.7
1,981	671,018	41,763	6.2	119.2
1,991	1,062,771	250,000	23.5	498.6
2,001	1,564,351	480,000	30.7	92

Source: Census of India 1971 to 1991- Town Directory of Madhya Pradesh & 1975 Bhopal Development Plan.

Nature of Housing

The slums have a mixture of housing from pucca (in areas such as Banganga), semi-pucca (where there is brick masonry with mud plaster) to kutcha mud houses and small shacks made of wood/bamboo slats and plastic sheet. Structures for housing are single storied, one to two room houses averaging an area of 300–400 square feet. The quality of housing stock depends on a combination of factors such as the age of settlement, level of tenure security, infrastructure provisions and funding from sources such as Bhopal gas relief fund. The impact of pattas was very clear in Banganga where pucca houses.

4.4 URBAN SETTLEMENT AND SPRAWL

Historic cities are increasingly being seen as 'cultural landscapes' emerging out of the human – environment interaction, and solely as collections of isolated physical entities. Bhopal is no exception to that.

- In the case of Bhopal, the character of the city is defined by forms ranging from concrete physical forms to the more abstract cultural values that people may associate with a place.
- The walled city of Bhopal was self contained unit governing a very small principality.
- The basic regional functions taking place in spaces were related to administration.
- This function of administration still continues but with a wide change of scale.

Except for a few units not much industrial activity could settle in Bhopal. After becoming capital of state physical configuration of Bhopal had undergone a rapid change of urbanization and industrialization. Almost overnight, the core area had to function as the center for a whole lot of new spatial developments, with the increase in population.

The following figure clearly indicates the shift of center of gravity of the physical development of the Bhopal city to be shifting south ward in the direction of Mandideep the industrial township in neighboring district Raisen. The aspect that is the cause of concern is that this is a fertile area having intensive agricultural land.

The population of Bhopal District is increased by 51% from 1981 to 1991, and by 36% from 1991 to 2001.

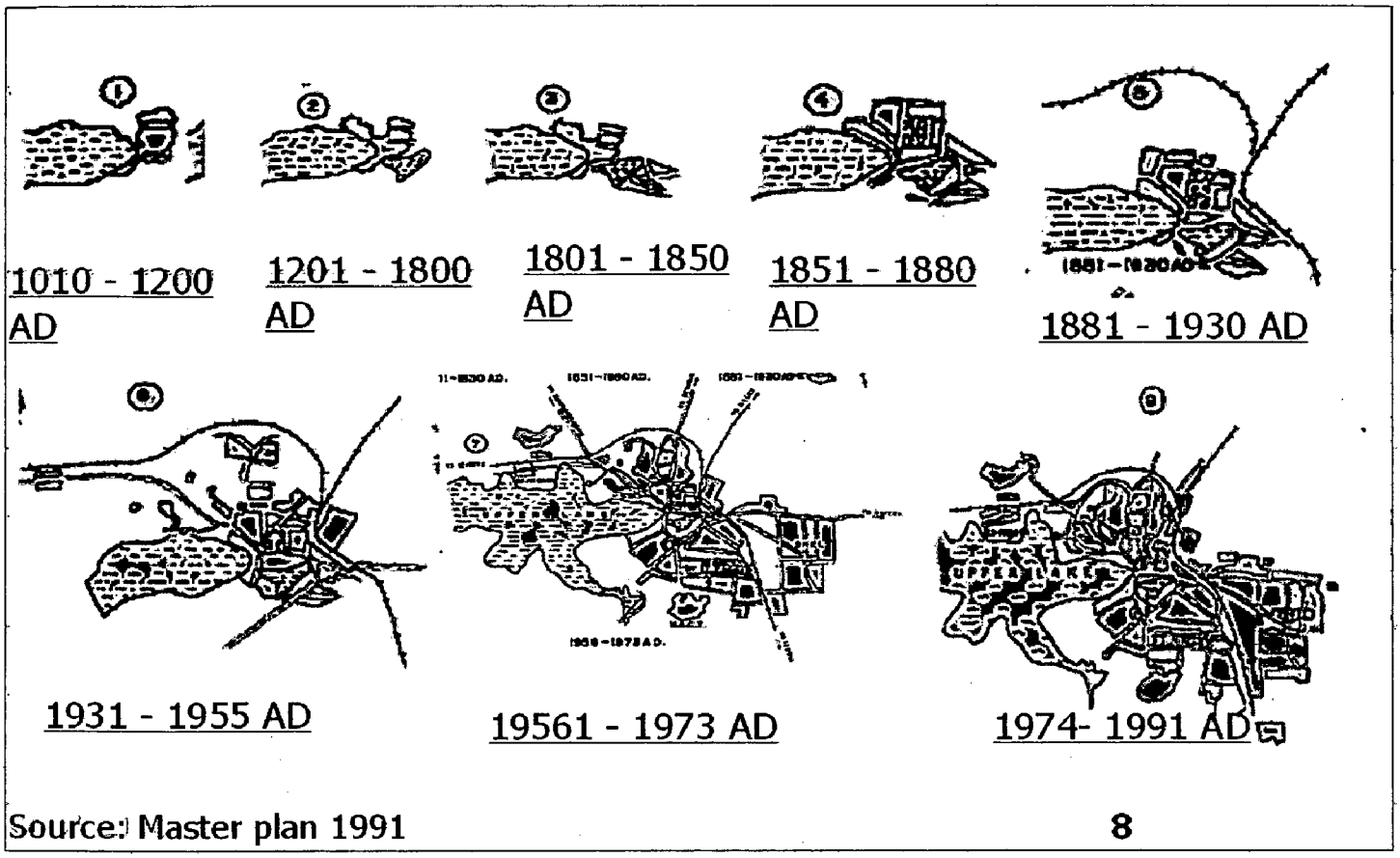


Fig 4.6 Chronological development of Bhopal

CHAPTER 5: ANALYSIS OF PLANNING INPUT

5.1 CHRONOLOGY OF PLANNING INPUT

1. "BHOPAL TOWN MASTER PLAN AND IMPROVEMENT" committee on 10th Dec., 1956. With the objective to give inputs for

(a) Urgent Administration requirement

(b) Long term (20 years) planning and improvement.

2. A department called "Capital Project" was formed in response to the state-I report of recommendation to (a) above.

3. The committee advised the government to split the Master plan in two stages. An interim plan followed by a detailed plan.

4. This was followed by the INTERIM MAST PLAN for greater Bhopal (draft) in Feb. 1962. The draft plan could not be adopted due to many reasons. But work progressed on the Capital project plan with development of roads and housing schemes for government officers etc.

5. Enactment of the M.P. Town and Country Planning Act 1973 shifted the responsibility of planning of towns from Local self-govt. to a new wing called the Town and country-planning department.

6. The Bhopal Development plan was published in 1975 for the period 1975 to 1991.

7. The planning limits defined in the 1975 master plan were extended in March 1993.

8. The planning limits of 1993 were redefined in 1995 with publication of Bhopal Master Plan 1995-2005

5.2 INCREASES IN URBAN SPRAWL, MUNICIPAL LIMITS AND PLANNING LIMITS

1. The urban spread of Bhopal was at the rate of 7.19 Hectares per 1000 person in 1975 .This shows that Bhopal was low-density town. But in view of inadequacies, future requirements of the capital town and undulating terrain of the town, The master plan(1975-95) provided land at a rate of 10 Hectares per 1000 persons.

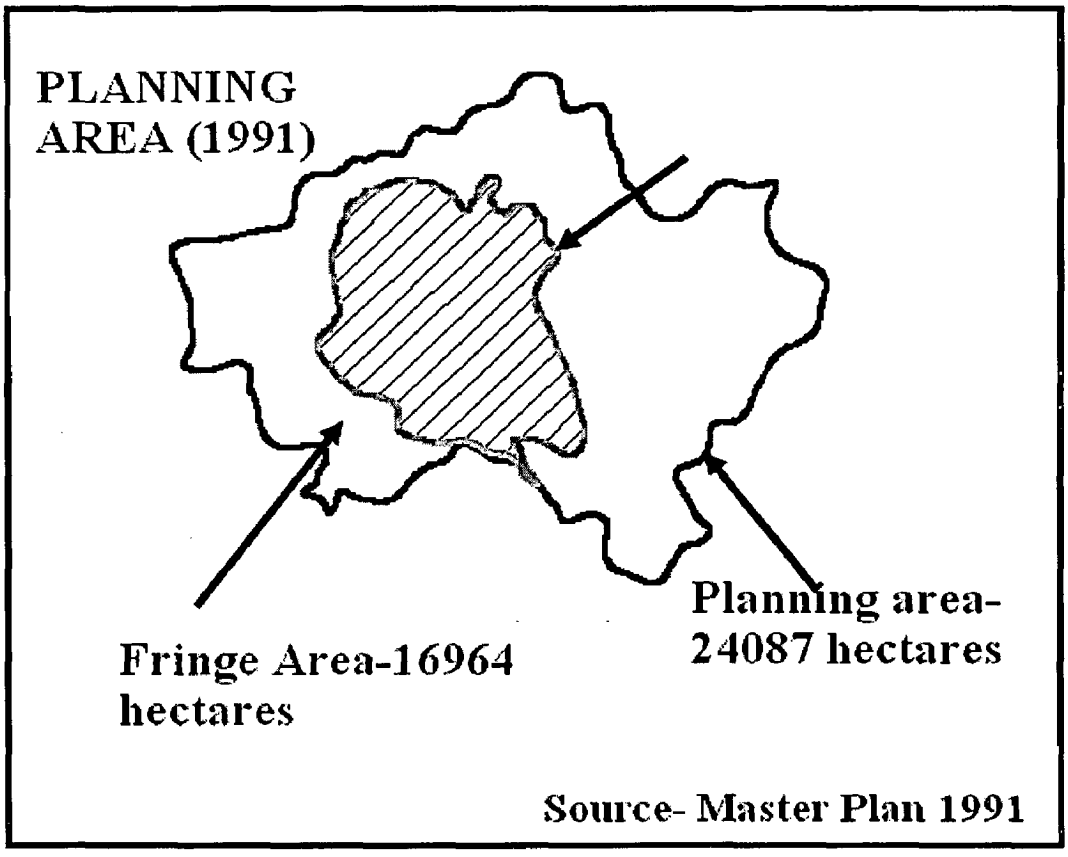


Fig 5.1- Bhopal Planning Area (1991)

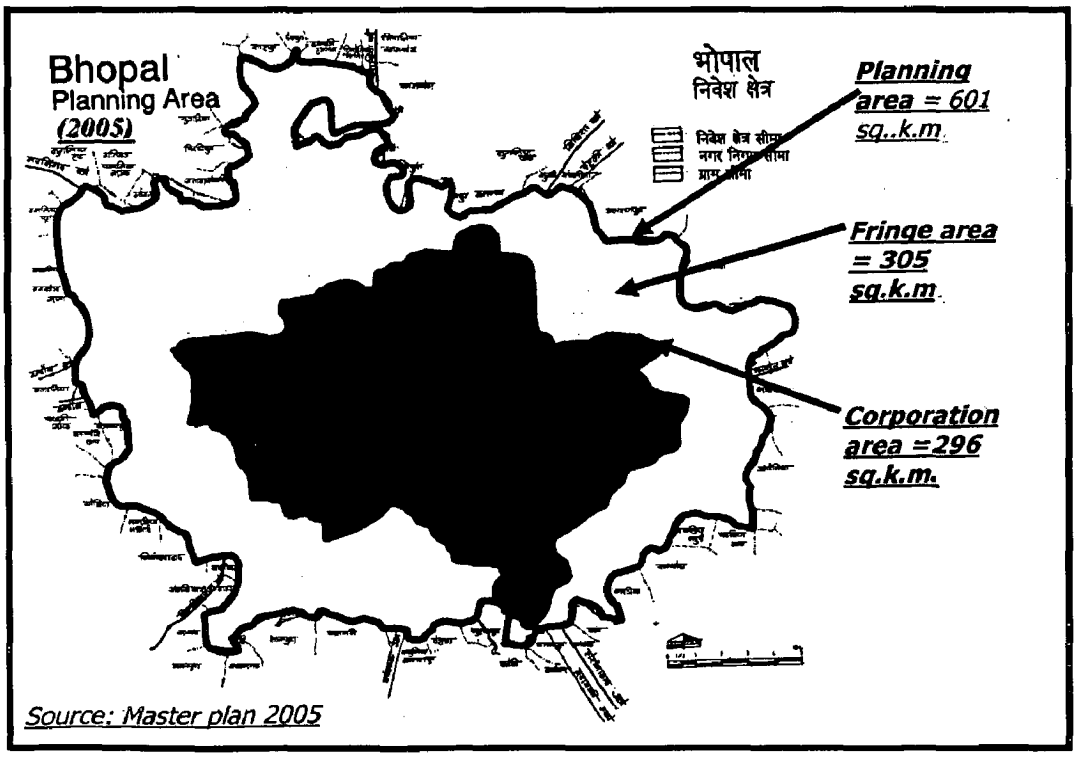


Fig 5.2- Bhopal Planning Area (2005)

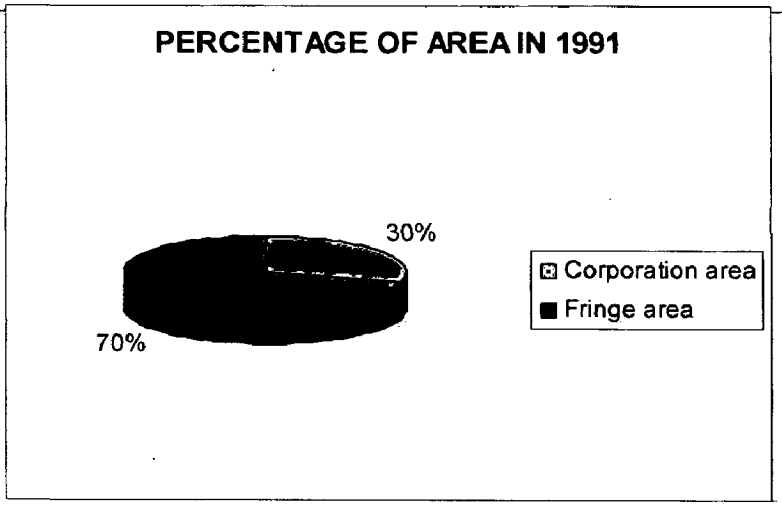


Fig 5.3- Percentage of area (1991)

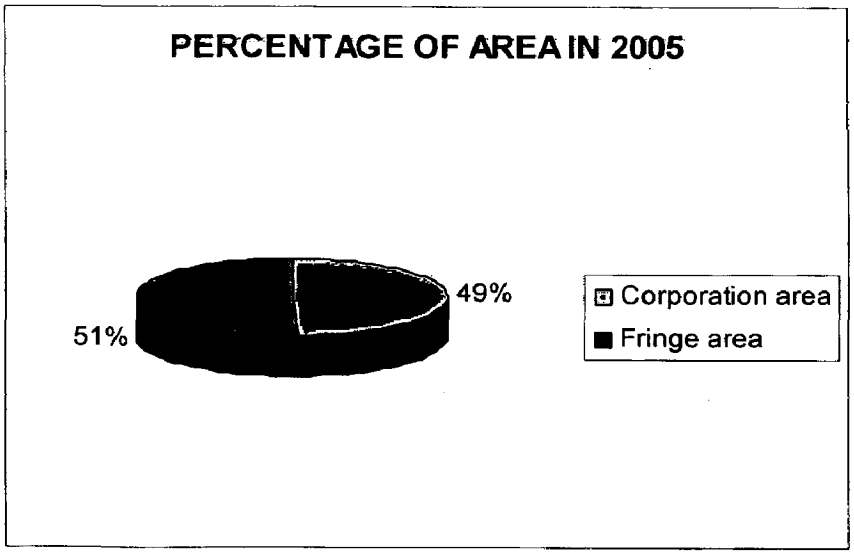


Fig 5.4- Percentage of area (2005)

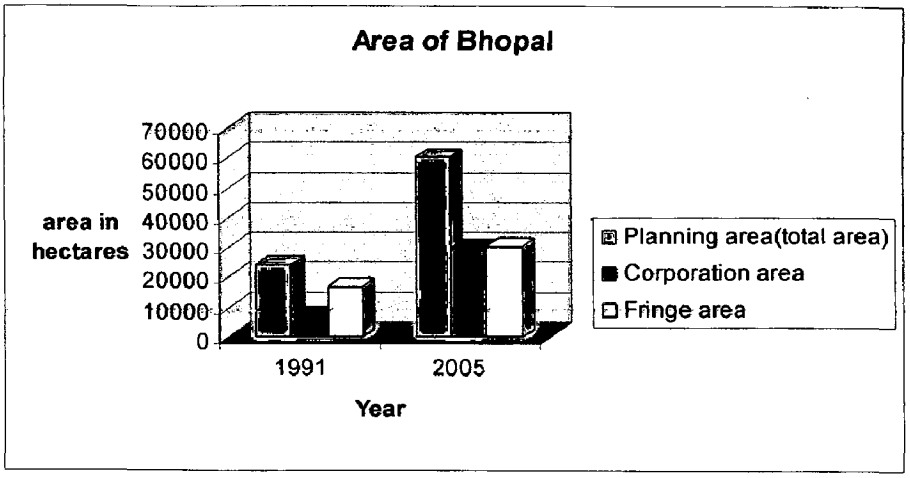


Fig-5.5 Area of Bhopal

As per 1995 plan, the land utilization rate comes to 7.45 Ha per 1000 person. Our analysis however yields quite different figures after deducting the land areas blocked the urban spread are 4.67 Hectares per. 1000 persons

2. The Municipal limits, which were first stated in 1916 were revised in 1958 to cover 71.23 Sq.Kms. divided into 39 wards. These limits were further revised in 1981 covering 284.50 Sq.Kms containing 56 wards. This almost followed the planning area boundary of 1975-95 plans.

3. The Planning limits for 1975 Master Plan covered an area of 240 sq. Kms. encompassing 40 villages.

4. This limit was subsequently enlarged in 1993 and redefined in 1995 to Cover a total area of 601 Sq.Kms. covering 135 villages.

5. The expansion of the planning limit added : 31 Village to the North, 13 village to the South, 21 Villages to the East, 15 Villages to the West.

6. The boundary of the enlarged planning limit now overlaps the boundary of urban land ceiling limits.

5.3 LAND AND LAND USE

5.3.1 Physical Growth

The urban spread of Bhopal has been greatly influenced by the extensive area of water bodies particularly the two lakes, covering about 2600 Ha and the number of hillocks situated on northern, south-western and southern side of the city. This topography has influenced the direction of growth and the shape of the city. The gridiron plan that was followed in old walled city area was not followed in other areas due to undulations and a more appropriate development pattern emerged.

The initial settlement of the city was contained within the fort wall and its surroundings, which later spread more on the southern and eastern side due to the pull effect of Capital Project Area and BHEL. The growth on the northern and northwestern side was restricted. On the western side the upper lake restricted the growth.

Bhopal is perceived by its planners as a group of townships. Each has distinct character and serves a different purpose. The city is conceptually subdivided in the following townships.

1. Walled City and its outgrowth.
2. Bairagarh.
3. BHEL Township.
4. Capital Project Area.

5.3.2 Land Use Analysis

The study of land use has been classified in the following categories for analysis :

1. Residential
2. Commercial
3. Industrial
4. Public and Semi-Public Use
5. Public utilities and facilities
6. Recreational
7. Transportation.

Table 5.1 Land Use

Landuse	**Area in hectares**			
	1961	**1973**	**1994**	**2005**
Residential	1056	1534	3660	8190
Commercial	22	65	243	650
Industrial	159	348	806	1389
Public & Semi-Public	96	382	912	1258
Public Facility	81	160	266	488
Recreation	43	23	902	2925
Transportation	357	542	1062	2600
Total	1814	3234	7851	17500

