PLANNING STRATEGIES FOR DEVELOPMENT OF FRINGES OF NEW TOWN, KOLKATA

A DISSERTATION

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

MASTER OF URBAN AND RURAL PLANNING

By

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JUNE, 2010

CERTIFICATE

Certified that this report entitled **"Planning Strategies For Development Of Fringes Of New Town, Kolkata"**, which has been submitted by Ms. Mekhala Saha, 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.

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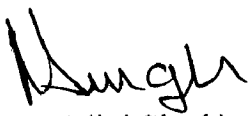

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CANDIDATE'S DECLARATION

I hereby certify that this report entitled **"Planning Strategies For Development Of Fringes Of New Town, Kolkata"**, which has been submitted 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 an authentic record of my own work carried out during the period from July 2009 to June 2010, under the supervision and guidance of Dr. Nalini Singh, Department of Architecture and Planning, Indian Institute of Technology Roorkee, India.

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ABSTRACT

Rapid and random expansion of urban centers results in the misbalance of landuses which is much critical in a country like India. This results in loss of agricultural land, reduction in the production of crops, rise in land value, land holding and speculation etc. Unauthorized urban sprawl and its effects on the fringes have always remained a neglected area in the field of urban research.

The study conducted in this thesis is based on the study of the present conditions of the fringes of New Town, Kolkata. The fast changing socio-economic condition and lack of planning inputs and implementation is resulting in the degradation of the fringes. The new town was proposed by Department of Housing, Government of West Bengal, in eastern fringe of Kolkata, to control the unplanned growth in that area and also to create a substitute CBD for the city, during the 90's. This development drove people not only towards New Town, but also towards its fringe villages as cheap land is available there along with pollution free environment with low taxes and relaxation in building laws. As a result the fringes became a potential development zone.

Keeping this in mind the aim of this study is taken as **'to evolve planning strategies for the development of fringes of New Town, Kolkata city.'** This work gives an up-to-date impact of the development of the fringe of New Town, Kolkata and their exact condition.

In-depth study is conducted to understand the degree of urban fringe development and the influence of a growing city over its fringe areas. The area is delineated to the Rajarhat Block, consisting of 24 villages as the study area which is adjacent to the Action Area I and II of the New Town. Although a lot of invasion is going on by different private developers and individuals, the area is lacking in some factors like required infrastructure facilities, public

As a result there is no control over the haphazard growth, poor infrastructure condition, problems of water logging, absence of steady source of surface water etc. In order to propose some development strategies, all these villages are scored on the basis of various indicators and clubbed in 4 different groups/zones. Then on the basis of their performance the villages will be developed according to their need. The focus of the study towards evolving the planning strategies is being sought as recommendations for development of the fringes of New Town, Kolkata.

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INTRODUCTION TO THE TOPIC

1.1. INTRODUCTION

"Urbanization is a complex socio-economic process intimately connected with the scientific-economic revolution, and that it exercise a growing influence on all aspects of society's life effecting the nature of economic development as well as the demographic, ethnic, and many other processes"

-Ravinder Singh Sandhu (Introduction; Urbanization in India, Sociological Contribution)

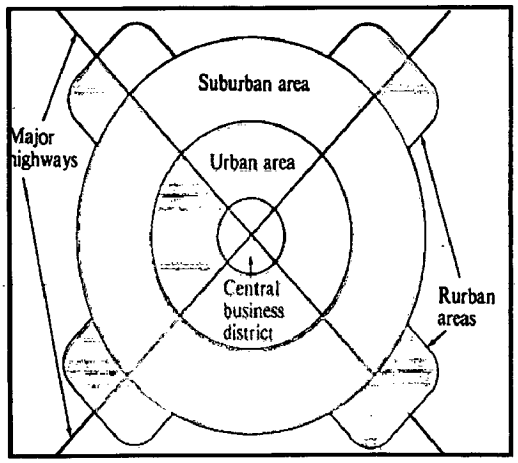


Fig. 1.1. Urban Fringes

Rapid urbanization is the sole cause of emergence of the urban fringe. A small town grows into a city and gradually into a metropolis, the rate of migration increased, and putting pressure on land. As the percentage of urban land decreases, its value goes up and is out of reach of the LIG people, leading to unprecedented growth of the urban fringe.