Source : Census & Bhopal development plan 2005

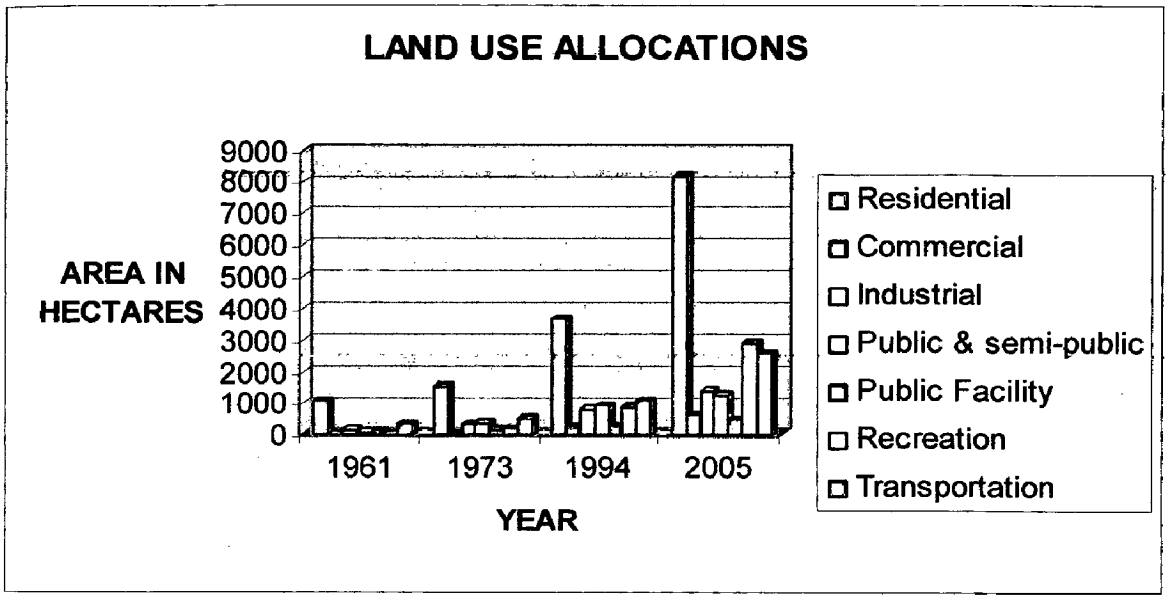


Fig 5.6- Land use allocations

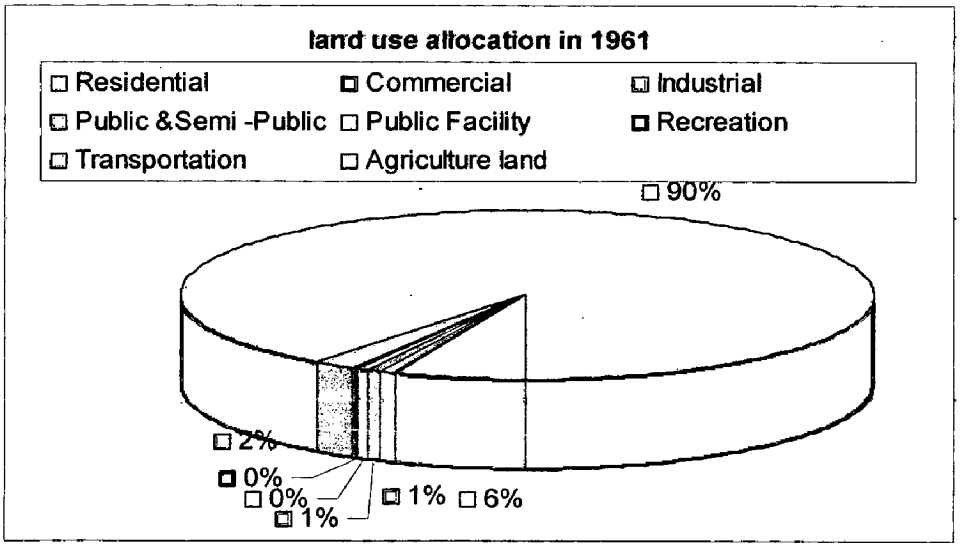


Fig 5.7- Land use allocations in 1961

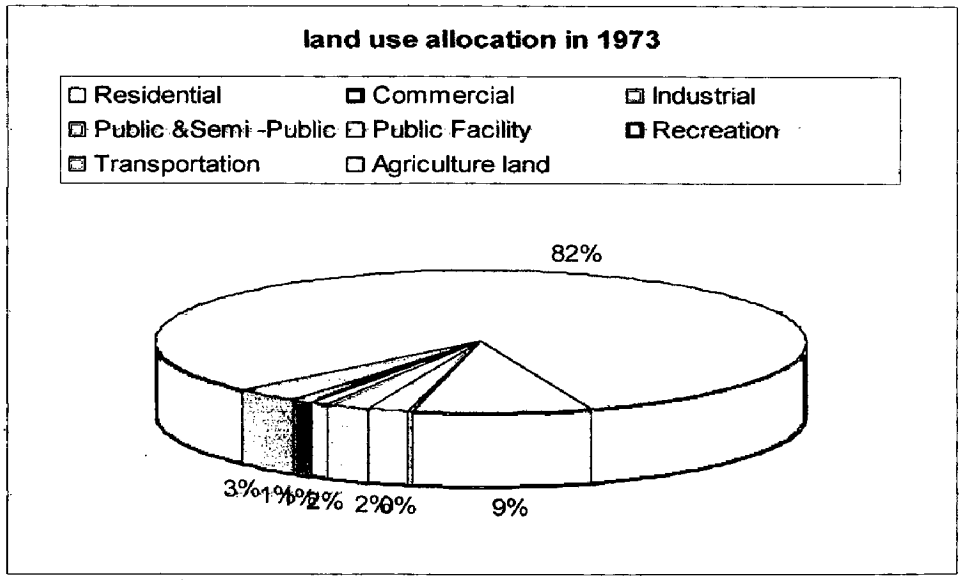


Fig 5.8 Land use allocations in 1973

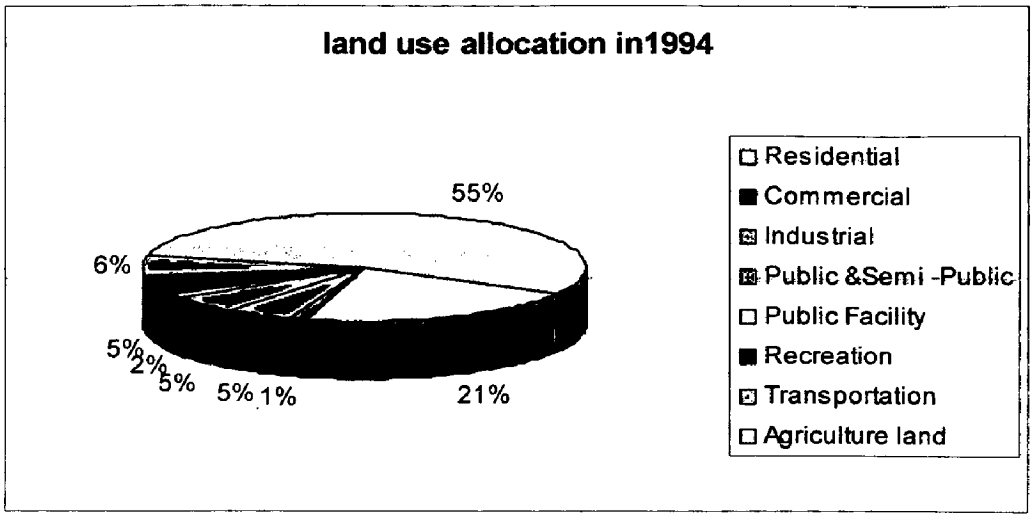


Fig 5.9 Land use allocation in 1994

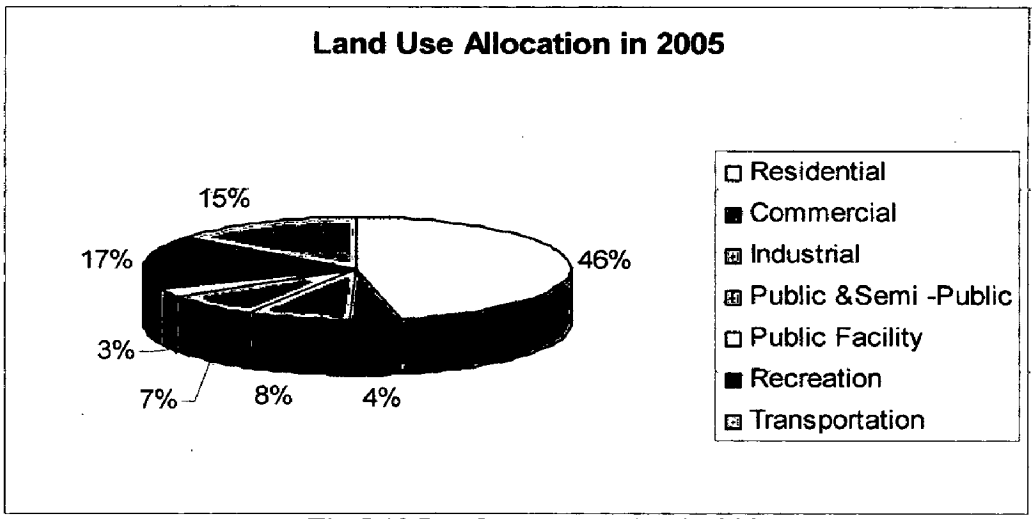


Fig 5.10 Land use allocation in 2005

5.3.3Density

The total residential land in 1975 was 1534 hectares which increased to 2060 hectares in 1994 (after deduction the land blocked due to various reasons) An increase of only 1.34 times, but at the same time population increased from 3.85 lakhs in more than 12.0 lakhs , showing an increase of more than 3 times.

Further, it was noticed that there has been a shift in the population and the population in ward no. 2, 15, 16, 17, 18, 19 & 24 has shown a declining trend in the population growth (1981-1991).As compared to these, wards 26, 29, 32, 33, 34, 35, 36, 37, 56 showed between 100% to 200% increase in the population. These entire wards are located on the Southern side of the city.

5.3.4 Land Value

A land value plot of the city shows that in 1994 the land value in the Southern side stands at an exorbitant Rs. 550.00 per Sq. Ft. in ward no. 56 and the extreme southern tip of the ward commands a value of Rs. 275 to Rs. 325 per Sq. Ft. as against ward No. 2 in the north which commands only a value of between Rs. 200 to Rs. 225 per Sq. Ft. for developed plots. The high value of the land associated with the southern part shows the desirability and coveted status of the land. This high value of land had its impact on the neighboring agricultural land and the land price for land in Southern fringe areas has risen from an average of Rs. 20,000 to Rs. 30,000 in 1975 to more than Rs.1 lakhs per acre in 1994. Now the Land value in the southern stands at price of 2500 to 3000 per sq ft. and 600 to 700 rs per sq ft at southern fringes and land value for agricultural land stands at a phenomenal 24 Lakhs per acre in Nayapura (study area) and 8 to 12 lakhs per acre at three km away from this development.

The high land price now commanded by the agricultural land in Southern fringe has increased the sub-division of land as value of agricultural produce cannot compete with the lowest growth rate than may be ascribed capital after sale. (For example the value of output from these lands ranged between Rs. 6,000 to Rs. 20,000 per annum which is less than that yielded @ 10% p.a. by the prevailing land price of 2 to 4 lakhs per acre. when most of the transaction occurred.)

5.3.5 Housing shortage

Housing shortage at present is about 1.2 lakh units taking into consideration the poorly sheltered informal sector in jhuggies, squatter settlements, families sharing accommodation and old dilapidated houses requiring replacements. Adding additional housing requirement to the tune of 3.2 lakhs units to the present housing back log, efforts shall have to be mobilized to generate the housing stock as under.

Table 5.2 Housing Shortage & Requirement

Year	Housing Shortage (dwelling units)	Additional Housing Need (dwelling units)	Over all (dwelling units)
1995	1,20,000	50,000	1,70,000
2001		1,20,000	1,20,000
2005		1,50,000	1,50,000
Total	1,20,000	3,20,000	4,40,000

Source: Census development plan 2005

5.3.6 Housing Finance

Availability and access to finance is one of the major components of housing development. The study show that earlier majority of the people (60-70%) build their own houses but over a period of time as per the availability of finance rather than loans. The formal housing finance institutions are HDFC, LIC, GIC and banks. But even the financial assistance provided to these institutions was inadequate to meet the demand.

Also the lower income groups have nearly no access to the housing finance though this section mostly needs this assistance. They resort to the informal system of finance i.e. from friends/relatives from moneylender's etc. ending up paying a much higher rate of interest.

The finance for housing has been minimal from the private and public sector though finances from HDFC, etc. is easily available, its full benefit has not been availed. Also these finance companies refuse to give loans to unauthorized development which is a rampant practice in the fringe area.

Now for lower income group and middle income group housing loans area easily available so these section select fringe areas as land price is comparatively lower than the city. Also the property and service taxes are relatively higher in the city than in the fringe area so people want to live in this area

5.4 ANALYSIS

When Bhopal became capital of the new state of Madhya Pradesh in 1956, A "Capital Project Agency" was conceived for the over all development of the new township. About 380 acres of land was identified to accommodate New Vidhan Sabha, The Secretariat Offices, Residential accommodation, Physical and Social Infrastructure, amenities etc.

The development under taken was of a high standard. It provided large open spaces, interspersed between Ground plus two blocks of walkup apartments serviced by wide roads and a liberal sprinkling of Social and Physical Infrastructure. It was also anticipated, that such a large scale of government sponsored housing and development may also generate private housing efforts and thus about 56 Acres of land was planned to receive such an input.

The total population to be supported in the entire areas was about one lakh.

This planning and quality of development made the southern side of the city a more favored place for the residential use.

Development plan (1975-95) recognized the importance of relation ships between work centers and residential areas. It provided land around Govindpura Industrial Area and BHEL areas as well as on the northern edge beyond Shahjanhabad and Berasia road. Recognizing the spatial preference of the government servants and other for the southern side, it earmarked land for residential used beyond Arera colony too.

However, all lands that were privately owned and earmarked residential came under urban land Ceiling Act 1976 and was therefore blocked. The land could not be developed and build upon as the land supply was hampered. This happened within one year of the publication of the Development plan.

The total quantity of blocked land due to various reasons was around 1650 hectares, out of which 541 ha was blocked in ULCAR. Thus we see that more than 50% of the total land earmarked for meeting the housing requirements could not be developed.

293.4 hectares i.e. 54.15% of land was blocked in North direction.

201.3 hectares i.e. 37.14% of land was blocked in South direction.

33.98 hectares i.e. 6.27% of land was blocked in North direction.

13.25 hectares i.e. 2.45% of land was blocked in North direction.

For the next couple of years, after 1975, the effect of blocked land was not really noticeable as vacant spots within the existing areas took up the slack. Beginning 82 and after 85 the effect of bladed land supply had a dramatic effect on land values too as can be seen in the next paragraph.

The urgent need to build the places of residences before and around retirement of the people working in government offices, the poor quality of infrastructure, congestion, lack of facilities in the northern areas and the better development and open environment in the new city added as an incentive caused the housing pressure to build up.

It is interesting to note that BHEL on the eastern side now acted as a Man made barrier despite its high standard of physical development, Because of socio-economic reasons.

The lake on the Western side with its catchments areas acted as a Physical and planning barrier.

In the early seventies, the govt. had identified land on the southern side of the city as a high potential agricultural belt. It planned two irrigation dams: - one on the Kolar river and the other on the Kaliasote river.

The approach road to Kolar started from the middle of this intensive government sponsored development.

When the demand for residential land increased by 1981-82, which could not met because of the above blockades, KOLAR ROAD and NH-I2 HOSHANGABAD ROAD became the conduit for relieving the housing stress, thus started the development of the Southern fringe of the city.

The Southern Fringe initially started outside the planning limits. The development plan and its provisions were working against there own objective.

Table 5.3 Village wise break up of land blocked

S.NO.	VILLAGE NAME	LOCATION	ARES IN HECTARES
2	HATAI KHEDA	EAST	18.03
22	NARELA SHANKARI	EAST	5.92
32	KOKTA	EAST	9.76
34	GOVINDPURA	EAST	0.26
1	NISHAT PURA	NORTH	34.16
3	SEMRA KALAN	NORTH	8.53
4	KARARIA	NORTH	78.60
5	RAUSUA	NORTH	17.40
6	KAROND KALAN	NORTH	18.96
7	BHANPUR	NORTH	68.29
8	MAHOU	NORTH	5.41
9	CHOLA	NORTH	19.94
17	HINOTIA KACHIY AN	NORTH	1.36
18	KOLUA KALAN	NORTH	21.56
24	NAYAPURA	NORTH	0.048
25	SINGHRCHOU	NORTH	8.065
26	HALALPURA	NORTH	4.021
27	KOH-E-FILA	NORTH	3.23
33	NAVERI	NORTH	3.76
10	BAGHMUNGAUA	SOUTH	46.65
12	BAGH SEWANIA	SOUTH	19.15
13	BAV ARIA KALAN	SOUTH	13.19
14	KOTRA SULTANA BAD	SOUTH	8.86
15	CHUNA BHATTI	SOUTH	6.26
16	AHEMEDPUR KALAN	SOUTH	1.29
19	KHUDA GANJ	SOUTH	1.78
20	AMARAWART	SOUTH	21.06

28	PREMPURA	SOUTH	6.55
29	DHARAMPURI	SOUTH	30.29
30	SHAHPURA	SOUTH	0.25
31	DAMKHERA	SOUTH	0.29
11	BERKHEDA PATHANI	SOUTH	45.55
23	LAUKHERI	SOUTH-EAST	9.75
21	BHOPAL	WEST	3.49
TOTAL LAND DECLARED UNDER ULCAR			541.87

Source : Land Revenue Dept.

CHAPTER 6: LEGAL CONTROL FOR URBAN DEVELOPMENT

Development on any piece of land is governed by various legal tools. Since the land is a state subject, therefore the legal controls and bylaws governing the development differ from one state to another; in addition there are a few central government acts which are to be applied in all states.

The objective of central government acts is to implement the directive principles of the state policy.

In the state of Madhya Pradesh the development is governed by the following acts:

(1) Land Acquisition Act – 1894
(2) M.P Municipal corporation Act – 1956
(3) M.P Periphery Control Act – 1960
(4) M.P Land Revenue Code - 1960
(5) M.P Town and Country Planning Ac t - 1973
(6) M.P Slum Clearance Act – 1975
(7) Urban Land Ceiling Act – 1976
(8) M.P Vinirdisht Bhrashtacharan Nivaran Adhiniyam – 1982
(9) Madhya Pradesh Panchayat Act

The above acts are applicable indifferent combinations over different area in the urban context. The areas may be classified in the following three categories.

(1) The Municipal Area
(2) The Planning Area
(3) Outside Planning Area

With respect to the development in fringe if we stack the various acts in terms of their control the following picture emerges in relation to the control of land use and type of development.

ACTS/RULES

1) Land Revenue Code
2) M.P Panchayat Act
3) M.P Vinirdisht Bhrashtacharan Nivaran Adhiniyam – 1982
4) Periphery Control Act
5) ULCAR Land Acquisition Act and Slum Clearance Act.

6.1 Land Revenue code

The following are the relevant sections of Indian Land Revenue Code.

U/S 172

U/S 24

ACTIVITY CONTROLLED

- Diversion of land from agricultural to non-agricultural developments.

a) No control over the purpose of diversion.
b) No control over the built form, shape, size and quality of construction.

A land kept fallow for more than three years enjoys automatic diversion.

6.2 M.P Panchayat act

a) Facilitates the provision of amenities and infrastructure
b) Nominal control over diversion, ineffective due to lack of building by laws, form and type of construction and absence of coordinated plan of land use.

c) The control is in the form of procedure for permission. The objective is to prevent avoidance of tax, as in the case with Land Revenue Code.

6.3 M.P Vinirdisht Bhrasht Acharan Nivaran Adhiniyam 1982

a) The act controls large scale acquisition by individuals and its subdivision and development.
b) This act ensures the quality, type and nature of development within a stipulated period, through a system of license and punitive actions.
c) Therefore, it indirectly provides extension to the M.P Town and Country – Planning act and regulates the developmental activities by enforcing some form of plan over large chunks of land.
d) It prevents development without infrastructure but does not lay down the type, size and nature of infrastructure.

6.4 Periphery control act

a) This act controls the type of Land use and its compatibility to adjoining activities.
b) It doesn't control the type, size and quality of construction.

6.5 ULCAR, Land acquisition act, Slum clearance act

a) The applicability of this act fulfils only the social objectives of the directive principles of the State policy.
b) Like other acts, its applicability does not ensure development or its quality.

Thus, we see that the fringe areas lie in the gray areas of law. The developmental activity is controlled only incidentally, without any overall co-ordination or plan. This leads to ad-hoc evaluation and arbitrary decisions especially in context with the actual construction activity on site, which is totally uncontrolled.

It would be interesting to note the procedure that is to be followed in the three areas and compare the time required vis-à-vis each other.

6.6 Procedure of building permission

Table 6.1 Development permissions within municipal limits

S. No.	ACTIVITY	TIME REQUIRED
Step 1	Get the Land use certificate as per development plan from Town and Country planning	-----
Step 2	Get clearance from Urban Land Ceiling and Regulation Act 1976	No limit
Step 3	Land ownership	------
Step 4	Colonization license under M.P.V.B.A.N.A	6-9 Months
Step 5	Handing over of 15% of land to slum board	15 days
Step 6	Planning permission under T& CP Act 1973	60 days
Step 7	Developing estimate and permission from Municipal corporation	30 days
Step 8	Intimation of colonization	30 days

Step 9	Rule 10(4) of M.P.V.B.A.N.A 1982	2 years
Step 10	Completion of development work	-----
Step 11	Allotmentment and Registry of plots	Varies as per site and location
Step 12	Construction of building	------

Table 6.2 Development permissions outside planning limits

S. No.	ACTIVITY	TIME REQUIRED
Step 1	Land ownership	------
Step 2	Colonization license under M.P.V.B.A.N.A	6-9 Months
Step 3	Handing over of 15% of land to slum board	15 days
Step 4	Planning permission under T& CP Act 1973	60 days
Step 5	Development estimate and permission from Municipal corporation	30 days
Step 6	Intimation of colonization	30 days

Step 7	Rule 10(4) of M.P.V.B.A.N.A 1982	2 years
Step 8	Completion of development work	-----
Step 9	Allotment and Registry of plots	Varies as per site and location
Step 10	Building permission from Panchayat	Varies as per site
Step 11	Construction of Building	------

Thus, we see that the time required in the fringe areas is much lesser and more assured than in the areas within the planning limits and Municipal limits.

Besides, the procedure is less cumbersome and provides more flexibility to the colonizer/ Developer.

Since the M.P.V.B.A.N.A 1982 is not applicable in all states of the country, we have reproduced it relevant sections here in to make its strength and role clearer.

6.7 Extract of M.P Vinirdisht Bhrasht Acharan Nivaran Adhiniyam

M.P Vinirdishta Bhrashta Acharan Nivaran (Registration in development of colonies) Rules 1982 notified on 14 December 1982, under section 24 of main act.

Part - II - License and permission

Rule- 3 - Application for license

Rule- 5 - Grant or refusal of license

Rule- 6 - Development of colonization

Rule- 8 - Cancellation of license

Rule-10 - Establishment of colony, 10(4) intimation of colonization

Rule-12 - Effects of non-compliance of rule 10

Part- III - Management of colonies

Rule-13 - Show cause notice

Rule-15 - Taking the management of land

Rule-18 - Preparation of scheme for development and allotment of land.

Rule- 20 - recovery of expenses incurred by collector.

Part- IV - Deals with the offences and illegal colonization.

Sec- 24 - Definitions

Sec- 25 - Offence of illegal diversion of land

Sec- 26 - Offence of illegal colonization

Sec- 27 - Punishment for illegal diversion and illegal colonization.

Sec- 28 - Offence of illegal construction

Sec- 29 - Punishment for illegal construction

Sec- 30 - Punishment for abatement of the offence of illegal construction.

Sec- 31 - Transfer of plots in an area of illegal diversion or illegal colonization to be void.

Sec- 32 - Forfeiture of land involved in illegal colonization.

Requirement for COLONIZATION LICENSE;-

- Application
- Fees Rs. 500.00
- Khasra map and site plan
- Proposed plan
- Registered sales deed
- Land use certificate

- Exemption under ULCAR act 1976
- Development estimate
- Bank deposit of 10% amount of estimate
- Society/ firm documents
- Police report
- Report from land acquisition office

Requirement for granting permission for development under rule 10(4)

- Approved layout from T & C.P
- No objection certificate from Nazul department.
- Municipal corporation / Panchayat permission.
- 15% Land possession certificate from slum clearance board.

6.8 Extract of M.P Town (periphery) control act, 1960

M.P, Town (periphery) control act, 1960 made applicable in 1990 under section -3 and control areas has declared in section -4.

Section-6- Deals with restrictions in controlled area- "No person shall erect or re erect any building or make or extend any excavation or layout on any means of access to a road, in controlled area without permission".

Section-7- Applications for permission, and grant or refusal of such permission.

Section-12- Prohibition of use of land

Section-13- Offences and penalties

Section-17- Power to make rules.

6.9 Present Status:-

Although the M.P Town (Periphery) control act 1960 was made applicable in Bhopal in 1990 but the implementation and enforcement was not properly done because:-

- The competent authority (i.e. collector) is busy in day-to-day administration work.
- No proper guidelines for fixing the land use.

CHAPTER 7: URBAN FRINGES OF BHOPAL

7.1 INTRODUCTION

Like any other city Bhopal is growing spatially and the urban sprawl is covering up more and more rural land. The human settlement process finds an uninterrupted supply of land at the peripheries of the urban areas and the development methods get a new way of implementing themselves. This is a result of increasing pressure on the existing housing available with in the urban area or the municipal or planning area.

One of the major reasons for development of the fringes of urban centers is the continuous immigration, which the centers have to counter the people from the nearby rural areas small town etc. all come in search of job opportunities and settle down in the fringe areas due to easy availability of land supply as a result of cheaper land values as compared to the main city facilitated by easy Permission procedure for development. In addition to the economically weak sections of immigrant there are other middle class people coming from other cities due to their job transfers who also look for the same kind of accommodation arrangements.

All these factors are responsible for the growing up of fringe areas into major residential pockets. These same factors have contributed to the development of fringe areas of Bhopal, which have come up in the last decade or so due to the rapid urbanization going on in the city.

The major reasons behind the development of any specific fringe pocket are directly or indirectly same as discussed above. But the only aspects in which the different fringes are characterized are the minor reasons which evolve out of some special needs and purposes for which space gets inhabited.

A comparison of the major fringe areas of Bhopal needs to be done as to facilitate the study and also strengthen the reason for selecting a particular case study area over the other potential sites for study. The major roads of Bhopal are:

1. Narsingarh road
2. Barasia road
3. Vidisha road
4. Raisen road
5. Hoshangabad road
6. Kolar road
7. Bilquisganj road
8. Indore road

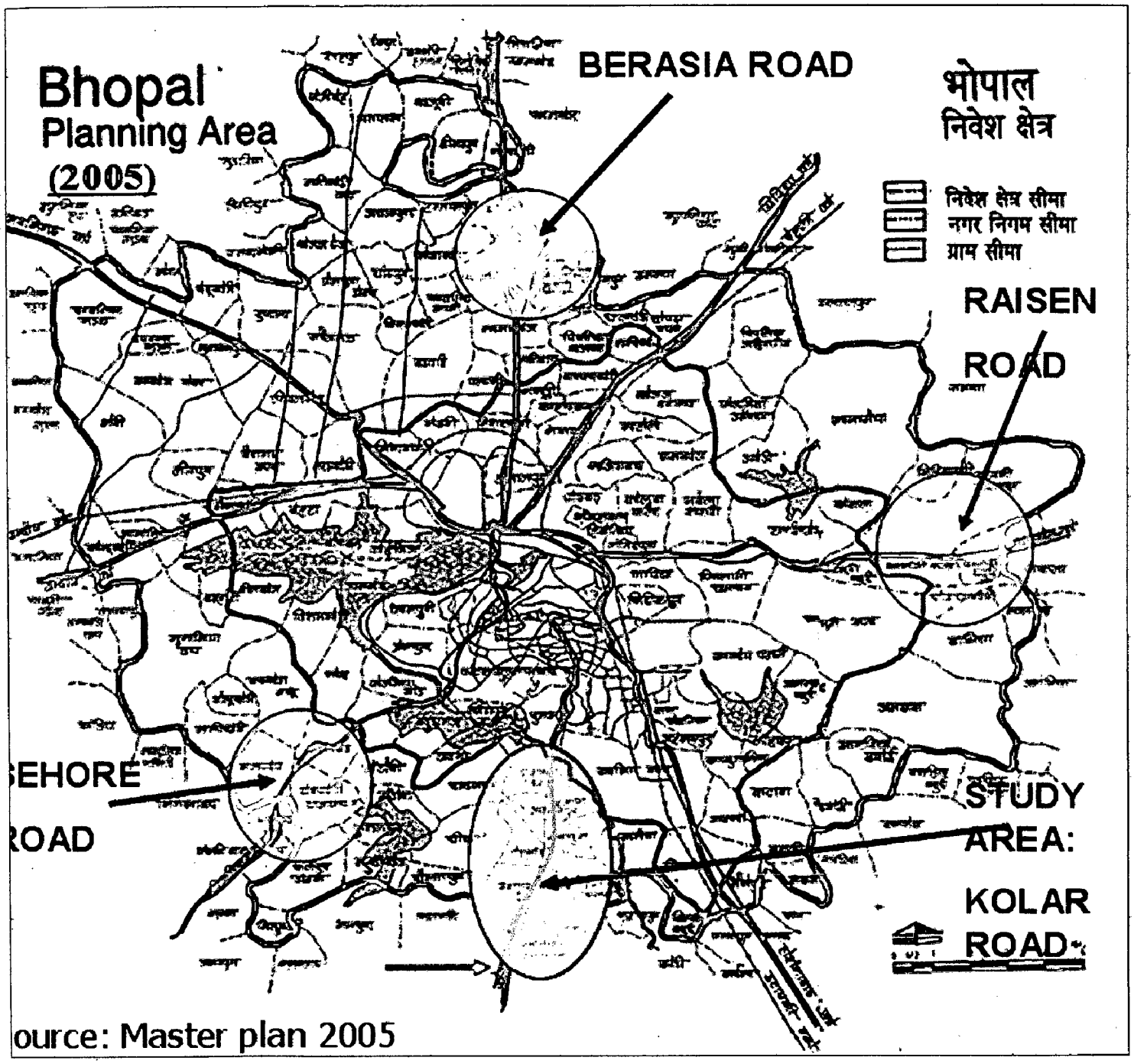


Fig 7.1 Urban fringe/ peri urban area , Bhopal

7.2 MAJOR URBAN FRINGE OF BHOPAL

7.2.1 Sehore Road

This area lies in the western pocket of the city and comes on the map towards Sehore, a small town 15-25 km. away from Bhopal. The major residential development taking place here includes Bairagarh which is situated after some gap with the main city. Also recently the area near to the city has started to witness the construction of marriage lawns on this road. The main features of this area are

- It lies in the sub city 7 of Bhopal
- It has mainly grown after partition in 1947 due to high refugee influx in the city.
- It is partly inside municipal limits.
- The settlement pattern witnesses a marked physical gap before Bairagarh arrives as this was the main area used for housing refugees. So it was developed first.
- The highway mainly has service centers and showrooms of automobile companies and the initial area near to city is facing residential development recently.
- The recent development is also due to the improvement of the Airport road.
- The main reason for its detachment with the city has been the upper lake which acts as a barrier for accessibility to major work centers.
- Sindhi community thrives in Bairagrh as all are involved retail trade.

7.2.2 Berasiya Road

This area lies in the northern pocket of the city, on the road towards Berasia, a small town nearby. This road also leads to Islamnagar the headquarters of Dost Mohammed Khan. The road rail link towards Vidisha also witness fair amount of development. The bye pass road for NH-12 passes through here, which is also being subjected to fair amount of development. The main features of this area are

- It lies in sub city 7 of Bhopal.
- It is the least preferred area for residential development mainly due to poor accessibility as a result of the physical barriers that is the upper lake and the congested old city which deprive this area from easy access to the major work centers.

- It is partly inside municipal limits.
- The bye pass road for NH-12 gets diverted from the airport and cuts through this area resulting in the springing up of dispersed development.
- The coming up of Rajeev Gandhi technical university on it has resulted in many technical and non technical institutes to come ups here
- Also the Bhopal memorial hospital constructed for the gas affected people on this road has given some sort of settlement to grow.
- Bhopal gas tragedy on 3 Dec. 1984 in this area, gave rise to some physiological reasons, restricting people to settle here. Hence the development is mainly of unauthorized slums which degrade the overall quality of the place.

7.2.3 B.H.E.L. Area

This area lies in the eastern pocket of the city and falls on the road towords Raisen a small town nearby. This road passes through the north of B.H.E.L. area and the development is also on the eastern side of the B.H.E.L. The major residential colony coming in this pocket is Anand nagar which is 1 km inside B.H.E.L. It houses a population of around 12000 people inside it. The main features of this area are

- It lies in sub city 4 of Bhopal.
- The road to Raisen and the B.H.E.L. campus have been the two major reasons behind the development of this fringe of Bhopal.

  This area is mostly inside the municipal limits of the city.

  The vast expanse covered by B.H.E.L. forces the inevitable development near it to find suitable space in its environs.
- Anand nagar the main residential set up consist mainly of labour class people employed there only who as a result do not want to leave this place for obvious reasons.
- The colony has a major rural character with the urban scene lining the main roads periphery. Apart from B.H.E.L, the other areas are less developed on the infrastructure aspect.

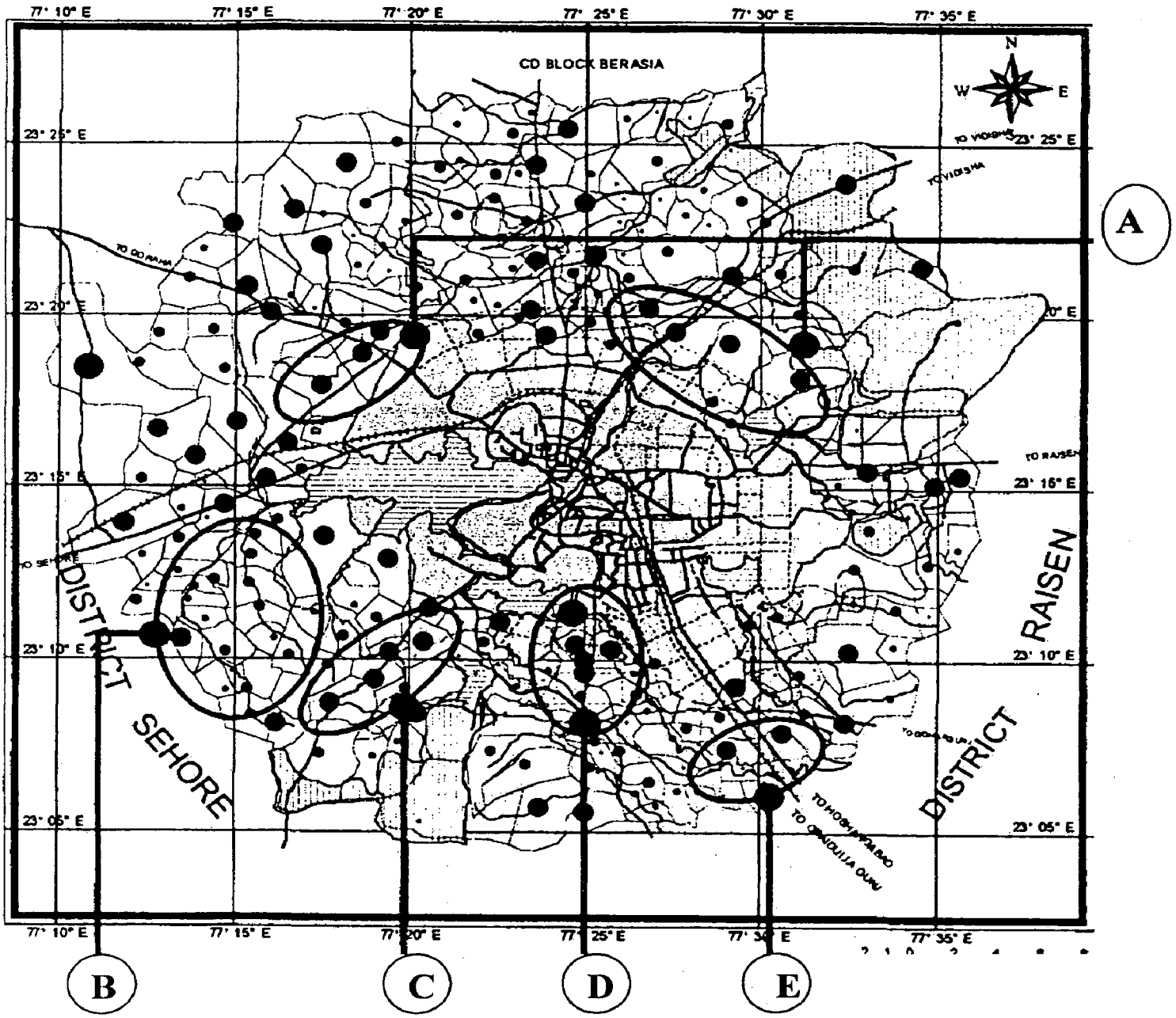


Fig 7.2 Urban fringe in all direction

A: Villages on the north of the Bhopal city have developed mainly because of the newly constructed bypass road

B: These villages are settled along the water bodies and are dominantly agricultural.

C: Villages on Bilkisgunj road are on initial stages of urbanization induced by the growth of present city. Most of the villages are having population around 1000 persons.

D: Damkheda, Akbarpur, Banjari, Nayapura, Gehunkheda villages on Kolar road have shown high percentage of Population growth in last decade . In the course of time the leap frog development of the Parent city across the natural barrier of Kaliasot River has become contiguous with the city limit.

E: Villages on Hoshangabad road , outside the urban boundary have grown under the pressure of Ribbon development on National Highway-12.
The development is mainly private sector housing, institutions, recreational areas, little bit of commercial (specially automobile repair shops) and hotels along the national highway.

CHAPTER 8: KOLAR ROAD FRINGE

8.1 INTRODUCTION

Kolar road constructed in early eighties started the emergence of a new potential pocket for residential development. The existing scenario provided an increasing shortage of housing supply within the municipal area. The planning area, which earlier comprised of an area of 241 sq km, was over looked for residential development by easy permission seekers.

Also the intervention of urban land ceiling and regulations act 1992 meant the handing over of surplus land to the state within the planning area. This factor along with some previously discussed factors contributed towards the development moving outside the planning limits and eventually towards the KOLAR ROAD.

The major villages falling to urbanization forming the study area are as follows:

DAMKHEDA
BANJARI
NAYAPURA
AKBARPUR
BAIRAGARH CHICHLI

As discussed earlier the development permissions were supposed to be provided by gram Panchayat or Directorate-T.C.P.O in an overlapping area of powers but the powers for demolition or penalties against land use violation were not given to them and they could only give various notice to the developer as a sole action. The demolition powers in such cases are exercised by the municipal corporation did not or in other words comic not use this power as this area was outside

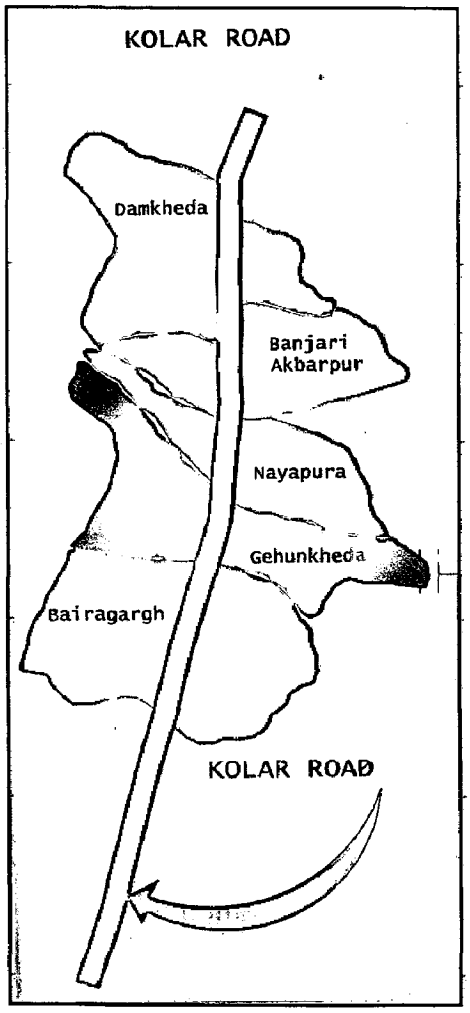


Fig 8.1 Kolar Road

there jurisdiction.

All five villages are still outside municipal limits in spite of a large scale of urbanization eruption. The reason for its non incorporation into limit can be due to the fact that it would bring more initial investments rather than returns to the already overburdened local body.

8.2 LOCATION AND LINKAGES

The study area in fig lies in the south of Bhopal on the road towards Kolar dam (30 km away from the city), A water reservoir constructed in the early eighties as a water supply source to supplement the supply from upper lake, which was the main source for irrigation and water supply but now Kolar road is the axis of the most favored diction for residential development.

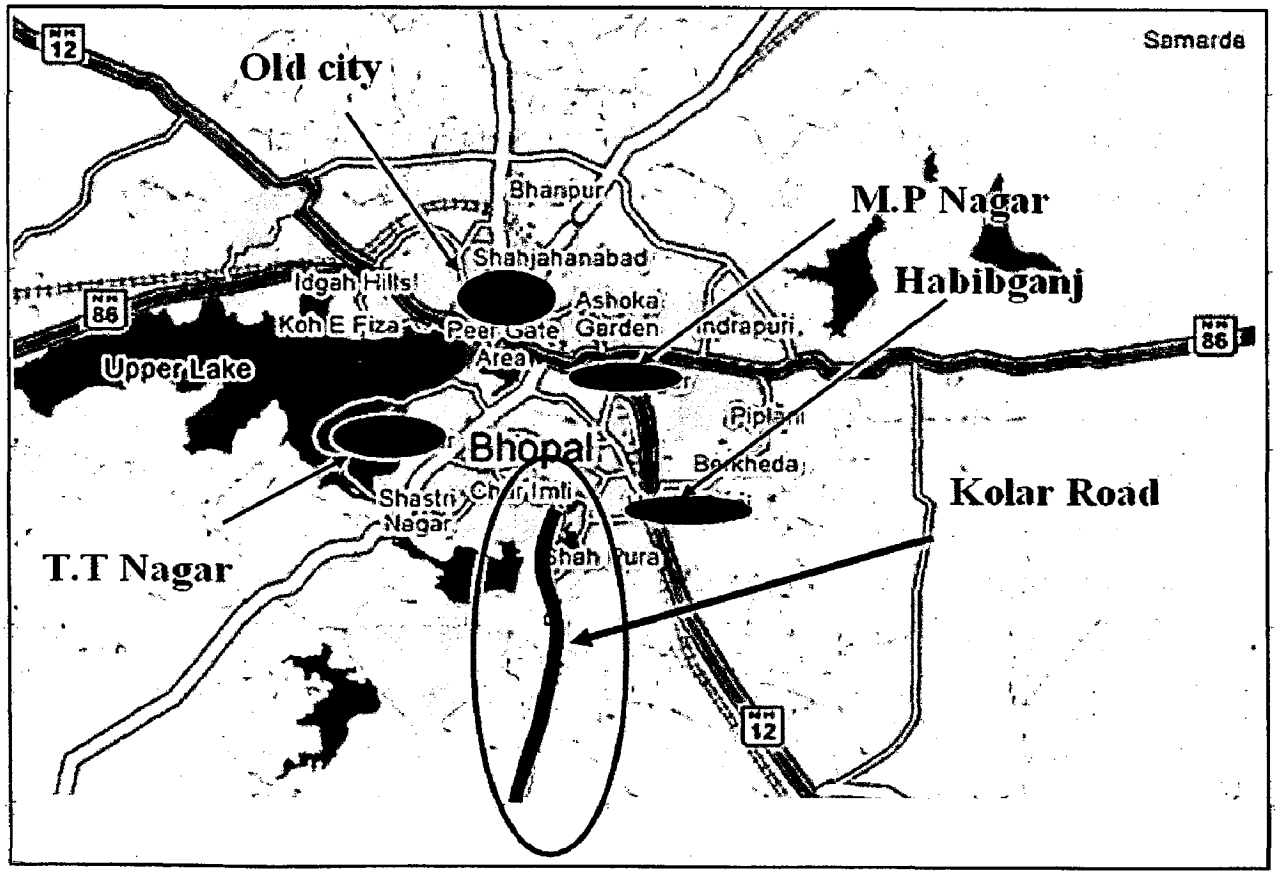


Fig 8.2 Location Map

The area is well linked to the major work centers of the city distances of which are mentioned in increasing order as follows-

Table 8.1 Location and Linkages

S.NO.	WORK CENTER	DISTANCE(KM)	TYPE
1	M.A.C.T	4	INSTITUTIONAL
2	M.P. NAGAR	6	COMMERCIAL
3	CAPITAL COMPLEX	7.5	ADMINISRATIVE
4	T.T. NAGAR	8	COMMERCIAL
5	B.H.E.L	9	INDUSTRIAL
6	OLD CITY	13	MULTI PURPOSE
7	MANDIDEEP	25	INDUSTRIAL

It is evident from the table that the area is well linked with the major work centers of the city. Only Old city and Mandideep which is an industrial town 18 km away from the city are far from it but in comparison to the other areas of Bhopal it is relatively near.

A part from the major work centers the area is fairly well linked with the main transport zones of Bhopal. The other main features of its location are:

1) Proximity with the Habibganj Railway station which is fast growing in stature and the number of stoppage is increasing every day.
2) Proposed I.S.B.T. adjacent to the Habibganj station is also a plus point.

3) Its distance from the city is a negative factor, as due to this it get cut off from the cultural places of the city, like- Bharat bhawan, Ravindra Bhawan, Upper Lake, Major theaters, hustle bustle of the core city etc.
4) Distance from the airport is also a negative aspect.

Mainly this area is far from the cultural hubs and recreational space of Bhopal city.

8.3 POPULATION

Table 8.2 Population

VILLAGES	1981	1991	2001
DAMKHEDA	0	1361	10233
BANJARI AKBARPUR	38	471	4066
NAYAPURA	174	708	3492
GEHUNKHEDA	98	118	1129
BAIRAGARH CHICHLI	210	551	748

Source: Census 2001

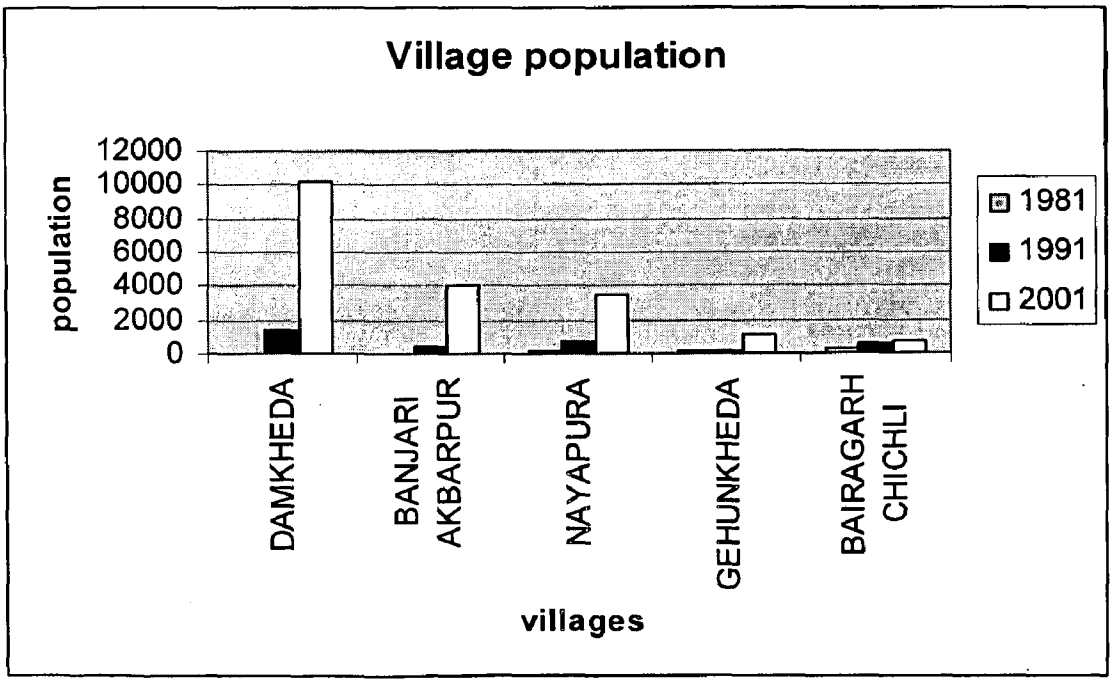


Fig 8.3 Population Variation in villages

8.4 CHARACTERISTICS OF STUDY AREA

8.4.1 Village- Damkheda

This village is nearest to the city and can be attributed with the quality of being the first to show the invasion of urbanization. Damkheda thus is the maximum urbanized village among all the five and is basically the extension of the city. It carries this extension to the approaching villages, but in a decreasing sense of urban character, quality and quantity wise.