In older days, rural areas were clearly differentiated from urban areas by walls or gates. People in urban areas were engaged in non-agricultural works, while those in rural areas were having agriculture and animal husbandry as their livelihoods. But yesterday's rural areas are today transformed by urban, residential, commercial and industrial complexes. Thus the dichotomy between two contrasting concepts has led to the need of urban fringe management so as to regulate growth and unplanned development. Hence the fringe area remains devoid of legal planning inputs and potential 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 a morbid spot on the city landscape. Absence of proper development control and controlling agency, the urban fringe is getting worse and aggravated due to the

non-confirming landuse, sub-standard services, and consequent environmental and landscape problems etc.

Fringe is 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).

A transitional advancing urban zone, out of the urban administrative limits, in the form of unplanned, mixed, haphazard, scattered, different star-shaped land use pattern results through conversion of primary uses in guidance of economic suitability and urbanization. (Ramchandran, 1993).

1.2. EFFECTS OF EVOLUTION

- **Physical** - Reduction of agricultural land-holdings, concentration of urbanized land, loss of fertile agriculture land, new building and built forms, increase in density.
- **Socio Economic** - Occupational change, in migration, out migration, increases in economic status of villagers but usually decrease in quality of life.
- **Functional** - Mixed land use increases- change from primary to tertiary, more dependence on the parent city.
- **Environmental And Ecological** - Decrease in open spaces and loss of rural character, resource base drastically changes, traditional sources of water are overloaded or lost, villagers are forced to buy food grains rather than farming.

	Economic activity	Morphology	Social System
Stage III Suburb	Agriculture is not an important activity.	Urban morphological features are dominant and settlement looses its rural appearance.	Became a part of the larger urban society.
	Tertiary and Secondary activities are important for employment.		
	Distinct urban land-use pattern		
	Complete economic integration with the city.		
Stage II Urbanized Villages	Capital intensive and market oriented agriculture, part-time farming.	Modern reinforced concrete structure like factories and residential buildings and business premises etc.	Rapid increase in population for rented villages.
	Commuting to and fro the city.	Better transport and Communication facilities with the city.	Heterogeneous population due to in migration.
			Social change due to increased contacts with the city and migrants.
			Literacy rate increase and social segregation looses its strength.
Stage I Urbanizing Village	Agriculture dominant economic activity with products like vegetable, flowers etc.	Building with indigenous mud walls and brick walls and huts clustered together.	Hierarchically organized castes base social system.
	Negligible nonagricultural jobs within the village.	Segregation of residential areas by castes.	Conservative social values and social segregation.
	Villagers take up unskilled jobs in the city.	No laid out drainage.	Culturally homogeneous population with extremely low literacy.

Table. 1.1. Stages in the evolution of a metropolitan fringe.

1.3. PHYSICAL CHARACTERISTICS OF FRINGES

- Physically disintegrated and sporadic development.
- Chaotic and constantly changing land use patterns.
- Environmental degradation due to non-confirming land uses.
- Increasing land prices at a rate more than in main areas.
- Ribbon development.
- Rapid residential expansion.
- Mobile population with low and moderate density.
- Inadequate service and public utilities.
- Speculation of land and buildings.
- Small size farms.

1.4. NATURE OF FRINGE

In the modern age of the urban expansion the term 'FRINGE' has assumed important significance. Subjective definitions based on individual areas of study are not adequate since the definition should be capable of being universally applicable and not only to a particular region. The term fringe suggest a border-line 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. Researchers, in different social sciences have tried to define the term but none have given a clear and precise definition.

The term urban fringe was first used by T.S. Smith (1937) to describe the built-up areas just outside the limits of the city. Singh (1967) has described fringe as "the rural land with urban phenomena". He further develops the idea of fringe on the basis of the study of Wehrwe (1942) by saying that the rural land is forced into urban uses prematurely and is almost frozen rarely being restored to agricultural uses. Thus, 'institutional desert' is forced or else, one may term it as urban erosion of lands. (Modi P.2003)

1.5. NEED FOR STUDY

- There is a need to study the emergence of fringe areas because of problems existing there.
- Fringe areas, are most often characterized by lack of 'urban' values, such as the lack of adequate required amount of infrastructure, services and regulations, etc., or the vanishing of 'rural' values, like the high prices for the land, loss of fertile soil, social cohesion, etc.
- Provision of infrastructure by public agencies is demand based to registered demand.
- Demands are not registered in such settlements more due to the fact that hey are unintended and also due to planning incapability. As a result of this, planning intervention seems to be partially ineffective. A viable alternative of this problem is sought in this study.
- The city conditions grow around and beyond the fringe area, represents the potential for future urban growth and also determine the direction of the growth of the city.