The main features of this village are-

- Total population- 10233 (census of India- 2001)
- Total area- 210 hectares
- Total density- 48.72 P/Ha
- Total land available for development purpose excluding area occupied by natural barriers like hillocks, canals etc- 180.8 hectares
- Total existing residential land- 88.95 hectares
- Total gross residential density- 165.2 P/H

8.4.2 Village- Banjari Akbarpur

Banjari takes the urbanization process forward in direction. It has the major identifiable commercial spine serving it and the surrounding village also. A stretch of kolar road in this village has some commercial complexes with local shopping facilities, a big petrol pump, an ICICI bank ATM, with ample informal sector also.

The main features of it are-

- Total population – 4066 (census of India-2001)
- Total area – 157.7 hectares
- Total density – 25.81 P/Ha

- Total land available for development purpose excluding area occupied by natural barriers like hillocks, canals etc - 137.77 Hectares
- Total existing residential land – 75.96 Ha
- Total gross residential density – 53.52 P/Ha

8.4.3 Village- Nayapura

The village occupies a small stretch of kolar road as it narrow down on it, but than expand outwards. The village witnesses developers seeking potential land away from the road.

The main features of it are-

- Total population- 3492 (census of India- 2001)
- Total area- 143.5 hectares
- Total density- 24.39 P/Ha
- Total land available for development purpose excluding area occupied by natural barriers like hillocks, canals etc- 128.23 hectares
- Total existing residential land- 67.8 hectares
- Total gross residential density- 51.5 P/Ha

8.4.4 Village- Gehunkheda

In this village the existing rural character is observed to be fighting with the invading urban fabric.

The main features of it are-

- Total population- 1129 (census of India- 2001)
- Total area- 125 hectares
- Total density- 9.03 P/Ha
- Total land available for development purpose excluding area occupied by natural barriers like hillocks, canals etc- 100.2 hectares
- Total existing residential land- 54 hectares
- Total gross residential density- 20.90 P/Ha

8.5.5 Village- Bairagarh Chichli

This village has a dominating rural character. The other side of the coin shows in the perception of the developers who see large potential landscapes.

The main features of it are-

- Total population- 748 (census of India- 2001)
- Total area- 300 hectares
- Total density – 2.49 P/Ha
- Total land available for development purpose excluding area occupied by natural barriers like hillocks, canals etc- 71.89 hectares
- Total existing residential land- 73.14 hectares
- Total gross residential density- 10.12 P/Ha

8.5 OVERALL STATUS

The overall status of the area reveals that urbanization is increasing continuously. Substantial land still shows rural character but they have been either demarcated or assessed as potential developable land by the colonizer. The type of residential development taking place reflects the cities contemporary styles. The colonizers are catering to all sections of society; on one hand individual bungalows are being provided within a society campus along with good micro level infrastructure while on the other hand they have built three – four storied apartment complexes.

8.5.1 Infrastructure status-

Physical Infrastructure

The analysis is based on the following physical infrastructure aspects-

- Water supply
- Sewerage
- Solid waste management
- Road network

Water supply:-

Water supply scenario in the whole area is in very bad shape. The municipal authorities do not provide connection as it is not in their jurisdiction and also it is of no financial returns to them.

As a result the people who have bought their individual plots here dug their own bore wells because the ground water availability is easy. This is due to the nearness to kalisot dam.

The colonizer developing large colonies in this area provides the residents with uninterrupted water supply through boring done in the colony premises. Developers working here like Shalimar group, Danish housing, agarwal builders etc have adapted the same approach to fulfill the needs of their residents.

Sewerage:

As the city itself is lacking in sewer till date, the scenario in this fringes is even worse. The whole area falls short of a system to take out and dispose off the sewage from the colonies. People have built their own septic tanks. The colonies also follow the same method and charge the service to clean the septic tank once in a month in the monthly maintenance varying from Rs. 300 to Rs.600.

Solid Waste Management:

The solid waste management is not in the hand of any single authority. The people make their own arrangement. The survey reveals that people give Rs. 10 – 20 / month to the sweepers who than take the garbage to the vacant plots and dump it there. After sometime they burn the garbage.

Road Network:

The condition is very poor in the study area. The Kolar road which is proposed to be 30m wide in the development plan 2005 is no where near the mark. After such a long time gap there is no activity regarding this matter, the situation is even getting worse with the encroachment cropping up on the roads, which in no time take up an identity of permanent structures. The internal streets leading to residential colonies are not metaled in many places. The colonies which are for high income group are provided their residence with proper cemented roads.

There is a 60 m wide ring road proposed for Bhopal city which passes through the heart of this area from village Banjari. The roads existing location if superimposed on the site reveal a lot of settlement coming in the way. So its implementation might cause a lot of destruction.

8.5.2 Social infrastructure–

The scenario for the availability of social infrastructure to the residents over here also falls short of minimum standards. Though quantity wise it is almost sufficient but quality wise it is very poor.

Table 8.3 Social Infrastructure

VILLAGE(POP)	SCHOOLS	NURSING HOMES	REMARKS
	EXISTING	EXISTING	
DAMKHEDA-10233	3- MIDDLE SCHOOLS	NO DISPENSARY	NO SENIOR SECONDARY SCHOOLS AND HEALTH FACILITY
BANJARI- 4066	3- PRIMARY SCHOOLS	3 PRIVATE NURSING HOMES	SUFFICIENT

NAYAPURA-3492	1- MIDDLE, 2-PRIMARY SCHOOLS	1 DISPENSARY	SUFFICIENT
BAIRAGARH-748	2- NURSERY SCHOOLS	NO FACILITY	SCHOOL SUFFICIENT BUT NO HEALTH FACILITY

Apart from these the other supporting facilities are as follows-

- One community hall is specified for 15000 population but is absent.
- One petrol pump is specified for 150 ha gross residential area but there is only one in the village of Nayapura, which is 143 ha while the other villages do not have this facility.
- One police Station is also there in Akbarpur village.
- One post office is there in Damkheda village.
- One bank is in Banjari village including an ICICI ATM and one in Nayapura village.

The resident for major health problem have to either go to Ayushman hospital which is around 4 km or for serious problems they have to go to Hamidia Hospital which is about 15 km.

8.5.3 Land values-

The Residential Land values in Bhopal are ranging as high as Rs. 4500/ sq ft in New market toRs.500/ sq ft in some parts near Raisen road. The old city areas also command rates up to Rs. 2500/ sq ft.

The value of residential land decreases farther from the city in the study area.

Table 8.4 Land value variation in the study area

S.No.	Land description	Land value (Rs/sq ft)
1	From Nallah till Kolar Thana on the road	650
2	From Nallah till Kolar Thana away from the road and from thana till akbarpur village boundary limit on the road	600
3	From Thana till akbarpur village boundary away from the road and farther away from road	450 - 500
4	From Akbarpur Boundary limit till planning area limit away from the road	400

Table 8.5 Land use distribution in study area

S.No.	LAND USE	AREA(HA)	PERCENTAGE
1	RESIDENTIAL	363.15	35
2	COMMERCIAL	8.6	1
3	PUBLIC	7.2	1
4	INDUSTRIAL	1.85	0.001
5	OPEN AREA	655.95	63
6	TOTAL	1036.75	100

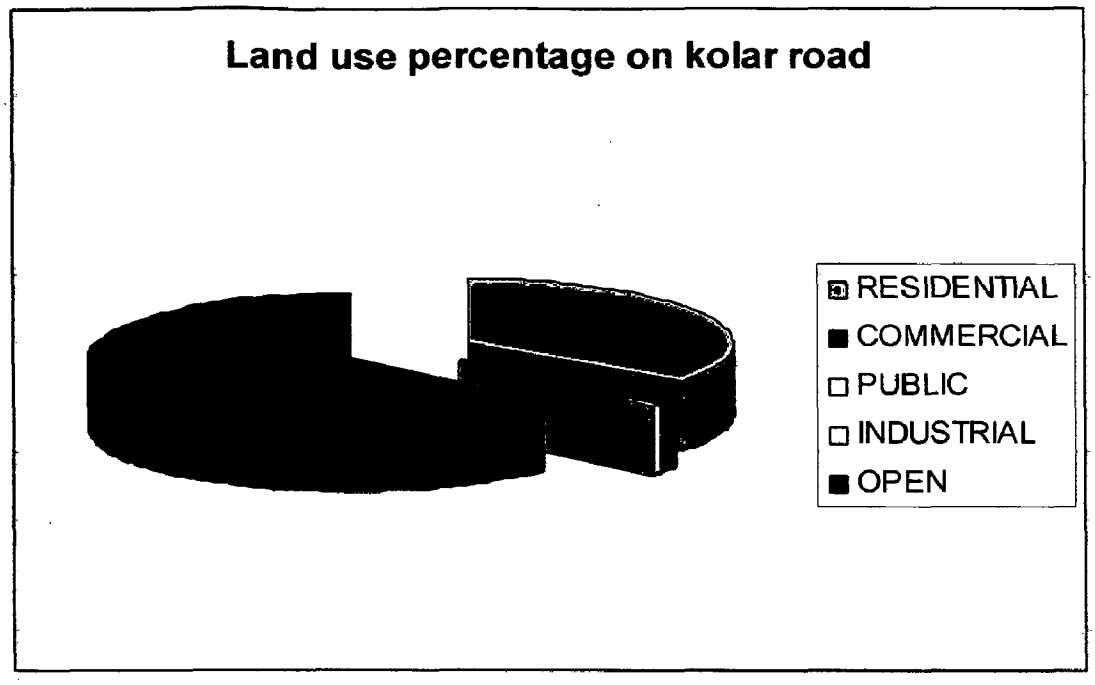
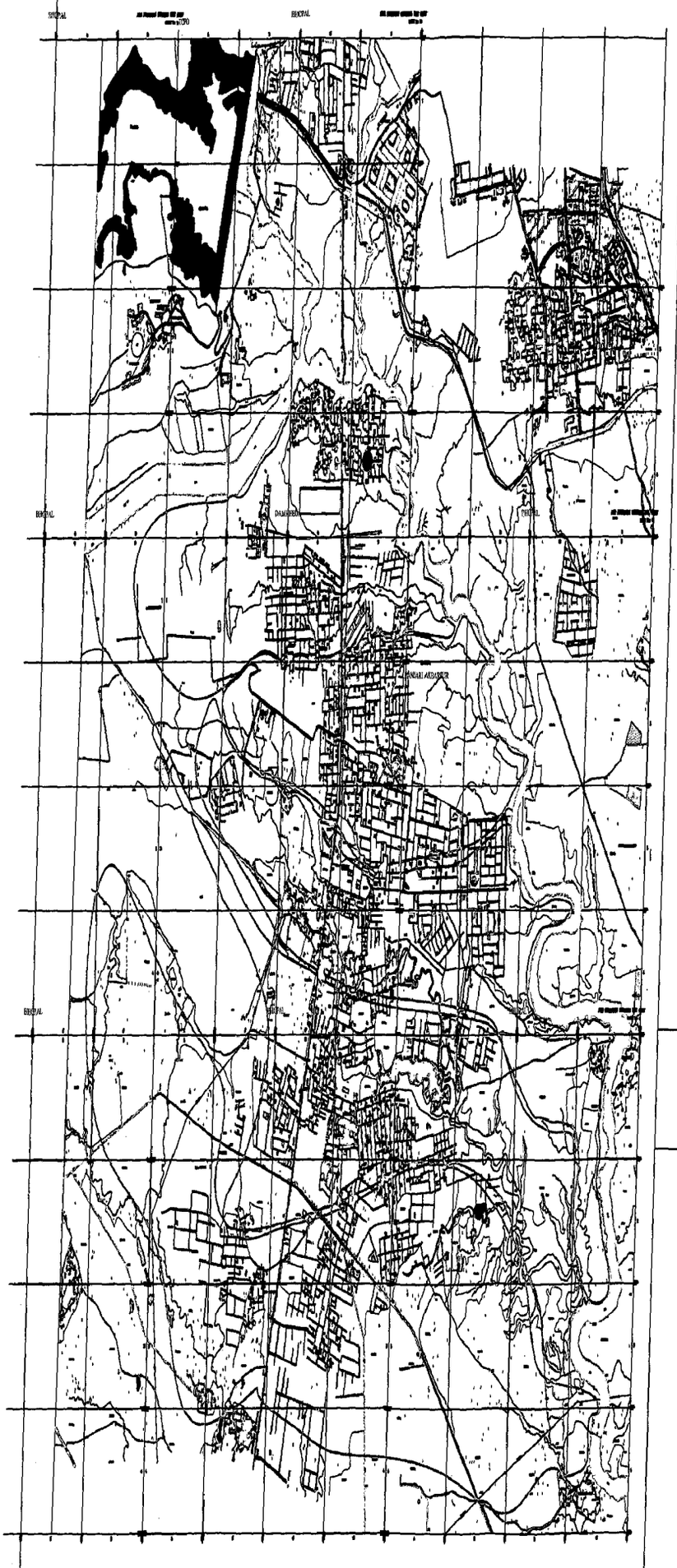


Fig 8.4 Land use percentage on Kolar Road



References

Buildings : Single, Group, Industrial, Institutional, Shed, Under construction, Stadium, Slum	
Roads : Metalled, with Bridge, Culvert, Unmetalled	
Road with Median/Divider, Fly over	
Cart-track, Lane, Footpath	
Railway line : Broad gauge, Metre gauge with bridge & Railway station	
Embankments : Up to 3m, Above 3m	
Cuttings : Up to 3m, Above 3m	
Rivers : Perennial; Dry, Stream : Perennial; Dry, Canal, Open Drain : Double, Single	
Tanks : Dry; with water limit, Pond, Swimming pool, Overhead tank, Ground level reservoir (GLR)	
Wells : Lined, Unlined, Tube-well, Fountain, Tap, Hand pump, Flow direction	
Temples, Mosque, Chhatri, Church, Idgah, Tomb, Post office, Telegraph office, Combined office, Fort	
Flag pole, Petrol pump, Chimney, Manhole, Watch tower, Communication tower, Statue	
Dispensary, Hospital, Hut : Permanent; Temporary, Grave, Brick kiln	
Trees : Coconut, Coco/Date Palm, Plantain, Palmyra, Others	
Fire Station, Police Station, Pump House, Rest House	FS PS PH RH
Wall, Fence, Hedge, Cutthetion	
Outlines : Garden/Park, Play Ground, Boulders, Mine/Quarry	Park PG
Plantation, Marshy land, Salt pan, Open scrub	
Dams : Masonry/Rockfilled, Earthwork, Weir	
Boundaries : Area limit, Forest	
Main Powerline with Pylon, Pipe line	
Bench mark, Spot height	
Contours, Form line, Cliff, Rocky slopes	

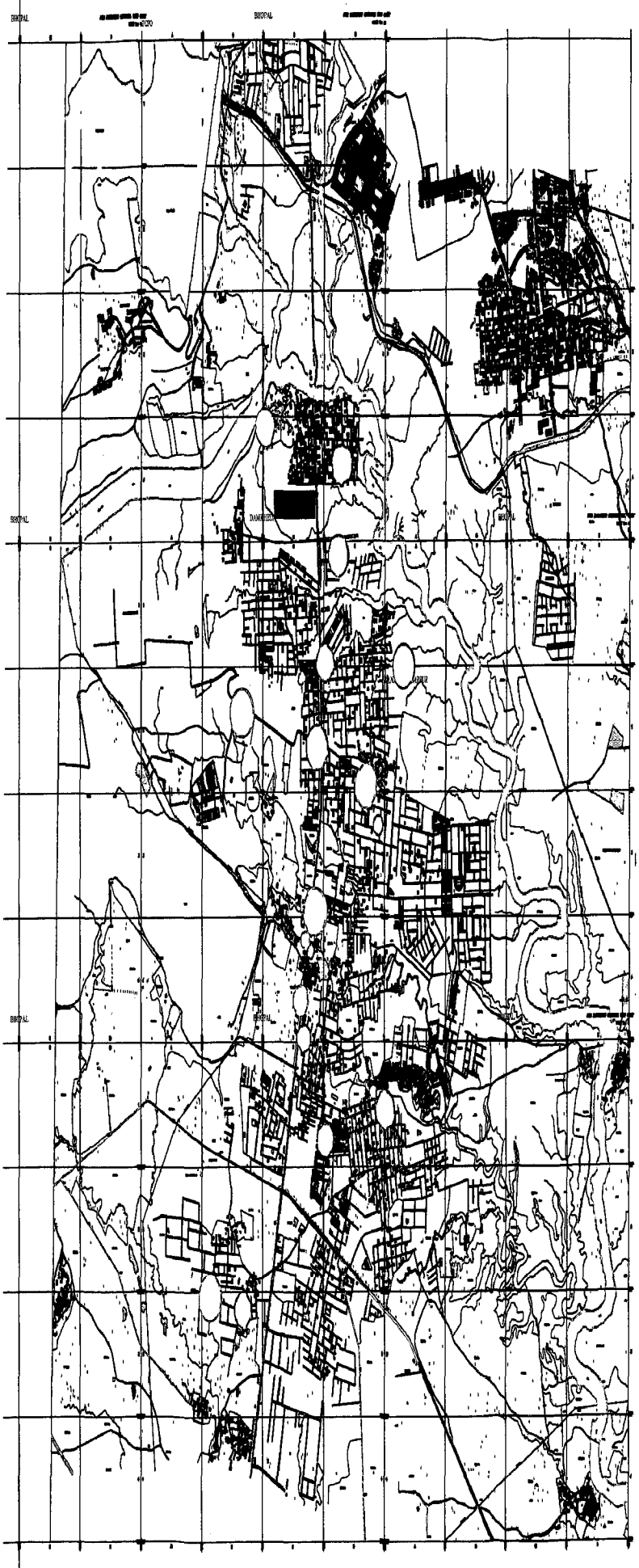
GRID DIMENSION– 500M X 500 M

Contour Interval : 1 metre

Note : This map is based on Aerial Photography flown in the year 2000

KOLAR ROAD SETTLEMENT

PREPARED BY- TOSHI SHARMA



References

Buildings : Single, Group, Industrial, Institutional, Shed, Under construction, Stadium, Slum	
Roads : Metalled, with Bridge, Culvert, Unmetalled	
Road with Median/Divider, Fly over	
Cart-track, Lane, Footpath	
Railway line : Broad gauge, Metre gauge with bridge & Railway station	
Embankments : Up to 3m, Above 3m	
Cuttings : Up to 3m, Above 3m	
Rivers : Perennial; Dry, Stream : Perennial; Dry, Canal, Open Drain : Double; Single	
Tanks : Dry with water limit, Pond, Swimming pool, Overhead tank, Ground level reservoir (GLR)	
Wells : Lined; Unlined, Tube-well, Fountain, Tap, Hand pump, Flow direction	
Temples, Mosque, Chhatri, Church, Idgah, Tomb, Post office, Telegraph office, Combined office, Fort	
Flag pole, Petrol pump, Chimney, Manhole, Watch tower, Communication tower, Statue	
Dispensary, Hospital, Hut : Permanent; Temporary, Graves, Brick kiln	
Trees : Coconut, Coco/Date Palm, Plantain, Palmyra, Others	
Fire Station, Police Station, Pump House, Rest House	FS PS PH RH
Wall, Fence, Hedge, Cutthertion	
Outlines : Garden/Park, Play Ground, Boulders, Mine/Quarry	
Plantation, Marshy land, Salt pan, Open scrub	
Dams : Masonry/Rockfilled, Earthwork, Weir	
Boundaries : Area limit, Forest	
Main Powerline with Pylon, Pipe line	
Bench mark, Spot height	
Contours, Form line, Cliff, Rocky slopes	

GRID DIMENSION – 500 M X 500 M

Contour Interval : 1 metre

Note : This map is based on Aerial Photography flown in the year 2000

SHEET TITLE- KOLAR ROAD SETTLEMENT

LOCATION OF SOCIAL INFRASTRUCTURE IN STUDY AREA

- SCHOOL
- HOSPITAL/ CLINIC
- BANK
- POLICE STATION
- RELIGIOUS PLACE

PREPARED BY- TOSHI SHARMA

CHAPTER 9: ANALYSIS

9.1 CITY LEVEL ANALYSIS

An analysis of the city level data has revealed the following points:

- The habitable area in the past plans increased from 33.25 sq km to 79.22 sq km mostly in the southern direction.

- The population has increased from 3.85 lakhs to 15 lakhs and most of the increased population has been accommodated in the southern direction.

- Thus the southern part of the city obviously shows a higher increase in density and greater physical and social infrastructure.

- The northern part of the city shows a higher net density, which leads to conjestion as it comprises of traditionally built residential areas and the spill over to the hinterland on the northern part did not occur due to lack of any major road or access.

- Further, it is observed that wards located in the northern side of the city have shown a declining trend in the population growth. Where as wards located in the southern side has shown an accelerating trend in population growth registering an increase between 100-200 persons per acre.

- Commensurate to the shift of the population, being funneled into the southern direction due to natural and man made obstacles, the land values in the southern direction have touched to an exorbitant 350 per sq fit as compared to 125 per sq fit in the northern parts (year 1991)

- The high value in the plan area has an effect on the peripheral land and the price of agricultural land on the periphery has risen to 21 lakhs per acre and more.

- The higher agriculture land price encouraged subdivision and sale of agriculture land because capitalization at these rates on even a nominal yield of 10% give better returns than that available from pursuit of agriculture activity.

- The preference and desirability in the minds of people was revealed in a survey carried out by M.P.V.P.S on a respondent size of 1.17 lakhs. It showed that 72% of the people preferred the two roads in the southern direction.

  Kolar road- 48.93%

  Misrod road- 23.16%

1. The reason for this preference is the level of infrastructure available in this area and proximity to work centers.
2. Good living environments
3. Good accessibility
4. Suitable flat land available for settlement without any natural or man made barriers
5. Arera colony (A residential colony having private residences of many businessman and top IAS, IPS and other top level beurocrats acts as status symbol.
6. Nearness to Habibganj railway system

All above factors also act as catalyst for development of area outside the planning area limits particularly on Kolar Road.

9.2 FIELD OBSERVATION

Fig-9.1 View of Damkheda village from kolar road showing urban character with lack of proper infrastructure facilities. The rural character of this village is completely vanished and high density and high rise development has come up. The area has poor road infrastructure and solid waste collection & disposal is not adequate.

Fig-9.2 Nayapura village: Village households are facing the dilemma of being estranged in their own area because of rapidly changing character of surrounding area. Farming activities and associated non-farming activities in the area are fast depleting.

Fig 9.3 Nayapura village, residential colony

Builders and colonizers build residential colonies in the fringe areas and provide separate water supply and other Infrastructural facilities to the resident. On the other hand just outside the boundary wall, garbage is dumped as the facilities are provided only inside the colony boundaries.

Fig 9.4 No proper drainage

No proper drainage facility in this area, as Municipal Corporation and other planning authority are least concern about the provision of proper infrastructure facilities in fringe areas.

Fig 9.5 Canal from Kaliasot Dam

Canal from Kaliasot Dam Feeds the agricultural area in the southeast of bhopal city but the Leap frog development in the Kolar Road and fast growing Ribbon development on the Hoshangabad Road is damaging the hinterland which was served by the canal

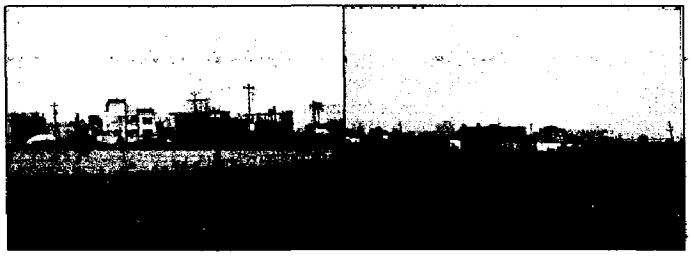


Fig 9.6 Large scale land acquired for residential development

Large scale land acquired for the purpose of Residential development on Kolar Road. In lack of proper guidelines the ecological sensitive areas are made available to the colonizers for development.

Fig 9.7 Road condition

Picture shows the poor road condition in Banjari akbarpur village. People construct their houses because of the low land prices in this area, but providing the infrastructure specially the roads is a very costly affair for the authority concern with it.

Fig 9.8 condition of social infrastructure

Though it is observed that no. of schools present in the study area is sufficient but their condition is not as per requirement. As we can see an example of mixed land use in the above pictures i.e. institutional with residential and institutional with commercial. It can be seen that there is no proper parking space for school buses as well as no playground or any open area for student's activities.

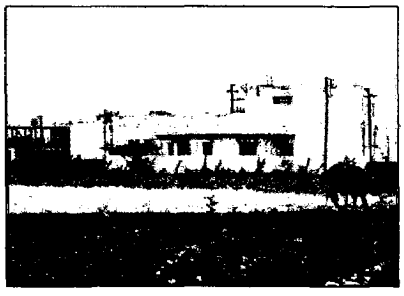


Fig 9.9 under utilization of land

The elite class of the city constructs their houses in immediate rural area. This typical example shows the rapidly changing character of villages, disturbing agricultural land and thus farming activities and associated non farming activities in this area are fast depleting. On the other hand construction of big bungalows in a a large chunk of land results in high cost infrastructure.

Fig 9.10 slums and squatter settlement

People leaves vacant plot and construct later, hence slums and squatter settlement develop at such places. The picture also shows degrading condition of the rural area because of occupation change

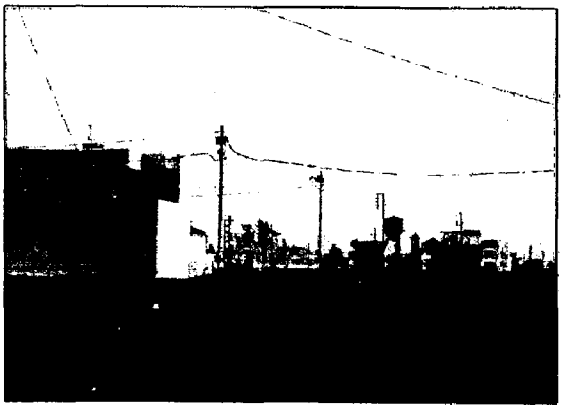


Fig 9.11 Vacant plot

Many people buy the plot and construct later. Many plots are lying vacant. And plots were also bought for speculation and investment and have change hand 2 to 3 times.

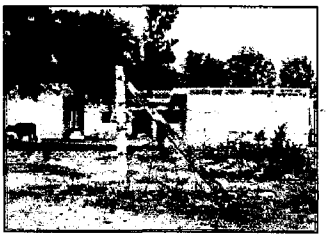


Fig 9.12 Degrading condition of school

Due to the change in occupation character, the govt schools which were already existing there in the rural areas is not preferred by the dwellers, hence school ground is serving as a dumping ground and the space looks dead even in the day time

Fig 9.13 Septic tank situated in the park.

At present it used as a small playing platform for the children because the park is not properly maintained and septic tank also occupy the space because of its improper

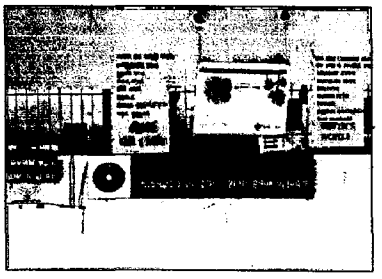


Fig 9.14 Police station and state bank in the study

9.3 FIELD STUDY

As it is discussed earlier that, the major development in the study area which is changing the rural character is residential and other development that is commercial, institutional, recreational depends upon the requirement of the residents.

Here is an analysis of different factors from the case studies of some residential colonies of the study area.

9.2.1 Case study 1- sarvdharm colony, Damkheda Village

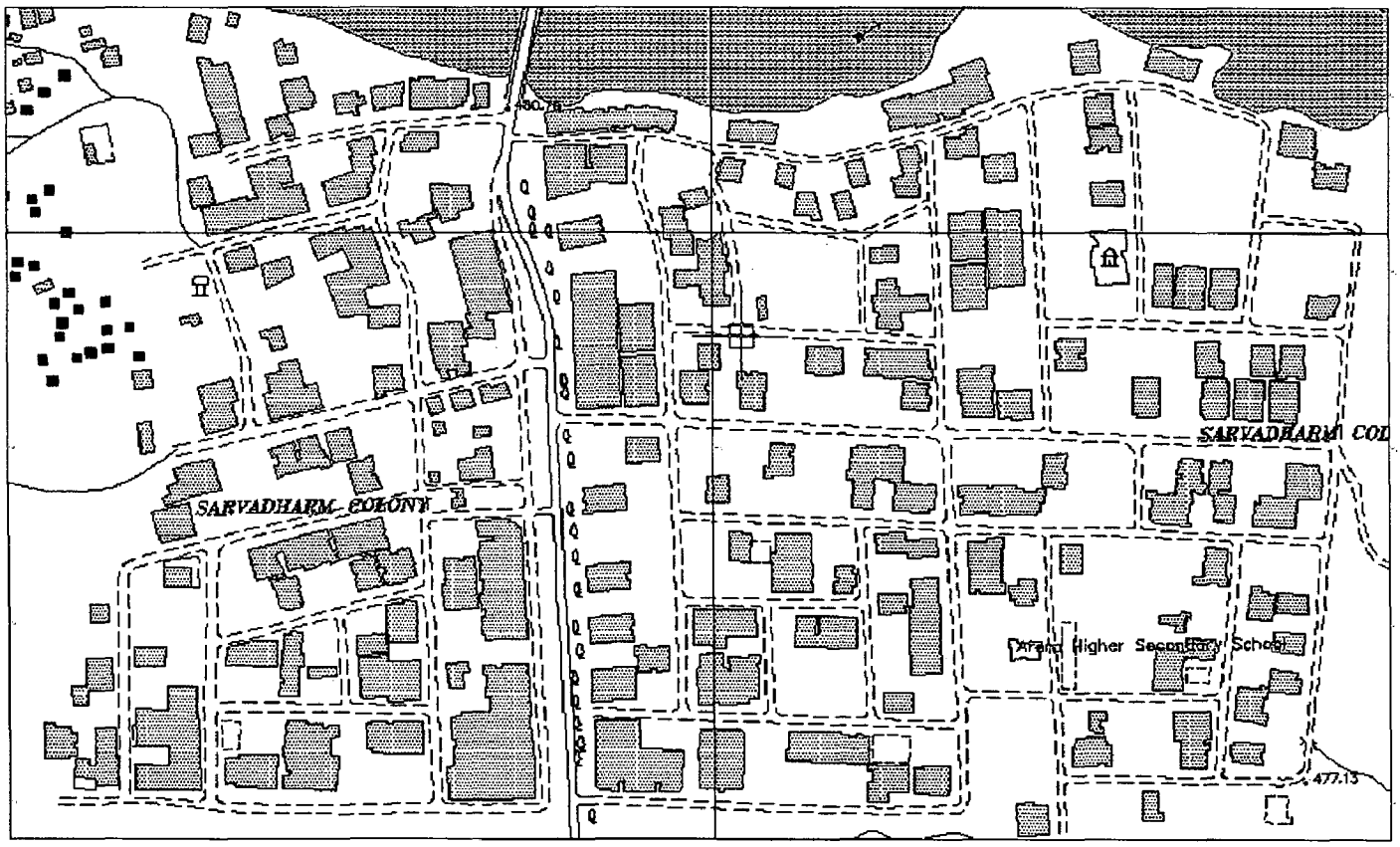


Fig 9.15 Sarvdharm colony

- Site area - 29.06 acre (11.7 ha.)
- Land use - Agriculture but Diverted to Residential
- Development Authority - Damkheda gram panchayt
- Developed by – Colonizer
- Year of approval of colony - 1988
- Present Density – 393 p.p.h.
- No. of plot – 418
- Population – 3955
- F.A.R. - Permissible - .75
- Income group – Low income group, Upper lower income group.
- Aveg. Plot size – 20'x53',23'x46',
- present land cost(2006) – 550 -600/ sq.feet

Table 9.1 Sarvdharm Colony

Category	Actual	Development plan2005
Density	340 P.P.H. medium and high density range	125 P.P.H. low density range
Water supply	25000 gal.	40 gal./per head/day
Sewerage	3 separate tank as per proposal	
F.A.R.		0.75

Ground coverage – 60%
Open space - 4.85%
Roads -33.2%
Institutional - 1.95%

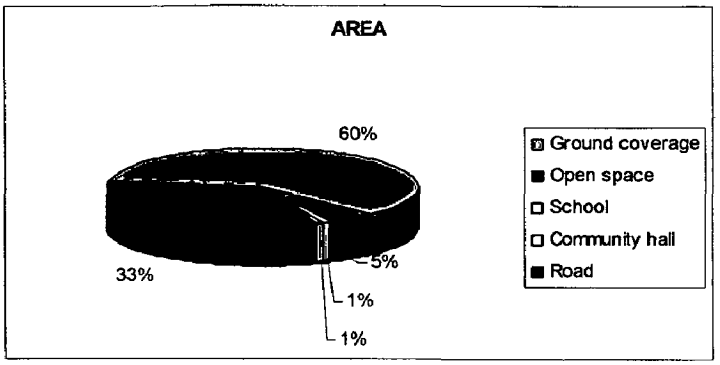


Fig 9.16 Area statements: Sarvdharm colony

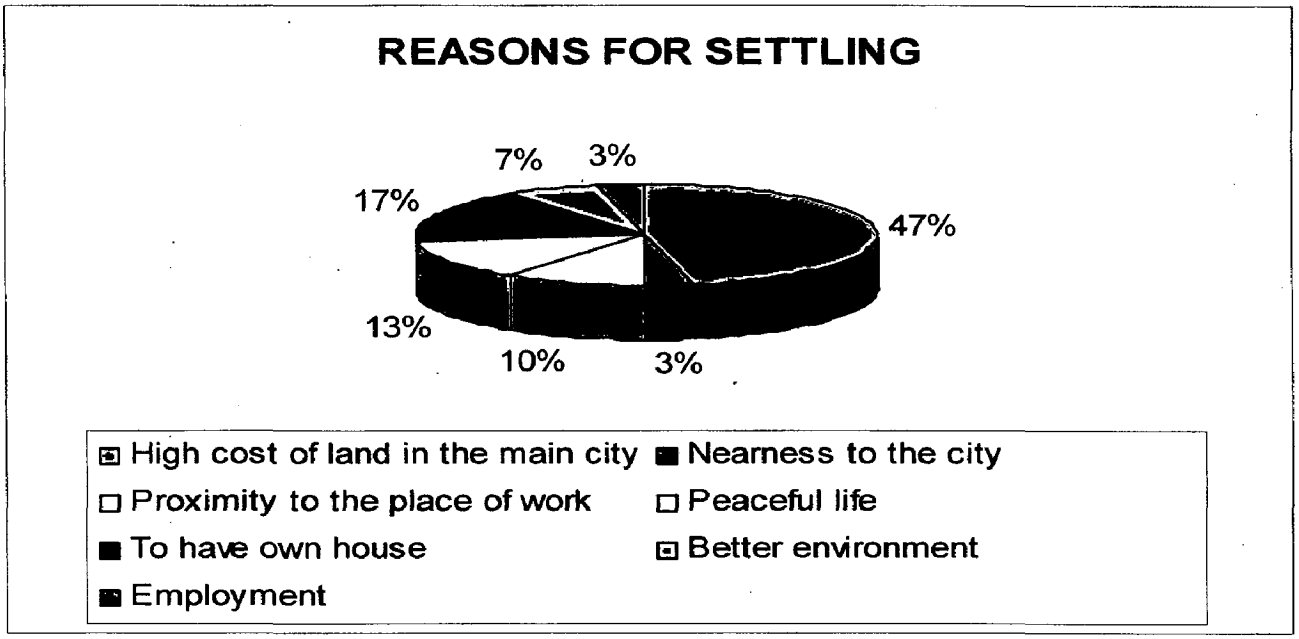


Fig 9.17 Reasons for settling in the sarvdharm colony

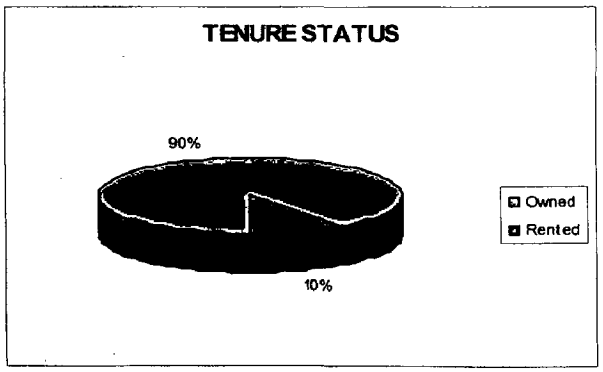


Fig 9.18 Tenure status

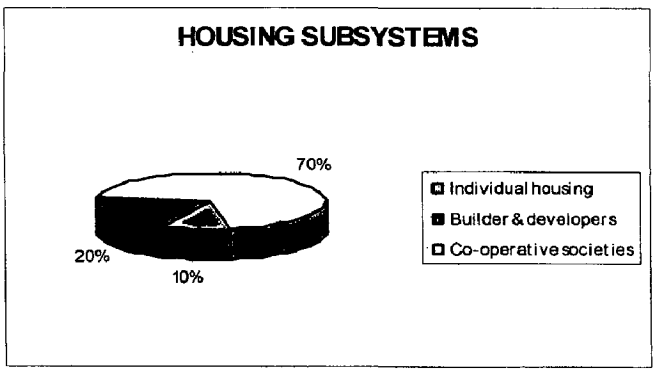


Fig 9.19 Housing subsystems

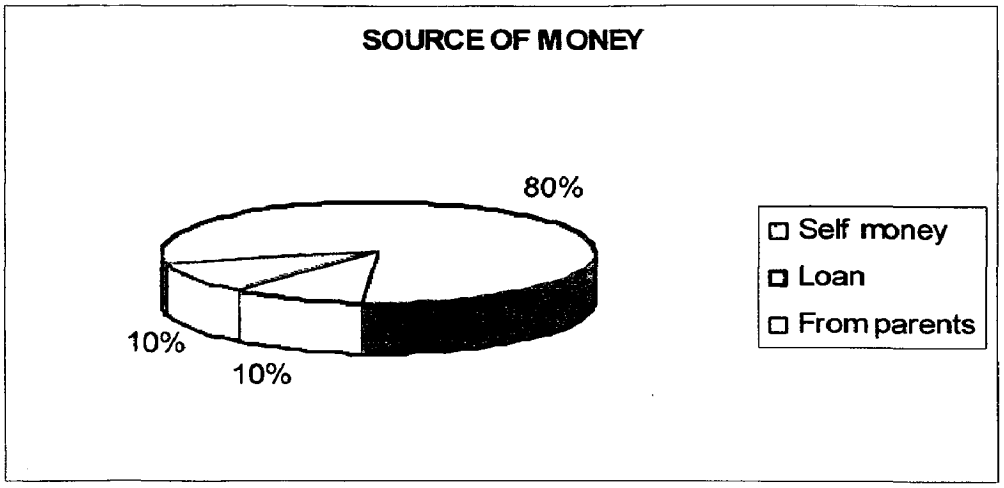


Fig 9.20 Source of money

Conclusions:

- This area comes in fringe area so no proper authority for maintenance.
- 95% of the housing is self owned and the rented housing comprises just 5% of the total housing as the area is far (fringe area) away from the city and thus rental value is low. So people don't want to invest in the rental housing.
- Housing finance – because of the loan facility people want to make their own house and in the city the cheap land is not available so people are moving towards the fringe area. On the other hand the property and service taxes are relatively higher in the city than in the fringe area.
- Electricity– Electricity provided by the Board (M.P.E.B.), maintenance is not proper as street lights are not working in most of the places
- Sewerage system is totally dependent on the septic tanks, weather it is a small bungalow or a larger scheme as no connection is available from the sewage system of the city.
- Drainage- No storm water drains.
- Security – No boundary wall around the colony and slum area is also very near to this place. People who are living in slum area go through this colony. This slum area is allotted by government.

9.2.2 Case study 2: Raj harsh colony, village - Gehunkheda

Table 9.2 Raj harsh colony

Category	Rajharsh colony
Income group	Middle
Average plot size	30'x40',20'x40', 20'x30',30'x50'
Year of approval	1984
Present land cost	600-650/ sq feet
No. of plot	334
Population	1770
Density	226 p.p.h
Total area of the colony	19.5 acre
status	authorized

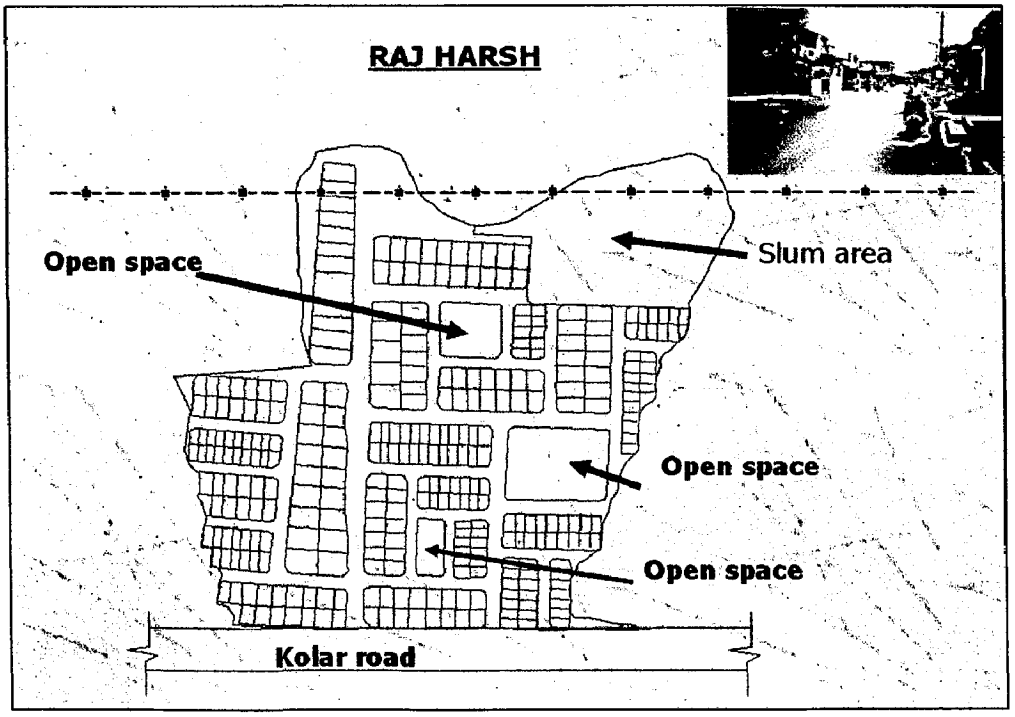


Fig 9.21 Raj harsh colony kolar road

- Land use - Agriculture but Diverted to Residential
- Development Authority - Gehun kheda gram panchayt
- Developed by – Colonizer
- Year of approval of colony - 1984

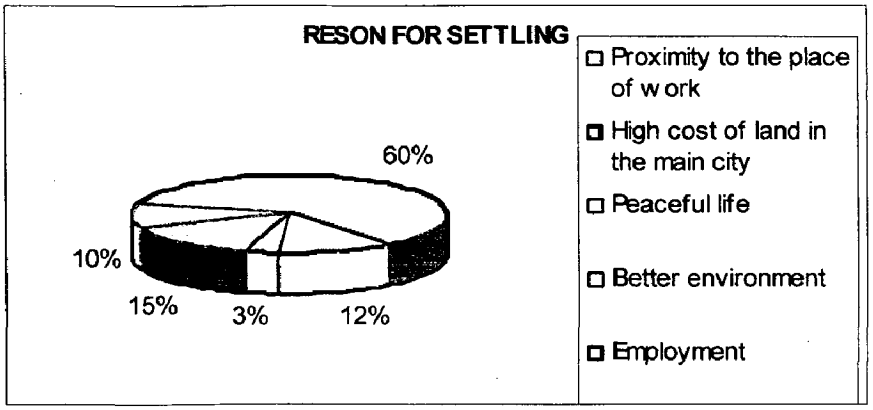


Fig 9.22 Reasons for settling: Rajharsh colony

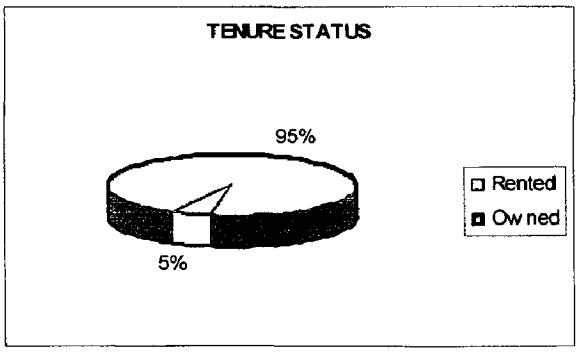


Fig 9.23 tenure status : Rajharsh colony

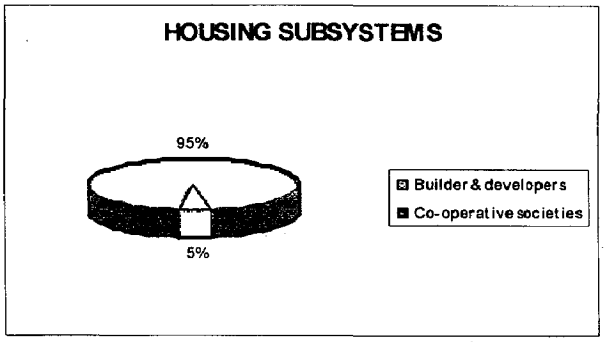


Fig 9.24 Housing subsystems: Rajharsh colony

Conclusions:

- Availability and access to finance is one of the major components of owned housing development.
- Because of vacant plots colony is not developed properly.
- The property and service taxes are relatively higher in the city than in the fringe area so people want to live in this area
- Majority of the plots are 20'x30' and it is mainly for upper lower income group.