1.6. SOME FACTS ABOUT FRINGE AREAS

- The vast expanses of this sprawling area are of great interest to real estate owners, planning officials, tax commissioners and social planners.
- To real estate owners, it represents an area to be easily exploited.
- To land use planners, it is an area of rapid population growth, unrestricted subdivision, incompatible land uses, fragmented growth and spreading slums.
- To city officials, it is a sizable 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.

1.7. IN CONTEXT OF KOLKATA

Kolkata, formerly **Calcutta,** is the capital of the Indian state of West Bengal and is located in eastern India on the east bank of the River Hooghly. Its population exceeds 15 million, making it India's third-largest metropolitan area and urban agglomeration as well as the world's 8th largest agglomeration. Once the capital of British India, it was the hub of Raj's Business and industry. Kolkata has always been known as the seat for the government, the main trading centre of eastern India and the cultural capital of India. Kolkata is the main business, commercial and financial hub of eastern India and the northeastern states. It is also a major commercial and military port, and the only city in the region to have an international airport.

Once India's leading city and Capital, Kolkata experienced steady economic decline in the years following India's independence due to the prevalent unstabilised political condition and rise in trade-unionism. The liberalization of the Indian economy in the 1990s has resulted in the improvement of the city's fortunes. Until recently, flexible production had always been the norm in Kolkata, and informal sector has comprised more than 40% of the labour force. Once the centre of modern education, industry, science, culture and politics, Kolkata has witnessed intense political violence, clashes and economic stagnation since 1954. Since the year 2000, economic rejuvenation has spurred on the city's growth. Like other metropolitan cities in India, Kolkata continues to struggle with the problems of urbanisation: poverty, pollution and traffic congestion.

1.8. RELEVANCE OF STUDY IN KOLKATA CITY

➢ In a city like Kolkata, over a history of 300 years of urbanization, lots of investment and migration from different districts and states of India is happening, changing the socio-economic structure of communities, living standards, etc.

➢ Increase in urban population lead the city to need more and more space to accommodate all the activities so it came up with different planned and unplanned development.

➢ The infrastructure facilities were far too inadequate and the civic services started breaking down.

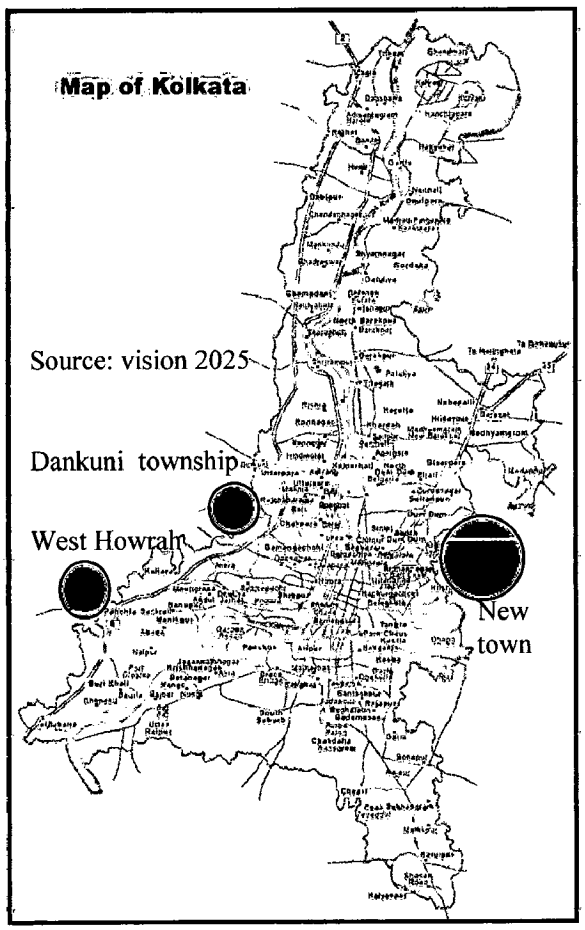
➢ The city suffered severely from crowding, congestion and squalor. There was chaotic sprawl and urban growth occurred without any urban facility.

➢ The planned development also accelerated the development of surrounding areas.

➢ Urban fringe is getting worse and aggravated due to non-confirming landuse, sub-standard services, and consequent environmental and landscape problems etc. along with absence of proper development control and controlling agency,

➢ People are buying plots in new town and surrounding areas in lesser price.

➢ These fringe areas are developing much more rapidly rather than the core area with their existing development methodology.