- The kolar urban fringe area are mainly inhabited by the upper lower income groups and middle income group. The higher income groups occupy a few isolated pockets in the fringe area

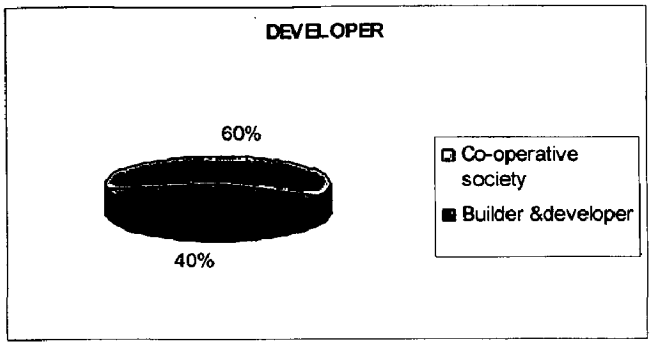


Fig 9.25 builder and developer vs cooperative society

- Builder and developer have entered the fringe housing market in the past few years only but have firmly established themselves.

9.4 VIOLATION OF MASTER PLAN

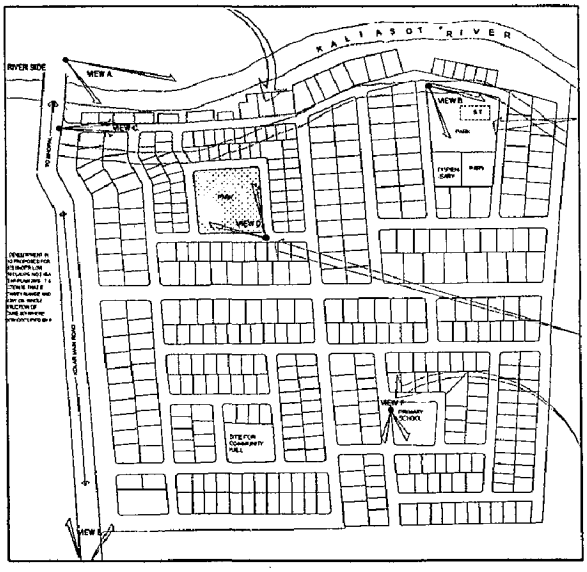


Fig 9.26 Green belt area along river side as per Bhopal development plan

Area hatched should be demolished as it comes under green belt (i.e. 100' from river bed) along river side as per clause: 4.47B of Bhopal development plan, T & CP Bhopal and also it is risky for the people as it's a question of life.

Fig 9.27 school building in sarvdharm colony

Picture showing H..S.School on the site which is to be provided for the population of 7500 to 10,000 people and for which area recommended is 1.6 to 2 hectares with reference from table no. 4.9 of Bhopal development plan 2005, T & CP Bhopal but actually area for the facility which is provided is about 0.1 hectare which is insufficient for the facility of H.S. School.

Fig 9.28 Apartment buildings Sarvdharm colony

Picture shows medium and high dense area on kolar road with most of apartment building. But according to Bhopal development plan this area should come under low density range. The development is not complying with the bylaws of the master plan and resulted in exceeded ground coverage and increased FAR.

There was a ring road proposed in the master plan to pass through the village Banjari and connecting the Bhopal city as a whole, but because of the substantial residential development , the proposal cannot be implemented.

9.5 INFRASTRUCTURE STATUS IN THE STUDY AREA

INFRASTRUCTURAL ANALYSIS : SOCIAL INFRASTRUCTURE

SUFFICIENT- ◯ **INSUFFICIENT-** ◯ **NOT REQUIRED-** ◯

	DAMKHEDA	BANJARI AKBARPUR	NAYAPURA	GEHUNKHEDA	BAIRAGARH CHICHLI
SCHOOLS	◯	◯	◯	◯	◯
HOSPITALS/ DISPENSARY	◯	◯	◯	◯	◯
BANK	◯	◯	◯	◯	◯
POLICE STATION	◯	◯	◯	◯	◯

INFRASTRUCTURAL ANALYSIS : PHYSICAL INFRASTRUCTURE

GOOD- ▭ **SUFFICIENT-** ▭ **POOR-** ▭

	DAMKHEDA	BANJARI AKBARPUR	NAYAPURA	GEHUNKHEDA	BAIRAGARH CHICHLI
ROAD CONDITION	▭	▭	▭	▭	▭
WATER SUPPLY	▭	▭	▭	▭	▭
SEWERAGE	▭	▭	▭	▭	▭
SOLID WASTE DISPOSAL	▭	▭	▭	▭	▭
DRAINAGE	▭	▭	▭	▭	▭

Fig 9.29 Infrastructural analysis (Social and Physical)

CHAPTER 10: FINAL ISSUES AND STRATEGIES

PART A: ISSUES AND STRATEGIES IN GENERAL FOR THE MEDIUM SIZED CITIES LIKE BHOPAL.

PART B: ISSUES AND STRATEGIES SPECIFICALLY DETAILED OUT FOR THE STUDY AREA.

10A.1 GENERAL ISSUES FOR FORMULATING STRATEGIES

The vision for a rural urban fringe is that it should be attractive, accessible, diverse and multi-functional and which serves the needs of both urban and rural communities, strengthens the links between town and country, and contributes fully towards sustainable development. The fringe is not just the place where town meets country but a collection of dynamic and productive environments set in inspiring cultural landscapes, meeting the needs of both the present and helping to change the way we live in the future.

10A.11 Environmental considerations

- Preserve prime agricultural land
- Protect groundwater, river and stream systems, and potable water quality
- Ensure non-agricultural land uses/development adequately addresses constraints from steep slopes and bedrock
- Preserve and protect (managed) watersheds

10A.1.2Growth considerations

- Manage residential growth in agricultural areas
- Promote sound economic development and diversification
- Manage impacts from residential, commercial, and industrial growth
- Foster efficient growth patterns and land uses
- Facilitate intergovernmental coordination
- Establish a common growth strategy that includes a shared vision for the location, type, intensity, and timing of growth
- Reach agreement on the type of services and facilities that should be provided for urban and rural development

- Support the agricultural industry
- Reduce commercial leakage
- Support health and welfare of all citizens
- Identify the necessary amount and appropriate areas for growth
- Encourage residential growth where services can be efficiently distributed

10A.1.3Community Facility considerations

- Plan for the provision of adequate public facilities and services (e.g. streets, utilities, storm water facilities, fire services/stations, etc.) to serve planned growth
- Protect transportation corridors
- Provide and maintain an efficient road system
- Minimize conflicts between agricultural and non-agricultural traffic
- Coordinate roadway and land use decisions
- Establish appropriate levels of service
- Establish equitable responsibilities for public improvements and services

10A.1.4 Regulatory considerations

- Ensure that and regulations are consistent with each jurisdiction's land use goals and objectives
- Develop consistent and appropriate regulations addressing the unique needs of urban and rural development

10A.2: OBJECTIVE FOR FORMULATING STRATEGIES

The objective of controlling the fringe development can be broadly classified into the following categories:

1. Preservation of the rural/existing character of the fringe
2. Control of the activities occurring in the fringe.
3. Growth of the activities occurring in the fringe.

All the three objectives are in a way interrelated because the fringe is a dynamic area under continuous change. Today it may be lying vacant, tomorrow it may be bubbling with activities, and in a few years it would ultimately become part of the main development.

Thus the soul and heart of our proposal rests on the premise of this continuously changing nature of fringe and the attitude and policies required.

Further, the policies and controls should be flexible enough to change with time to be in consonance with the changing objectives and should be firm enough to give a clear Direction to growth and prevent chaos.

A. PRESERVATION

There can be many proposals relating to the preservation of fringe but we do not dwell on them because the occurrence of change in the fringe is an inevitable process because of the expansion of the city. But in this thesis, we have tried to designate few areas for preservation as per their location and use which we have discussed later in this chapter.

B. CONTROL

The intension behind control is to check haphazard, uncoordinated, piecemeal development with mischievous objectives, over exploitation of land resource, over exploitation to the detriment to the user and the ultimate city.

The purpose of control is

1. To prevent degradation of the built environment.
2. To facilitate easy assimilation in the future development plans.
3. To achieve fair distribution of the cost of development between the agencies and the people.

C. GROWTH

The objectives "Growth of a fringe" will only occur as a deliberate policy when the direction of growth is specifically identified in preference to other direction as a measure of plan policy.

Under such an objective while all the elements of the objective stated above will continue to operate, the additional factors would be preferential location of social and higher level infrastructure to give a positive stimulation to the growth.

OPPORTUNITY FROM PLANNING IN URBAN FRINGE

Planning for development offers opportunities to:

- *Preserve and enhance environmental assets and ecological services;*
- *Efficiently provide infrastructure facilities and services; and*
- *Meet need/demand for certain type of lifestyle/housing choices.*

10A.3 STRATEGIES

10A.3.1 Distinction of land use classes for urban fringe areas

- Rural Service and Agricultural Conservation Area;
- Rural/Urban Transition Area; and,
- Urban Service Area.

1.Rural Service and Agricultural Conservation Area

The Rural Service and Agricultural Conservation Area are intended to be rural and agricultural in use and character throughout the life of the Plan. It should be protected from development that would damage the rural character. It is not intended for urban-scale growth. Inappropriate development includes both residential and non-residential development not characteristic of the rural community.

- ***Land Use*** The Rural Service and Agricultural Conservation Area are intended for agricultural and other very low intensity uses. Limited residential development should only occur as it relates to farming, or in select areas in a manner that

protects high-value farmland and the rural character of the area. Provisions may be made to cluster farm related developments on a limited scale; however, adequate road access and quality potable water supply must exist. All rural area development in the Rural Service and Agricultural Conservation Area should be designed to avoid interference with agricultural operations. It shall be developed in unison with the rural agricultural environment.

- ***Water and Wastewater: Since*** there will be limited growth in the Rural Service and Agricultural Conservation Area, there is not an immediate need for centralized wastewater systems. Rural development may use existing rural water supplies or well water. Wastewater may be treated with on-site systems. Agricultural activity and limited commercial/industrial development servicing the agricultural industry will be encouraged to provide on-site systems.

- ***Transportation:***The Rural Service and Agricultural Conservation Area will continue to use the existing county road systems that include dirt, gravel, and hard-surfaced roads. The government agencies generally do not pave roads or add new roads in the Rural Service and Agricultural Conservation Area unless and until increases in traffic volumes indicate the need in order to provide safe roads. System expansions must be done within the fiscal means of the county and should provide flexibility to evolve as needs and technology change. The location and design of new facilities should be compatible with municipal street networks and transportation plans. Street systems shall protect the character of existing areas. Transportation system planning is an on-going process that should be flexible, but comprehensive, open to public participation, and focused on the long-term.

- ***Public Facilities and Services:***Development within the Rural Service and Agricultural Conservation Area should not expect the same level of public facilities and services as the urban growth areas. Services shall be provided as the density of population increases, making the provision for services efficient and cost-effective. In rural areas, only the need for emergency services exists.

2.Rural/Urban Transition Area

The Rural/Urban Transition Area is to accommodate rural development that can also be accommodated within municipal jurisdiction at some time, perhaps beyond the life of the Plan. This area coordinates public preferences for broad choices in rural development with orderly and efficient future transition between land uses within municipal limits and unincorporated areas. These areas are not necessarily expected to be developed under sole municipal jurisdiction during the life of the Plan, but because of their proximity and/or juxtaposition in relation to city limits, development of these areas must be carefully orchestrated to be compatible with city development patterns.

The Rural/Urban Transition Area represents a critical intersection of village and city land use policies. Lands in the Rural/Urban Transition Area, if developed appropriately, can contribute to efficiently meeting the needs of the City to grow, while also helping to meet the market demand for larger residential lots in a rural setting. Lands identified for future industrial or commercial use are also included in the Rural/Urban Transition Area, but not all of this land should be utilized this way.

- ***Land Use:***The Rural/Urban Transition Area should intend to create as smooth transition as possible between rural and urban areas. Residential land uses occur, in some cases, at a density more typical of rural areas, while in other areas where city expansion is more likely in the near future, residential density is more typical of an urban area. Likewise, urban infrastructure standards may be applied in certain critical areas, while other areas are subject only to the minimum urban standards necessary to smooth potential transition into city limits in the distant future.

- ***Water and Wastewater:*** The provision of water and wastewater services in the Rural/Urban Transition Area will need to be carefully orchestrated to ensure that the needs of all cooperating communities are met, while unnecessary expenditures on urban-type services are eliminated where urban expansion is not anticipated in the near future. In certain areas, the installation of dry sewer and water services

may be necessary to ease the future rural-to-urban transition of development. In all cases, the cooperating communities will need to implement strategies that ensure the environmental soundness and health of on-site wastewater treatment systems and private water sources.

- ***Transportation:*** The existing rural road systems that include dirt, gravel, and hard-surfaced roads, will continue to be utilized within the Rural/Urban Transition Area. However, developer-funded additions to the road system are probable in keeping with city and county subdivision improvement standards.The location and design of new facilities should be compatible with the Cities street networks and transportation plans. Street systems shall protect the character of existing areas. Transportation system planning is an on-going process that should be flexible, but comprehensive, open to public participation, and focused on the long-term.

- ***Public Facilities and Services:*** Development within the Rural/Urban Transition Area should not expect the same level of public facilities and services as the urban growth areas of the City .New public facilities and services should be built and provided in the urban growth areas as the cities develop. Services shall be provided as the density of population increases, making the provision for services efficient and cost-effective. In rural areas, the affected county will maintain its existing levels of law enforcement and emergency services.

3.Urban Service Area

The Urban Service Area contains the lands into which the city may expand their municipal boundaries as development occurs. This area is adjacent to city limits and should be planned for urban development, with urban development standards, such as centralized water and wastewater services. These areas should be protected from any form of development that would constrain the efficient growth of the communities.

Inappropriate development includes low-density residential lots served by on-site wastewater treatment systems and other forms of rural development. This will enable

The city to grow in unison with the growth in the Urban Fringe, in an orderly manner where there is coordination of annexation with the timely and efficient extension of public facilities and services.

- ***Balanced, Smart Growth:*** Rural and city residents are affected by large lot, scattered development in the Urban Fringe. Development that occurs in a disorderly, unplanned pattern can create barriers to planned expansion of infrastructure and city boundaries. Infrastructure is expensive and barriers add unnecessary costs to the expansion and extension of services.Unplanned, sporadic residential growth also consumes areas ideal for agricultural uses. There are areas within the Urban Fringe where high value agricultural land needs to be preserved. There are also natural areas that are negatively-affected by residential development. Sprawling development increases the area of conflict between agricultural uses and residential development. Cities are expected to grow beyond their current boundaries. Property owners in the Urban Fringe have reasonable expectations for the extension of centralized water and sewer service in the future. Developed rural water suppliers provide rural levels of service; however, limited capacity for adequate fire protection exists.

- ***Development in Identified Growth Areas:*** Identified growth areas delineate locations where the communities expect to support growth over the next 30 years. Development within these growth corridors will be required to provide the necessary infrastructure to support the expanding urbanized population. If interim development is allowed, it should not create a barrier to future infrastructure expansion and growth. Such development should entail explicit development and annexation agreements and may require the installation of "dry" sanitary and sewer systems – meaning installing the necessary water and sewer infrastructure that will eventually connect to municipal services. Involuntary annexation should not occur unless it is determined that the affected community has sufficient capacity to serve the location with municipal infrastructure and services, including but not limited to public safety services, water, sewer, and road

maintenance. However, reasonable availability of adequate municipal water and wastewater service does not mean that infrastructure will be extended to each vacant parcel. It means that the affected community, in review of the annexation, should be provided for the extension of utilities to existing developed parcels.

- ***Rural Planning and Development Regulations:*** Rural residential development may consume valuable farmland, generate public services demands usually exceeding revenues from the development, often interfere with normal farm practices, and increases pressure on the conversion of farmland. Designated areas for rural development avoid creating barriers to the long-term growth of the City and the preservation of valuable farmland and farm economy.

- ***Fiscal Planning***: Development patterns impact the ability of city to provide public facilities and services generated by new development. The establishment of impact fees or "pay-as-you-grow" programs for new growth may be necessary to promote development in designated areas. Service and infrastructure capacity should be in place to serve designated growth areas. Development outside of service areas is costly and should be avoided or should be required to pay the expense of inefficient growth.

10A.3.2Land-use designation

1. Land Use Designations for Rural Service and Agricultural Conservation Area

- ***Agriculture and Farm Service:*** Farming and agricultural production is the predominant characteristic of areas given the Agriculture and Farm Service designation. The designation encompasses large areas of highly valuable farmland. All industrial or commercial uses within this designation are dependent upon proximity to agricultural land use for their viability and are strategically located to support the continued use of these areas for farming and agricultural production. Subdivisions for new residential development lots are not anticipated within the Agriculture and Farm Service designation.

- ***Agricultural Preservation Area:*** Comprised primarily of highly valuable farmland, like the Agriculture and Farm Service Area, this area is intended for farming and agricultural production. In addition, this area serves the important function of permanently separating the urban areas allowing both retaining and improving their unique community characteristics and identities.

- ***Rural Residential:*** Residential land uses within Rural Residential designated areas are developed at a rural density and in areas where urban infrastructure may not be in place for a time period. Therefore full urban infrastructure standards are not required. But infrastructure facility at village standards should be facilitated. Clustering of residential land shall be encouraged to limit the short-term and long-term costs associated with infrastructure improvements and the distribution of public services.

- ***Parks and Open Space:*** This designation involves public or private areas for recreation that do not fall within areas designated as natural resource areas.

- ***Rural Enterprise:*** The Rural Enterprise designation identifies areas within the Urban Fringe that are appropriate for commercial and industrial land uses not necessarily associated with agriculture. The designation encompasses instances of existing industrial or commercial land use and locations ideal for industrial or commercial enterprises that would benefit from the rural setting of the area. Urban services are not required, nor often expected to be available or feasible during the life of the Plan. The designation capitalizes on the benefits of rail and highway access, isolation from urban levels of traffic and development, and quick access to agricultural products and commodities.

2.Land Use Designations for Rural/Urban Transition Area

- ***Rural Transitional Residential:*** Residential land uses within the Rural Transitional Residential designated areas are developed at a rural density and in areas where urban infrastructure may not be in place for a time period beyond the Urban Fringe Plan. Therefore full urban infrastructure standards may not be required. But infrastructure provided should meet the village standards. Clustering of residential land shall be encouraged to limit the short-term and long-term costs associated with infrastructure improvements and the distribution of public services. Rural Transitional Residential land uses should be strategically-located in targeted areas and provide for an orderly and efficient future transition between land uses within municipal limits and the village. Rural Transitional Residential land uses shall make provisions to protect environmental resources or environmentally-sensitive areas. Storm water run-off, soil erosion, and wastewater discharge from Rural Transitional Residential land uses must be mitigated and managed.

- ***Priority Transitional Residential:*** Residential land uses within Priority Transitional Residential designated areas are developed in proximity to the city boundaries and therefore require a greater degree of urban infrastructure standards. Urban right-of-way standards, urban street construction design and specification, and urban subdivision standards are required. Clustering of residential land shall be encouraged to limit the short-term and long-term costs associated with infrastructure improvements and the distribution of public services. Priority Transitional Residential land uses should be strategically-located in targeted areas and provide for an orderly and efficient transition between land uses within municipal limits and the village Priority Transitional Residential land uses shall make provisions to protect environmental resources or environmentally-sensitive areas.

- ***Gateway Protection:*** Entries into the City are extremely important to the community. Entries provide the opportunity to enhance the perception of an arrival into the community and link major areas or activity centers. Within this designation, entries shall be well defined and designed to accentuate access to major areas and activity centers. This designation includes areas that should have distinctive design characteristics to enhance the aesthetics of community "gateways" or entry areas. Aspects of Gateway Protection areas should include, but not be limited to, more restrictive signage regulation, higher landscape standards, building placement standards, limited parking in front of uses, compatibility standards that promote the continuation and preservation of distinctive design elements associated with the gateway/interchange area.

- ***Highway-Oriented Commercial:*** This designation applies to commercial land uses along arterial corridors that are primarily designed to accommodate the automobile. Highway-Oriented Commercial areas are located along high traffic transportation corridors and require urban transportation infrastructure to meet the demands of high vehicular movement. Depending on the commercial use, such as a restaurant, water intensive uses, or places designed for the gathering of people, other urban infrastructure standards like wastewater treatment and potable water distribution of sufficient size to support emergency services is necessary. Clustering of uses is preferred to limit the short-term and long-term costs associated with infrastructure improvements and the distribution of public services. Highway-Oriented land uses should be strategically-located in targeted areas and provide for an orderly and efficient transition between land uses within municipal limits and the county. Storm water run-off, soil erosion, and wastewater discharge form Highway-Oriented Commercial land uses must be mitigated and managed.

- ***Transportation Corridor Protection Area:*** Like entries into a community, major transportation corridors provide for the opportunity to enhance the perception of an arrival into the community and link major areas or activity centers. The type and aesthetics of development along a major transportation network bears much influence on the perception of travelers along the network. Furthermore, major transportation networks provide the necessary infrastructure for more intense land uses. Transportation corridors are essential for the future growth of an area. If development is not strategically located within transportation corridors, it can have negative impacts on the future development of traffic intensive land uses and/or prohibit efficient and cost effective use of future transportation networks. This designation delineates areas along highway and interstate corridors that require further scrutiny and transportation planning before development is permitted to occur.Transportation plans and the plans for high traffic land uses of all jurisdictions shall be taken into account before development is permitted within these designated areas.

- ***Industrial Reserve:*** Areas designated as Industrial Reserve indicate long-range planning objectives, and are intended to accommodate future demand for new industrial growth beyond the life of the plan. Until such time that the utilization of Industrial Reserve lands is necessary to accommodate industrial growth, predominate land uses in these areas are agricultural in nature.Rezoning or development of Industrial Reserve areas is not anticipated during the life of the plan unless significant development of Planned Industrial areas has already occurred, or unless it can be demonstrated that significant public benefit would be gained from such development.The urban level design requirements and service standards required in areas designated Planned Industrial will also be applicable to the Industrial Reserve Areas when development is eventually proposed.