Map 1.1. Location of townships in Kolkata

1.9. EXISTING PROBLEMS

The city of Kolkata constitutes the dominant urban centre of a vast hinterland extending over Bihar, Orissa, West Bengal, Assam, Arunachal Pradesh, Meghalaya, Mizoram, Manipur, Ngaland, Tripura and Sikkim. It covers an area of 6.8 lakh sq.km with a population of about 220 million (1991). Kolkata acts as the main producer and distributor of goods and services. In the entire region of the eastern India, there is no city which can act as major metropolitan centre in the region in respect of national and international trade, traffic and other economic activities. In spite of its importance at the national level and in various aspects of life of people of entire eastern region, Kolkata had to face major onslaughts that threatened her very existence. Famine, World War, partition of Bengal, epidemic – one followed another.

The deterioration of civic facilities and derivation of service in Calcutta, however, became critical after partition of Bengal when Calcutta had to accommodate a large number of refugee population. The infrastructure facilities were far too inadequate and the civic services started breaking down. The city suffered severely from crowding, congestion and squalor. There was chaotic sprawl and urban growth occurred without any urban facility. One of the worst affected areas was shelter and housing.

Traditionally, Kolkata had accommodated people from entire eastern India who had come here in search of employment and other purposes. About 60% of the industrial workers are migrants from the other states. The percentage is higher in case of informal sector workers many of whom belong to economically weaker section. The total population of KMA as per 1991 Census was 11.86 million; of which 4.39 million lived in Kolkata Metropolitan Corporation (KMC) area.

The KMC covers about 14% of the total KMA land accommodating about 37% of KMA population. It is stated by KMDA that in 1021 the KMA's population would reach 20 million and "it is only obvious that the urban continuum around the cities of Calcutta and Howrah would continue to grow."

1.10. BACKGROUND OF NEW TOWN, KOLKATA

New Town was proposed by Department of Housing, Government of West Bengal, during mid 90's as a totally new township in eastern side of Kolkata to control the unplanned growth in that area and also to create a substitute CBD for the city.

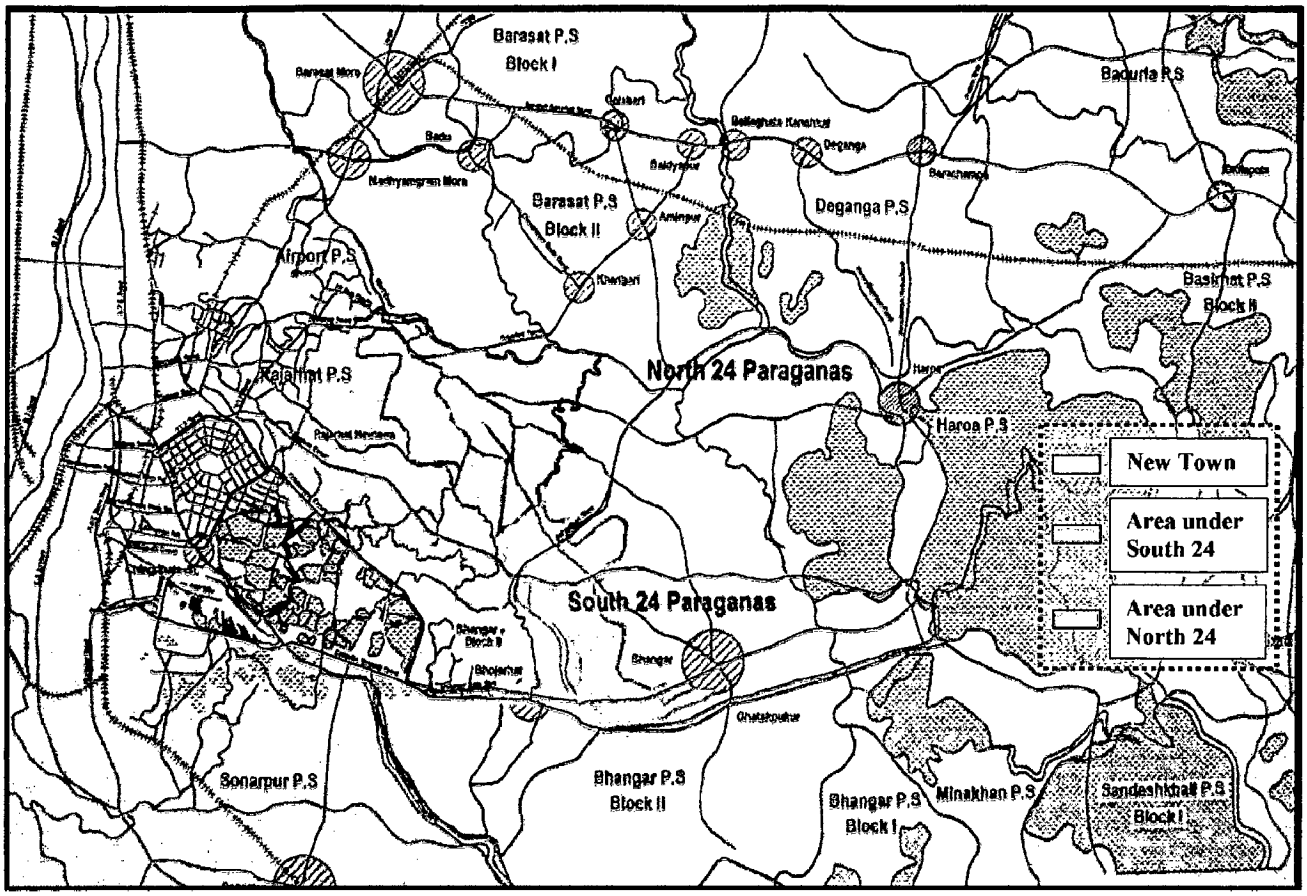
"The New Town has been planned to grow as an organic city producing a composite fabric of different uses that are needed for the people of various categories of different income groups to live, work and invest in an efficient, attractive and healthy environment."- WBHIDCO Project Report 1999.

This development was driving people not only towards the New Town, but also towards the fringe villages of New Town. As a result the fringe areas also become a potential development zone. The area is delineated to the Rajarhat Block (consisting of 24 villages) as the study area which is adjacent to the action area 1&2 of the New Town. The total area is about 3150 ha with a very low population density of 25 pph (as per Census 2001). Among the 24 villages some villages like Rigachhi, Rekjuani, Bishnupur, Basina etc. are having a bit high density and well connectivity within the region, as a result, they have attained some peri-urban characteristics. Some other villages which are near to the action area 1 have shown a high growth in terms of land values along with high level of land speculation.

Although a lot of invasion is going on by different developers and also by the individuals, the area it self is lacking in some factors like absence of an active planning authority which can control the haphazard growth, poor infrastructure condition, problems of water logging, absence of steady source of surface water etc

1.11. AIM

To evolve planning strategies for the development of fringes of New Town, Kolkata city.



Map. 1.2. Location of New Town and its fringes Source: KMDA library

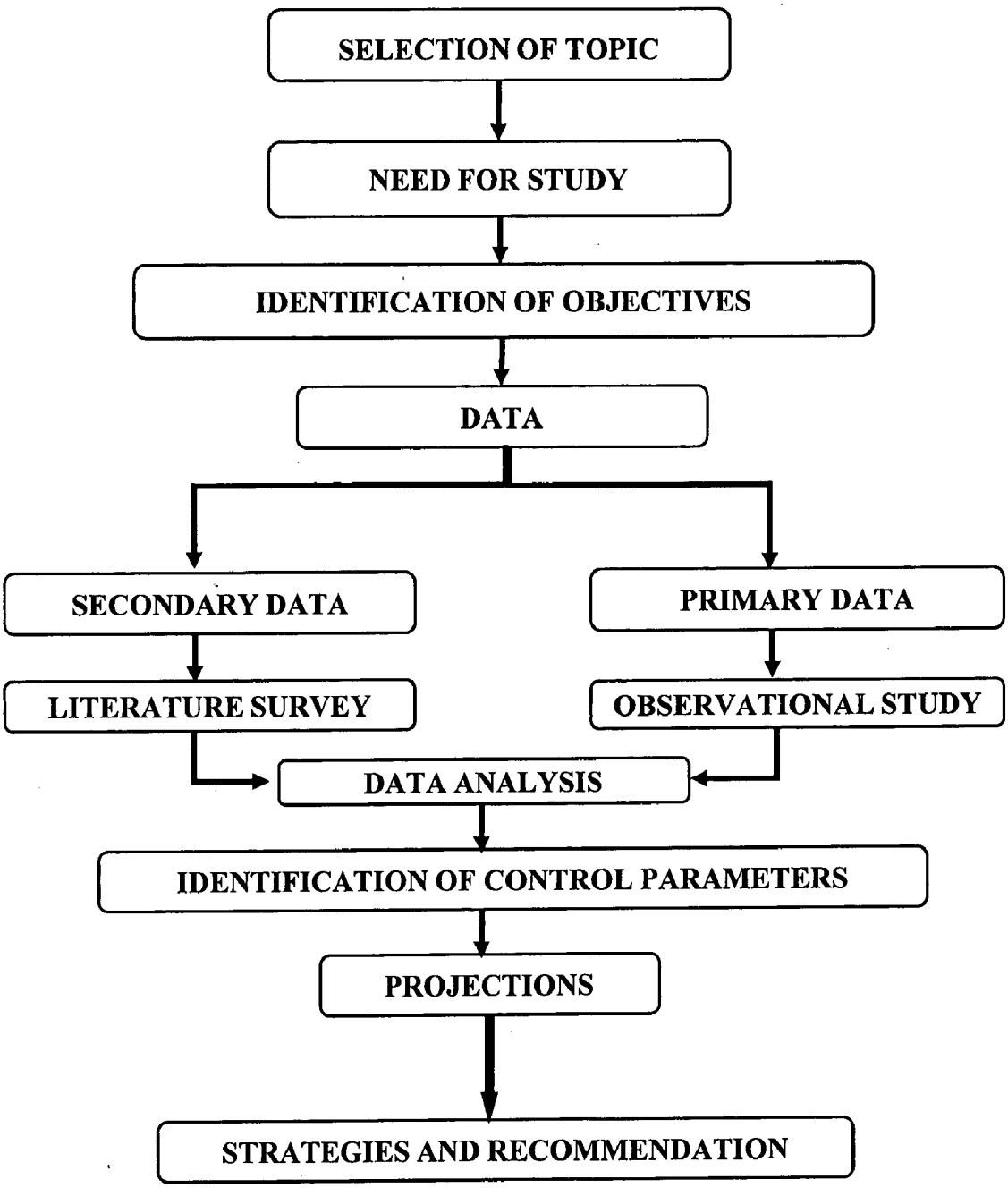
1.12. OBJECTIVES

- To study the features of fringe area of New Town, Kolkata city.
- To study the factors responsible for the development of the fringes.
- To identify the variables which decide the functions of the fringes.
- To forecast the demand and supply of the infrastructure for the development of the fringes.
- To evolve the strategies for the development of the fringes.

1.13. SCOPE AND LIMITATION

- This thesis will be focused on the formulation of planning strategies for the development of fringes of New Town, Kolkata considering all the urban subsystems.