- ***Natural Resource*** Natural Resource areas are vital to the region. They provide habitat for wildlife, minimize storm water run-off, stabilize soils, modify climatic effects, provide for visual attractiveness, and serve some recreational purposes. This designation seeks to conserve natural resources. This designation is intended to prevent development encroachment, or encourage greater mitigation standards. A buffer or other mitigation device may be necessary to fully protect Natural Resource areas. Natural Resource areas may be composed of the following features and locales that intermingle with each other:

    1. **Environmentally Sensitive Areas** – flood-prone areas, wetlands, water bodies, areas of steep slopes and sensitive soil conditions, and other designated areas that should be protected from detrimental impacts from other land uses.

    2. **Parks and Open Spaces** – facilities, land, and/or structured programs for a variety of public recreational opportunities. The term "Open Space" refers to primarily undeveloped areas; such areas are typically maintained and managed as natural areas for passive recreational uses.

    3. **Future Parks** -- general areas where future parks are anticipated.

    4. **Greenways** -- stream ways, parks, improved and unimproved trail systems, and open spaces that provide linkages that in effect create a continuous "greenway" or recreational system. Greenways provide recreational linkages in both rural and urban areas.

Particular features in the Natural Resource areas often are appropriately described by more than one of the above labels. This is a reflection of the multiple benefits of, and the diversity of landscapes represented in the areas designated Natural Resource. Regardless of type, Natural Resource Areas are protected from negative land use impacts.

Sources of negative impacts to Natural Resource Areas that should be mitigated include, but are not limited to, the following uses: agricultural chemical application, animal confinement and feeding, agricultural irrigation, miscellaneous agricultural activities like manure and fuel storage, improper and non-functioning on-site wastewater systems, underground storage tanks, and nutrient-loaded urban storm water run-off.

3. Land Use Designations for Urban Service Area

- ***Urban Residential:***This land use designation applies to areas reserved for future city growth. Residential land uses within Urban Residential designated areas are developed at an urban density and all urban infrastructure and subdivision standards are required.

- ***Community Commercial Node:*** It is recommended that future community-scale commercial activities be associated with nodes. A cluster of mixed commercial uses typically associated with one or more arterial streets is representative of a Community Commercial Node. Higher acreage and building intensity is recommended only where there is an exceptional concentration of residents.Uses within the nodes should be more selective than those permitted in highway oriented commercial. The intent is to create a shopping and services area where there is shared attraction involving one vehicular trip to two-or-more destinations within a node Clustering of uses is required to limit the short-term and long-term costs associated with infrastructure improvements and the distribution of public services. Community Commercial Node land uses should be strategically located in targeted areas. Storm water run-off, soil erosion, and wastewater discharge from Community Commercial Node land uses must mitigated and managed.

- ***Convenience Commercial Node:*** Convenience Commercial Nodes represent areas for neighborhood scale commercial development for conventional suburban residential developments. Depending on the intensity of commercial use within

the neighborhood commercial nodal location, urban infrastructure standards may immediately apply. Temporary common water distribution systems, such as wells or rural water services, must also meet standards. Clustering of uses is required to limit the short-term and long-term costs associated with infrastructure improvements and the distribution of public services. Convenience Commercial Node land uses should be functionally and aesthetically compatible with surrounding residential land uses, and be strategically located in targeted areas.

- ***Planned Industrial:*** Planned Industrial is a designation intended for clustered industrial uses. Such areas involve the integration of uses, access, and appearance. Areas designated Planned Industrial should be located near limited access thoroughfares and/or major railroad systems to accommodate the transportation of industrial goods and services. This designation requires landscape and earthen buffering of industrial activity, including parking areas, assembly yards, storage locations, and the like. Buildings within this designation should front major thoroughfares to minimize the appearance of industrial operations and enhance the aesthetics of the road corridor.Industrial land uses are strategically located to minimize environmental impacts and conflict with residential land uses. Furthermore, industrial uses should be timed according to suitable infrastructure and services and not impose extraneous impacts on the city's resources. Clustering of uses is preferred to limit the short-term and long-term costs associated with infrastructure improvements and the distribution of public services. Planned Industrial land uses should be strategically located in targeted areas and provide for an orderly and efficient transition between land uses within municipal limits.

- ***Regional Commercial:***Regional Commercial is a designation for areas associated with major retail services centers near limited access thoroughfares. Uses allowed within this designation are large in commercial scale.

10A.3.3 Creating a separate development agencies for urban fringe areas:

Within the urban fringe areas, Panchayat is the smallest unit with the same responsibility structure as that of municipal corporations. Although constitution 73rd and 74th amendment acts gives more responsibility to the panchayat , but due to their poor administrative set up, poor financial status and lack of technical staff, they are institutionally weak in playing their role. Because of the pace of urbanization and infrastructure requirements in the urban fringe areas and to mitigate overlaps in the functions of various systems of panchayat, municipalities and other development agencies, creation of a specialized urban development agency/authority for urban fringe area is necessary.

The functions of the urban fringe authority will be:

- ✓ Implement a macro Structure plan for urban expansion, and assist the local authorities in the planning of macro developments within their geographic areas of authority.
- ✓ Coordinate the implementation of major trunk infrastructure with other relevant ministries.
- ✓ Provide technical support to communities in the planning stages.
- ✓ Approve changes in the community contracts.
- ✓ The peri urban authority would have jurisdiction over all land that is not presently within an urban boundary but which falls within the accepted definition of the peri urban area.
- ✓ Develop a general land use plan for the area with due regard for neighboring developments.
- ✓ Determine acceptable minimum standards for the community on environmental hygiene, building regulations, disposal of sewage and rubbish, zoning, subdivisions etc with full participation of community members.

The PUA should enforce:

- Settlement of boundary disputes.
- Enforcement of bye-laws
- Enforcement of settlement laws and tenancy

- Enforcement of the land use plan
- Right to impose fines on settlers and tenants who do not conform to the rules
- Right to request eviction of settlers and tenants after references to thr PUA.

10A.3.4 Information system:

Geographic and land information systems to be introduced and maintained providing generally available data on:

- Land tenure, boundaries between forms of tenure
- Practices for managing land, including such data as required for land market assessment.
- Spatially related population growth trends
- Physical development: Service infrastructure(Roads, pathways, water supply sewerage), Social infrastructure(schools, health centers, community facilities), structures(housing, owner occupier, rental)
- Administrative boundaries/ Jurisdictions, physical conditions (Landforms, climate, soils, land suitability etc)

10A.3.5 Formulation of Financial strategies:

Financial strategies can formulate on the basis of revising service charges. Aim is to make the system self reliant and self-financing at some extent. Financial resources of Villages are various grants at state and central level, revenue from land, service charges and house tax. Etc. At some extent user charges can revise in these urban fringe villages against providing sufficient infrastructure facilities. Thus it will help in improving quality of life and reducing burden on local authority.

10A.3.6: The major roads radiating from the Bhopal city connecting other urban centers are experiencing the change in land use from rural to urban as a consequence of urbanization. The traffic on the major links has become heterogeneous reducing the speed of thorough traffic.

Because the Urban fringe growth has taken place along the major corridors in Bhopal city, the interlinking of the major corridor can help in even development.

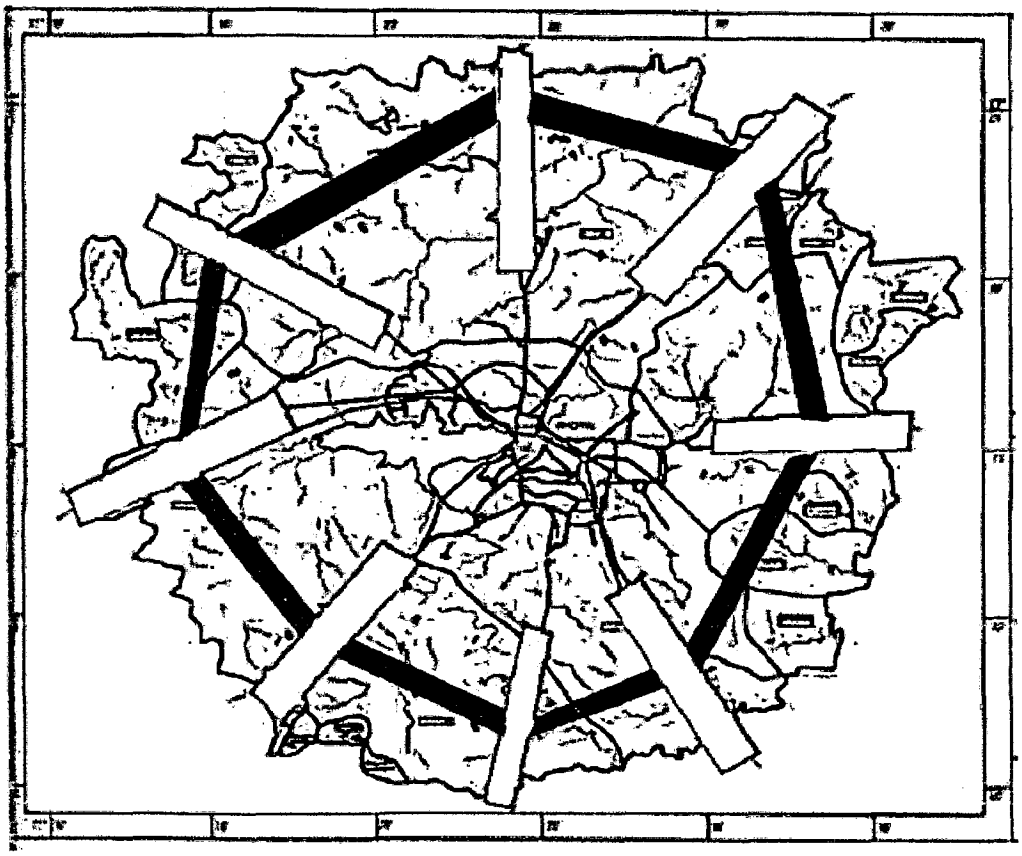


Fig 10.1 Proposal to reduce the urban sprawl along the major corridors

10B.1 ISSUES (in context with the study area)

10B.1.1 Kind of development:

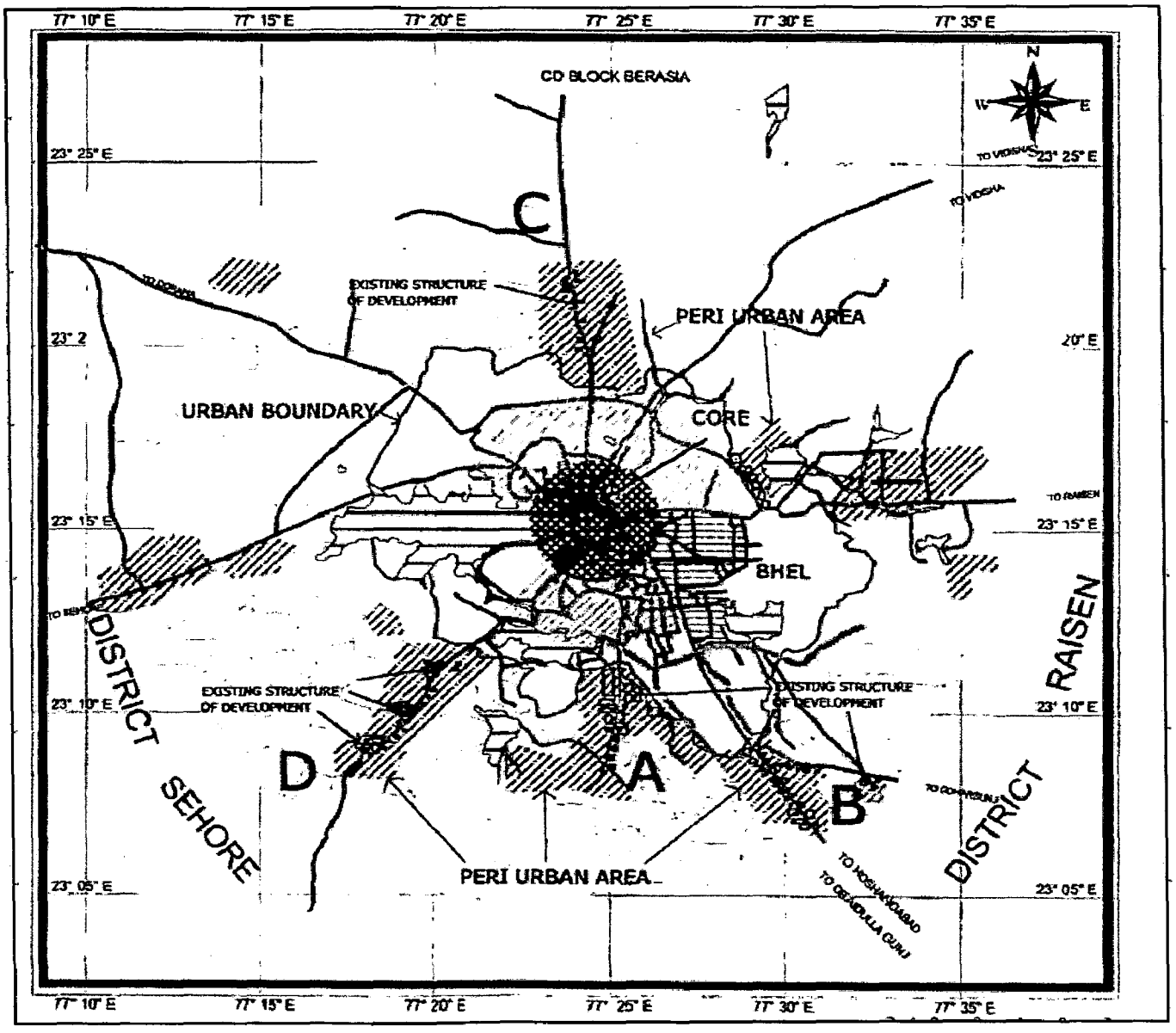


Fig 10.2 Peri urban area

KOLAR ROAD FRINGE

KIND OF DEVELOPMENT : Leap frog
PROXIMITY TO THE CITY: Proximate
NEED FOR CHANGE : High
PACE OF ADAPTION : Fast

The development at the Kolar road is leap frog development and is mainly comprises of two types of residential development namely: three or four stories residential apartments, low rise individual plots of mainly single or double floors. The development is acquiring a mixed type of sprawl and is not complying with the bylaws of the master plan and thus resulted in exceeded ground coverage and increased FAR. The predominant land use is residential due to proximity with major work centers of the city, cheap land values as compared to other parts and heavy traffic free nature of Kolar road.

L.E.A.P.F.R.O.G. development can be defined as:

Least
Expensive
Available
Property
Forces
Reckless
Objectionable
Growth

In other words, an extreme form of sprawl.

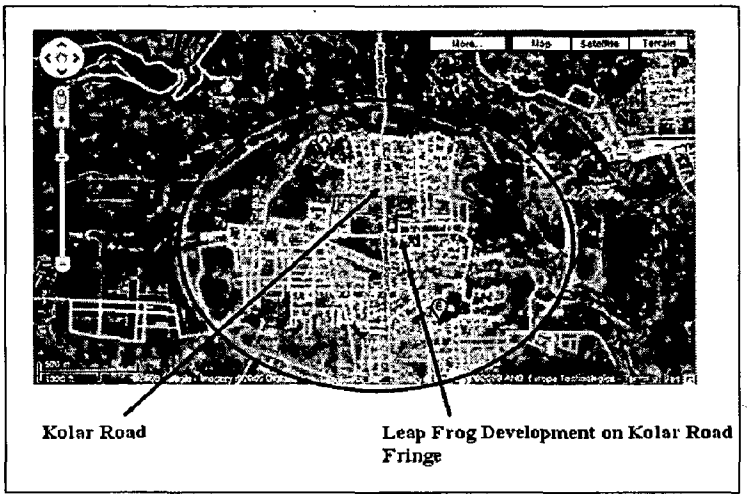


Fig 10.3 Leap frog development: Kolar Road

Leapfrog development is an even more inefficient use of land than sprawl. That's because it skips over available land and gobbles up large areas. Development leaps to outlying and isolated areas because the cheapest land is at the farthest distance.

Less expensive land is more attractive to builders.

However, the infrastructure costs are greater- more freeways and arterials, more pipe for sewer and water, fewer homes and jobs serviced, etc.

Leapfrog development bypasses concentrated development areas already served by public facilities and services. It creates disconnected development that places additional demands on an already overburdened public infrastructure.

10B.1.2 Infrastructural Issues

- The water supply is not being provided by the city authorities so people in the study area fulfill their requirement through private bores.

- The storm water drains through natural slopes, over the streets as there is no road side storm water drains.
- Solid waste is also handled at private level and dumped in vacant sites.
- Road condition is very poor in the villages of study area even the main road that is Kolar road is in deteriorated condition.
- Though quantity wise there are sufficient schools in the study area but there is a shortage of good schools and institutions.
- The absence of a proper commercial center pushes people towards the city for shopping purpose and other daily needs.

10B.1.3 Administrative Issues

- The study area is lying outside municipal limits of the city in spite of the rapid pace of urbanization and more and more people opting for it for residential accommodation.
- The overlapping functions of Gram Panchayat and TCPO also make it easy for people to get through the permission process.
- Absence of legal control resulted in unplanned development.
- The development plan proposals are not based on ground reality due to lack of extensive survey of the study area.

10B.1.4 Physical issues

- Land is subdivided in any shape or size. Often it is in the form of thin strips of land which is neither fit for agriculture nor for urban use. These subdivisions of land in irregular chunks are made without any consideration of approach or serviceability.
- The increase in land values in the adjoining planned development encourages sub divisions and hastens the process of urbanization in the fringe. The process of subdivision starts with the desire of people to demarcate their property in the face of rising land values. Subsequent to division the properties are totally misfit for agricultural use and therefore reach the urban investor who tries to reassemble them.

- The management of subdivision of land and infrastructure proportionate to development is neither coordinated nor governed by any specific law and control.
- Existing infrastructure is normally meager and barely enough to sustain the load of the rural settlement. The ingress of urban functions causes abnormal strain both physically and financially on the rural body.

10B.2 STRATEGIES REGARDING THE ABOVE DRAWN ISSUES

- Leapfrog development is evidenced by patchy development on the outskirts of the community and numerous overlooked vacant parcels. One of the most strategic ways to limit leapfrog development is to identify and utilize existing vacant land with full services. Establishing an inventory of vacant land with information on key parameters such as allowable uses, ownership and public facilities would be instrumental in the success of efforts to prohibit leapfrog development.

- As opposed to allowing spontaneous growth and continued sprawl, new growth should be encouraged to take place within the existing city fabric at planned locations or nodes and should be strongly discouraged in other locations.

- **Facilitating private sector participation in land development(In context of study area):** Bhopal is a fast growing city and will definitely face increase in population as well as housing demand and as discussed earlier; the study area is the most preferred area for residential development. It is suggested that it will be more advantageous to develop private townships with its own infrastructure facilities rather than scattered small scale development. Urban fringe areas are dependent on mother city for jobs and services. To develop this infrastructure the urban fringe areas should have a certain threshold population. Since the most important sector for urban fringe areas of Bhopal is private housing which is provided mainly by private builders and developers in form of housing colonies. It is recommended that the private townships should be permitted for certain

threshold population and for a certain size say 100 acres(min) so that infrastructure facilities can be provided.

- **Creating separate development agencies for urban fringe areas:** Because of the pace of urbanization and infrastructure requirements in the urban fringe areas and to mitigate overlaps in the functions of various systems of panchayat, municipalities and other development agencies, creation of a specialized urban development agency/authority for urban fringe area is necessary.

  The functions of the urban fringe authority will be:

  - ✓ Implement a macro Structure plan for urban expansion, and assist the local authorities in the planning of macro developments within their geographic areas of authority.
  - ✓ Coordinate the implementation of major trunk infrastructure with other relevant ministries.
  - ✓ Provide technical support to communities in the planning stages.
  - ✓ Approve changes in the community contracts.
  - ✓ The peri urban authority would have jurisdiction over all land that is not presently within an urban boundary but which falls within the accepted definition of the peri urban area.
  - ✓ Develop a general land use plan for the area with due regard for neighboring developments.
  - ✓ Determine acceptable minimum standards for the community on environmental hygiene, building regulations, disposal of sewage and rubbish, zoning, subdivisions etc with full participation of community members

- **Provision of Infrastructure:** The provision and development of infrastructure facilities and public utilities is the major aspect that governs further development of any region. In today's context such facilities are provided by the Gram Panchayat, which is quite insufficient and below the standards. So, to have enriched and homogenous development of the region such infrastructural facilities should be developed using following strategies:

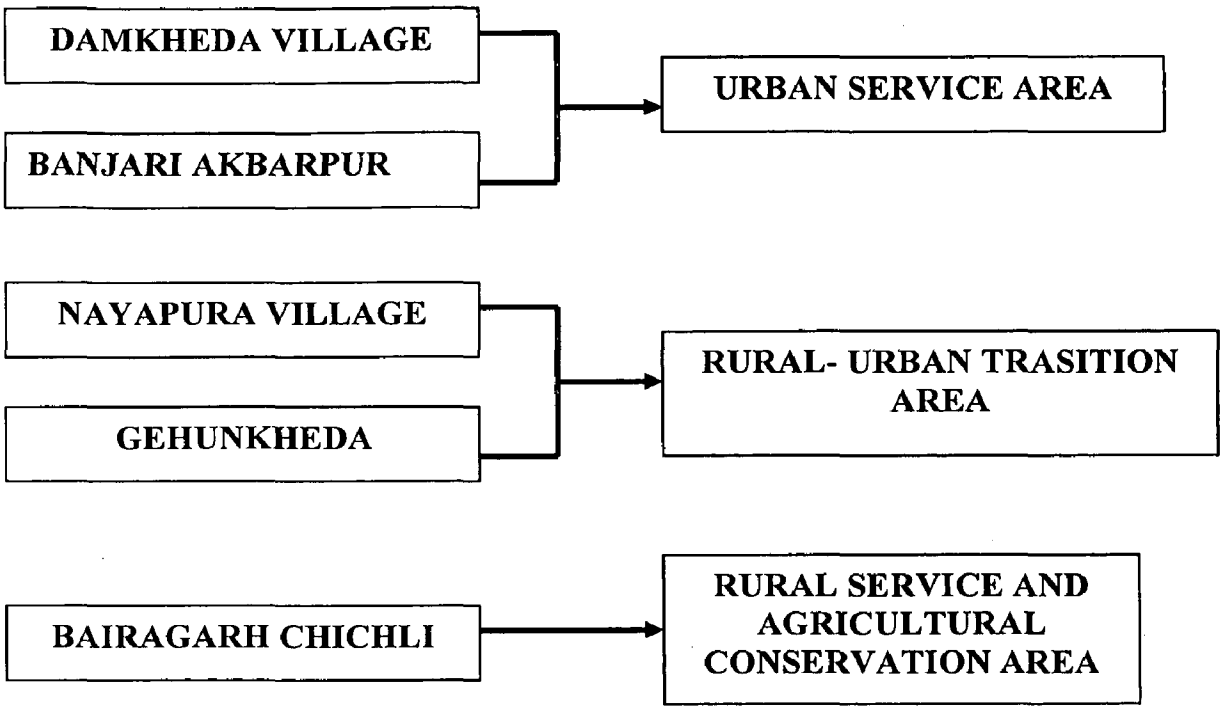
1. All existing facilities which may need improvement (structural, aesthetical /any other) will be identified by the appropriate authorities concerned.
2. All existing facilities, which have scope for expansion to serve the population satisfactorily, need to be planed by the appropriate authority and expanded to meet the community requirements.
3. Wherever possible and necessary, an existing facility shall be converted to perform higher/lower function within its hierarchy to increase the utility of the units and/or to support the corresponding function hierarchy in the area.
4. In areas with limited expansion possibilities, as a policy decision, multiple uses should be allowed at a single location to increase the utility, compliment the functions and reduce the costs. For e.g. operating a school in two shifts to conduct classes for different levels and/or sexes, combining a mother and children care center with a polyclinic/district hospital, etc

- **Vacant plots:** People buy plots and construct later. Many plots are lying vacant in the study area and plots were also bought for speculation and investment and changes hand 2 to 3 times because of which facilitating infrastructure becomes difficult. Thus there should be proper regulation for construction of dwelling units within a limited time say 2 years. Development of colonies should be divided into two stages, first stage (70%) should be kept for construction and second part (30%) should be reserved for investment.