- The study will be limited to the fringes of New town area, i.e., 24 villages of Rajarhat block.

1.15. METHODOLOGY



LITERATURE REVIEW: URBAN FRINGE

2.1. LITERATURE REVIEW

In the modern age of the urban expansion the term 'FRINGE' has assumed important significance. Scholars from different disciplines have discussed the 'rural-urban fringe'. The term fringe suggest a border-line 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. The term rural-urban fringe is comprised of two groups of words-'rural fringe' and 'urban fringe'. These two terms denotes overlapping boundaries with respect to an area, which is distinct in maters of form and function. Researchers, in different social sciences have tried to define the term but none have given a clear and precise definition.

The term urban fringe was first used by T.S. Smith (1937) to describe the built-up areas just outside the limits of the city. Singh (1967) has described fringe as "the rural land with urban phenomena". He further develops the idea of fringe on the basis of the study of Wehrwe (1942) by saying that the rural land is forced into urban uses prematurely and is almost frozen rarely being restored to agricultural uses. Thus, 'institutional desert' is forced or else, one may term it as urban erosion of lands. It suggests a border, which lies at periphery of urban areas, where the city is expected to expand in future and which generally share some rural as well as urban characters. These areas formally lie outside the legal limits of the city on one hand and having strong functional, social and economic linkages with the main urban settlement on the other. Conversion of land from rural agricultural to urban residential and industrial uses takes place in the fringes.