- **As discussed earlier designation of fringe area in three distinct classes can be proved as a working strategy for the planners as well as the residents. According to the site potential these classes can be divided further for different specific land uses (related to fringe areas). Though the study area**

had already undergone leapfrog development, it is difficult to allot further distinct classes for the vacant sites as this kind of development leaves narrow and irregular land behind, but still here is an effort to allot distinct classes to the study area and to designate certain land uses as per the site potential.

Land use classes



Proposed Land use class allotment for villages

- The Rural character of Damkheda village is completely vanished and high density high rise development in comparison to the city of Bhopal has come up here. As we have discussed earlier that the village is having maximum population and it is the nearest village to the city than other villages it can be considered under the class of "Urban service area". The Land use designation for this area shoul be according to this class.

- The village Banjari akbarpur is just next to Damkhada village on Kolar road. Now developers are continuously seeking land in this village for further development. Though the rural character of the three villages ie Banjari akbarpur, Nayapura, Gehunkheda is not completely vanished but urban character is dominating here. As it is discussed earlier that population of Bhopal is increasing and southern part of the city is the most preferable part for the people to live. After Damkheda, Banjari akbarpur is the nearest village to the city. The population of Damkheda is more than double of this village and thus it can be concluded that like Damkheda, Banjari akbarpur will also get fully urbanized ver soon. So this village should also be considered under the class of urban service area as there is an opportunity of systematic development of Residential as well as other land uses.

- Village Nayapura and Gehunkheda are also loosing their rural character day by day. But as we can see in the Fig the kaliasot river is passing through these villages and the adjacent land to the river is agricultural land and thus it should be preserved as it is near by the source of irrigation. On the other hand rural character still exists here and it should be maintained. So these villages should come under the class of "Rural urban transition area" and the land use designation of this area should be according to its class.

- As it is discussed earlier that the village Bairagarh chichli is the only village in the study area which shows dominating rural character, and thus it should be preserved. Till now no any residential colony has come up in this village only few individual plots have brought some tint of urban character. Hence "Rural service and agricultural preservation area" class has been allotted to this village.

Land use designation

It is clear from the study that Kolar road fringe is already suffering from the consequences of Haphazard development. Designating an area for a particular land use

works more efficiently if there is no development before. Land use designation after considering all aspects of a city or a village results in systematic and compact growth. But as there is already development in the study area it is a bit difficult to designate areas for different land uses, still we have tried to designate landuses for certain areas which can help to manage growth up to some extent.

A) The area between the Damkheda village and Bhopal city on either side of the Kolar road is getting squeezed because of the expansion of the city.

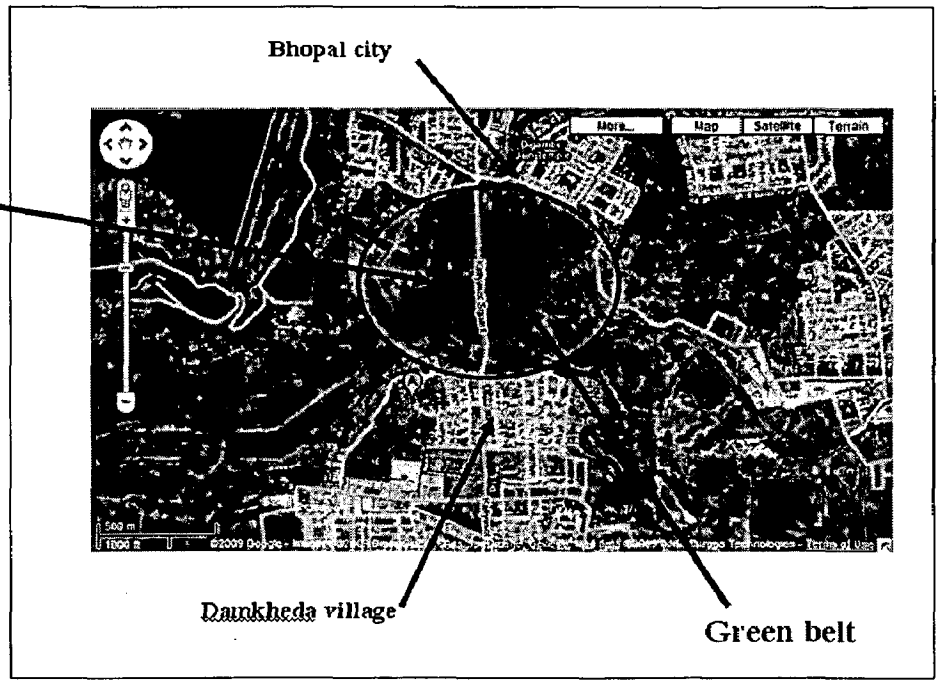


Fig 10.4 Green belt between Damkheda village and Bhopal city

The area is already developed as green belt and the land use designated to it is" thick forest area" or it can be developed as a "landscaped open space" for recreational purpose as Kaliasot river passes through it will also act as a positive feature. This will reduce the further expansion of city and encourage compact development of city for optimum utilization of land. This will also preserve and improve the environmental conditions of the city.

B) The area comes under Banjari Akbarpur village. Most of the agricultural land near the river is already occupied by residential development and rest will also get occupied by other developments as this village is now the target of the builders and developers after Damkheda. Therefore this area is designated as "recreational area" as there is no any well maintained park in the study area.

Designated as Recreational area

Fig 10.5 Designated Recreational area

C) This area is designated as "Agricultural conservation area" as the area is adjacent to the river which is a good means of irrigation as well as soil here is also very fertile. One canal is also passing through the village Bairagarh chichli. Earlier this canal serves the other villages also but now it is only serving the surrounding area as residential development has come up in the agricultural land.

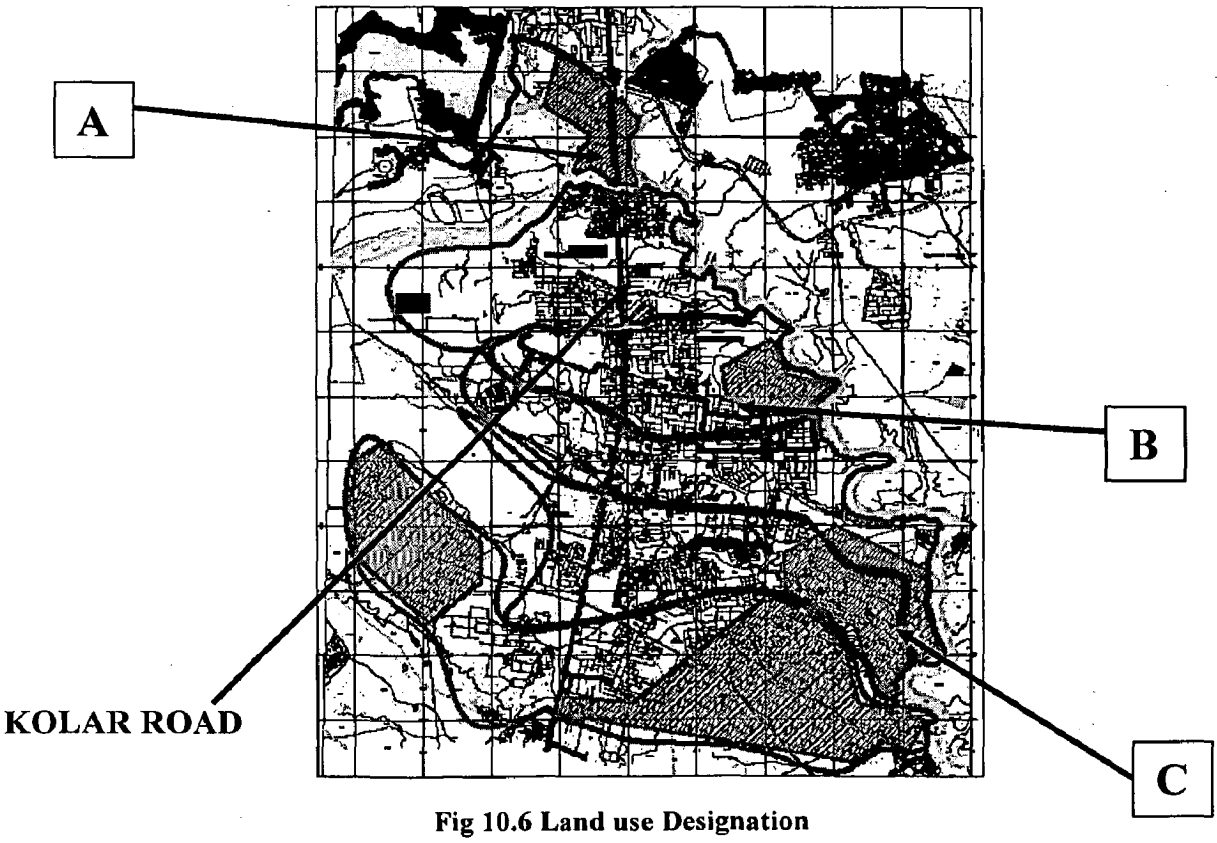
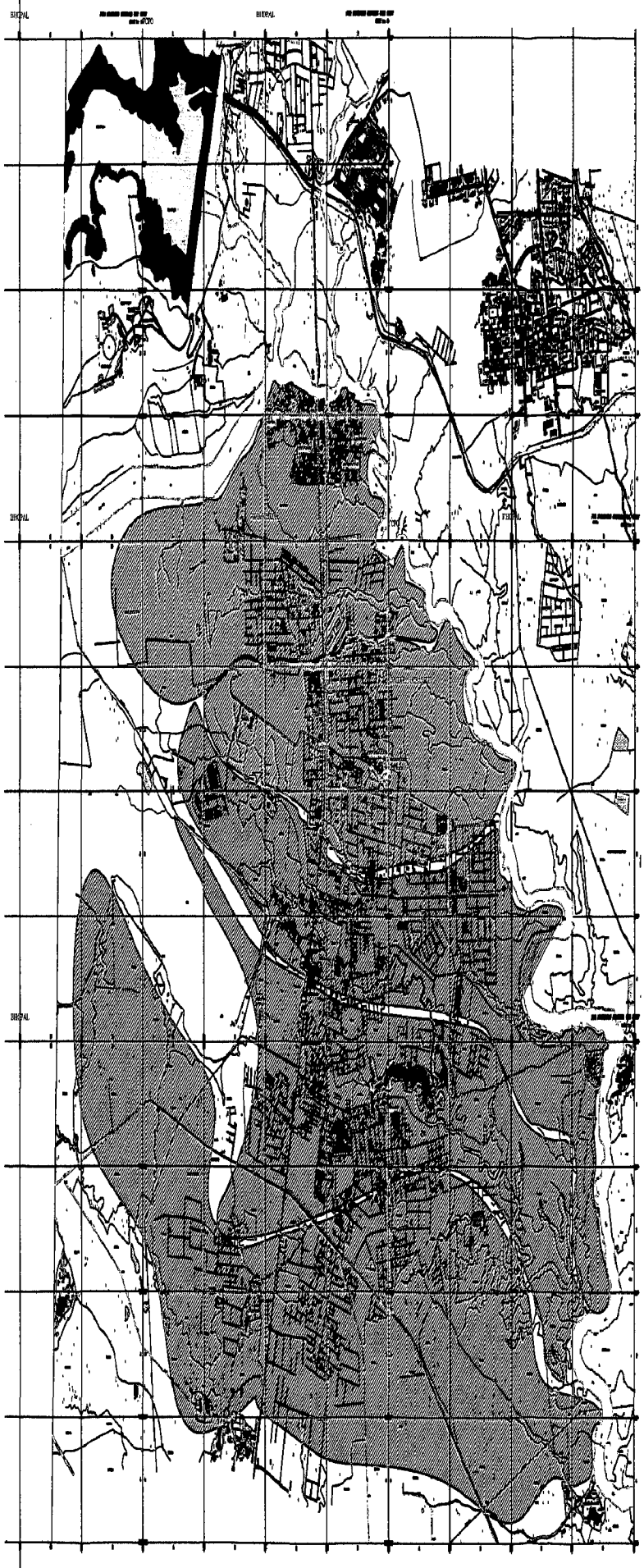


Fig 10.6 Land use Designation



References

Buildings : Single, Group, Industrial, Institutional, Shed, Under construction, Stadium, Slum	
Roads : Metalled, with Bridge, Culvert, Unmetalled	
Road with Median/Divider, Fly over	
Cart-track, Lane, Footpath	
Railway line : Broad guage, Metre guage with bridge & Railway station	
Embankments : Up to 3m, Above 3m	
Cuttings : Up to 3m, Above 3m	
Rivers : Perennial; Dry, Stream : Perennial; Dry, Canal, Open Drain : Double; Single	
Tanks : Dry; with water limit, Pond, Swimming pool, Overhead tank, Ground level reservoir (G.L.R)	
Wells : Lined, Unlined, Tube-well, Fountain, Tap, Hand pump, Flow direction	
Temples, Mosque, Chhatri, Church, Idgah, Tomb, Post office, Telegraph office, Combined office, Fort	
Flag pole, Petrol pump, Chimney, Manhole, Watch tower, Communication tower, Statue	
Dispensary, Hospital, Hut : Permanent; Temporary, Graves, Brick kiln	
Trees : Coconut, Coco/Date Palm, Plantain, Palmyra, Others	
Fire Station, Police Station, Pump House, Rest House	FS PS PH RH
Wall, Fence, Hedge, Cultivation	
Outlines : Garden/Park, Play Ground, Boulders, Mine/Quarry	Park PG
Plantation, Marshy land, Salt pan, Open scrub	
Dams : Masonry/Rockfilled, Earthwork, Weir	
Boundaries : Area limit, Forest	
Main Powerline with Pylon, Pipe line	
Bench mark, Spot height	
Contours, Form line, Cliff, Rocky slopes	

GRID DIMENSION- 500 M X 500 M

Contour Interval : 1 metre

Note : This map is based on Aerial Photography flown in the year 2000

SHEET TITLE: KOLAR ROAD SETTLEMENT

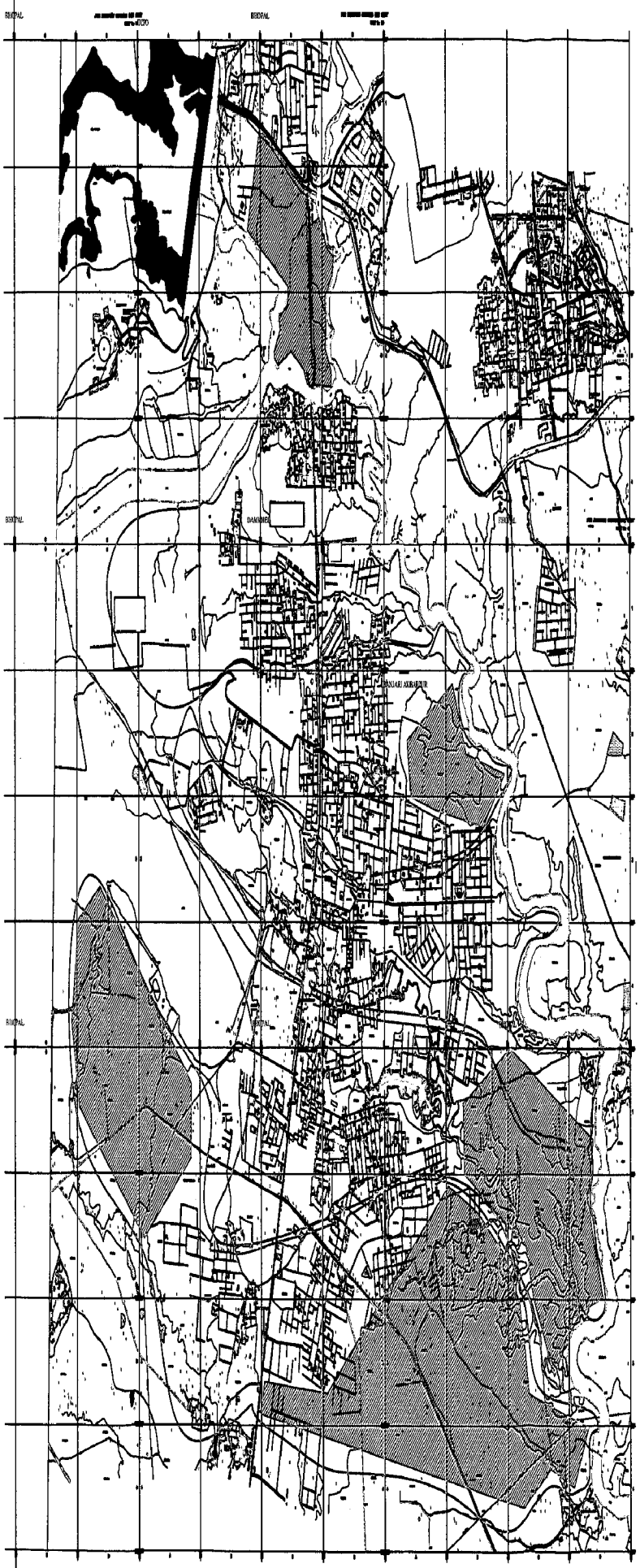
DISTINCTION OF LAND USE CLASSES FOR URBAN FRINGE AREA, KOLAR ROAD BHOPAL

URBAN SERVICE AREA

RURAL / URBAN TRANSITION AREA

RURAL SERVICE AND AGRICULTURAL CONSERVATION AREA

PREPARED BY- TOSHI SHARMA



References

Buildings : Single, Group, Industrial, Institutional, Shed, Under construction, Stadium, Slum	
Roads : Metalled, with Bridge, Culvert, Unmetalled	
Road with Median/Divider, Fly over	
Cart-track, Lane, Footpath	
Railway line : Broad guage, Metre guage with bridge & Railway station	
Embankments : Up to 3m, Above 3m	
Cuttings : Up to 3m, Above 3m	
Rivers : Perennial; Dry, Stream : Perennial; Dry, Canal, Open Drain : Double; Single	
Tanks : Dry; with water limit, Pond, Swimming pool, Overhead tank, Ground level reservoir (GLR)	
Wells : Lined; Unlined, Tube-well, Fountain, Tap, Hand pump, Flow direction	
Temples, Mosque, Chhatri, Church, Idgah, Tomb, Post office, Telegraph office, Combined office, Fort	
Flag pole, Petrol pump, Chimney, Manhole, Watch tower, Communication tower, Statue	
Dispensary, Hospital, Hut : Permanent; Temporary, Grave, Brick kiln	
Trees : Coconut, Coco/Date Palm, Plantain, Palmyra, Others	
Fire Station, Police Station, Pump House, Rest House	FS PS PH RH
Mill, Fence, Hedge, Cultivation	Mill
Outlines : Garden/Park, Play Ground, Boulders, Mine/Quarry	Park PG
Plantation, Marshy land, Salt pan, Open scrub	
Dams : Masonry/Rockfilled, Earthwork, Weir	
Boundaries : Area limit, Forest	
Main Powerline with Pylon, Pipe line	
Bench mark, Spot height	BM898.25 , 904.00
Contours, Farm line, Cliff, Rocky slopes	200

GRID DIMENSION- 500 M X 500 M

Contour Interval : 1 metre

Note : This map is based on Aerial Photography flown in the year 2000

SHEET TITLE: KOLAR ROAD SETTLEMENT

LAND USE DESIGNATION

THICK FOREST

RECREATIONAL OPEN SPACE

AGRICULTURAL CONSERVATION AREA

PREPARED BY- TOSHI SHARMA

REFERENCES

Alexander. Lan .C, ***City Center Pattern and Problems.***

Bryant C.R., Russwurm L. H., McLellan A.G, ***The City's Countryside (Land and its management in the rural- urban fringe),*** 1982 .

Census Handbook Bhopal district, 2001.

Dr .Ashutosh Joshi, ***Role of urban fringe in Metropolitan Development: Pune, "The journal of Indian Institute of Architects",*** May 2006(Journal).

Garett Nagle, ***Changing Settlement:*** Published by Nelson Thomes, 1998.

Kaur G., ***"Urban Perpheri Development Strategies, Study of Chandigarh Peripheri Region.***

M.P Town & Country Planning, ***Bhopal Development plan,*** 2005.

Ramchandran, ***Urbanization and urban systems in India.***

Singh R.C, ***The Rural Urban Fringe Studies.***

Story County Iowa, ***Ames Urban Fringe Plan.***

Utpal Sharma, Shobhit Tayal, ***Peri-Urban Development: "Alternative Models for Ahmedabad.SDR",*** vol.9 no.5 Sep –Oct 2002.

56TH National town and country planner's congress, technical papers: Published by Institute of Town Planners, India.

WEBSITES

www.gisdevelopment.net
www.geocases.co.uk
www.ers.usda.gov
www.durham.gov.uk
www.slideshare.net
www,itpi.org.in

BIBLIOGRAPHY

Siddhartha K., Mukherjee S, ***Cities Urbanization and Urban System.***

Kamal Nayan Kabra, ***Developing an Urban Fringe.***

Laquinta, David L., Drescher Axel W., ***Defining Peri Urban "Understanding Rural-Urban Linkages and their Connection to Institutional Context",*** 2000.

Rao, M.S.A, ***Urbanization and Social change: A Study of a Rural Community on a Metropolitan Fringe,*** 1970

Martin, W.T., Rural, ***Urban fringe "A study of adjustment to residence location***", 1953

Yadav C.S., ***Urban research methodsV.9. Rural- Urban fringe,*** 1987

Sinha M.M.P, ***The impact of urbanization on Land use in the Rural-Urban fringe.***