2.2. PRESENT SCENARIO

The process of urbanization in the fringe areas has given rise to typical problems associated with land use. Haphazard development of slums, unauthorized colonies piecemeal commercial development, intermixes of conforming and non-conforming uses of land coupled with

inadequate services and facilities have become a common feature in the fringe. The fringe area is generally under the jurisdiction of the Panchayat which has neither the financial resource nor the technical expertise to plan and manage the rapidly developing fringe. The urban authorities also ignore the problems as it falls outside their limits. For the residents of the fringe, there is hardly any difference between the city and the fringe, their movement is unrestricted and they use the municipal services without paying for them. Unplanned development of the fringes lead to the lack of public facilities – public open space, health centers and schools. Degradation of the environment takes place as the required sanitary and water disposal services are not available. The agricultural land around the city is eaten away and the farmers are forced to change their occupation. There is always a variety of pressure by vested interest groups for conversion of land use in the green belts. Industrialists press for large and cheap sites with less controls. Co-operative housing societies which have purchased land from the farmers prior to notification of the green belts press for exemptions. Established industries press for housing and expansion. Speculators have entered into deals with farmers for sale of their lands even after notification of green belt. Failure to prevent unauthorized development in the green belt has created political pressure to regularize them subsequently and change the land use from agricultural to industrial and finally unwanted extension of conurbation.

2.3. GROWTH OF CITIES

- Urban population explosion.
- Benefit for economic development.
- Existing economic criteria of city.
- Easy availability of resources.
- Relatively lower taxes in fringes.

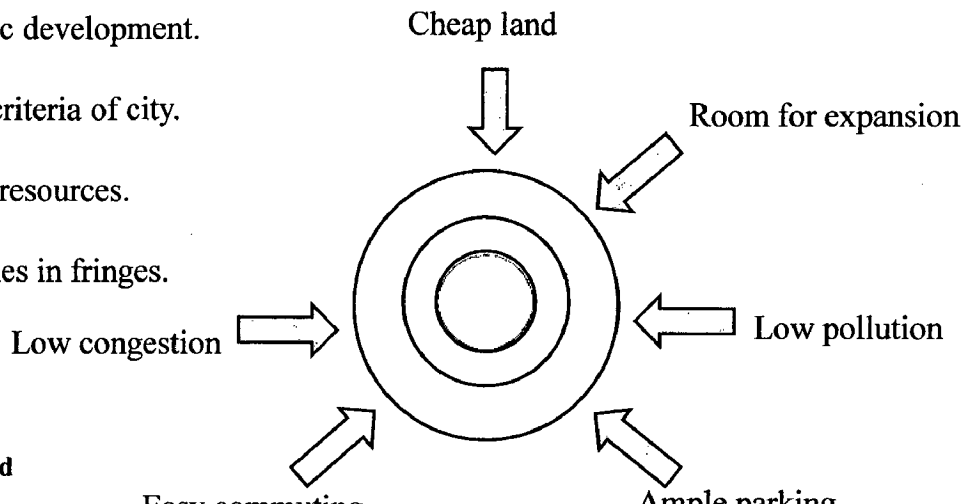


Fig. 2.1. Reasons behind settling in fringes

2.4. DYNAMICS OF URBAN GROWTH AND URBAN FRINGE

Urban fringe is defined as the land surrounding the town which is not considered as a part of the town but is directly influenced by the town. The fringe is characterized by extension of housing estates, buildings along main arterial roads, and by location of new factories, water works, cemeteries and the like. The main cause or impulse, however, have been, the rapid growth of the core city.

For example, in the U.S, motor transportation and the thirst of the city for space resulted in the development of residential areas along the highways in the fringes. Other reasons are the cheapness of land, absence of land use restrictions, set a trend to shift city-based industries to the fringe. At times, the recreational needs of the city such as parks, playgrounds and city utilities such as water works, sewage plants, airports also have led to fringe development.

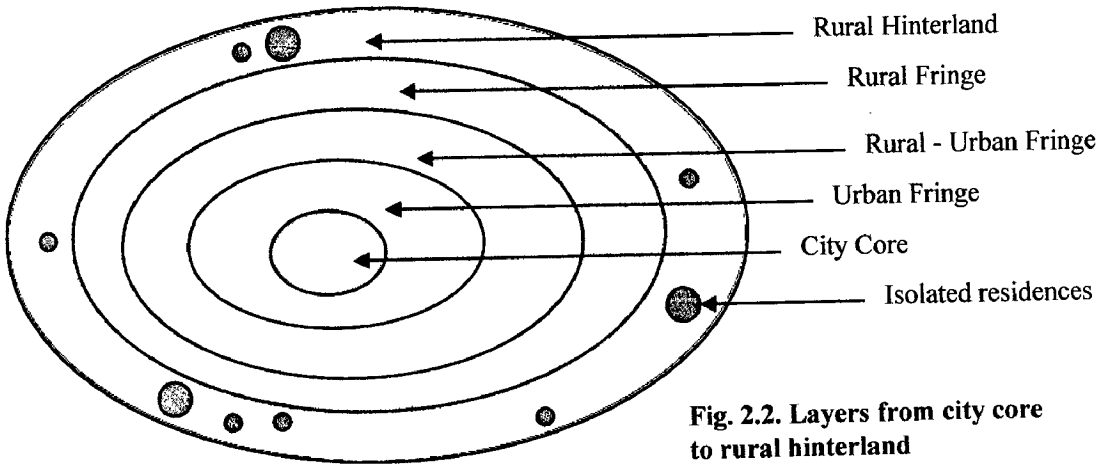


Fig. 2.2. Layers from city core to rural hinterland

2.5. CONCEPT OF URBAN FRINGE

According to the encyclopedia dictionary of urban terms, " The term fringe suggests a borderline case between the rural and the urban, actually lies on the periphery of the urban area, surrounding it and distinguishing it from the truly rural countryside. It is also described as the rural land with urban phenomena."

Spiro Kostof has described urban fringe as the extramural zone containing a collection of

heterogeneous land uses, and displaying a large scale low density building pattern that contrasts with the thickly woven fabric of the core. Over the period of time, the city may incorporate and leapfrog over its first fringe belt, alter some of its characters with an overlay of residential development, and give rise o a new fringe belt further outwards.

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

Pryor R.J (1968), defines fringe as an area of transition where rural land uses are giving way to urban land uses. Further he described that urban fringe exhibits a density of occupied dwellings higher than medium density of total fringe area, having a higher rate of population density, land use conversion and commuting. Fringe belts provide practical geographical orientation by providing a sense of position within or on the edge of the city. Fringe belts survive within urban areas as physical entities redolent of the history of cities, but local plans and central government policy documents, scarcely mention them.

2.6. FRINGE DEVELOPMENT IN DEVELOPED COUNTRIES

Intensive researches has made it clear that the problem of overcrowding of cities cannot be solved by increasing the intensity of the land within, but by opening up the hinterland with adequate road network with public transport system to allow people to live in and commute easily from urban fringe areas. Prominent approaches in this regard are Garden City by Ebenzer Haward and Vertical City by Le Corbusier. The ground is made free through high-rise buildings, with parking, social facilities, employment areas etc. The suburbs have low density development and cheaper land costs.

2.7. REASONS BEHIND FRINGE DEVELOPMENT IN INDIA

- Easy conversion of agricultural land for industrial purposes.
- Easy availability and lower land prices at the peripheral areas in comparison to the main city.
- Restrictions on the development of land within the city on account of Urban Land Ceiling Act, Development Controls and other legal procedures.
- Under utilization of land in the urban development limits.
- Comparatively pollution free environment.

2.8. URBAN FRINGE AS PER LEGISLATIONS IN INDIA

The Urban Land Ceiling And Regulation Act 1976 has given the concept of peripheral areas around a city. It applies to Andhra Pradesh, Gujrat, Haryana, Himachal Pradesh, Karnataka, Maharashtra, Orissa, Punjab, Tripura, Uttar Pradesh, West Bengal and all the union territories. The term urban agglomeration has been used, including the periphery of urban centers. The peripheral area notified by either the state or the central Government as a part of urban agglomeration with population more than 1 lakh is stipulated as 1km around the city and is co-terminus with urban fringe.

Census of India 1961 also gave the concept of urban agglomeration, which includes a continuous urban spread and normally consists of a town and its adjoining urban outgrowths. The term outgrowth is used to describe those areas, which are around a city core, fairly urbanized, and lying within the revenue limits. This is co-terminus with urban fringe and is still continued in the country.

2.9. ISSUES IN CONTEXT WITH FRINGE AREAS

The development pattern of the fringe area has strong relationship with the development plan of the city and the direction of the actual physical growth. In most cases, the boundary of the permissible developed area is rigid and inflexible, and does not recognize the fact that development occurs extensively beyond the urban development authority limits here is a subdivision of the plots and the process of direct conversion of agricultural land to residential or any other use by the original landowner himself or by the new owner.

In terms of market share, the informal subdivision and sale of land is the major urban housing market. While the fringe areas provide outlet to the growth pressure on the city, there are some
negative features that are cause of concern:

- Underutilization of the areas lying within the development authorities
- Lack of infrastructural and other amenities
- Land values decrease with the increase in distance from the city.

Figure below depicts the relationship between the distance from the core and land value.

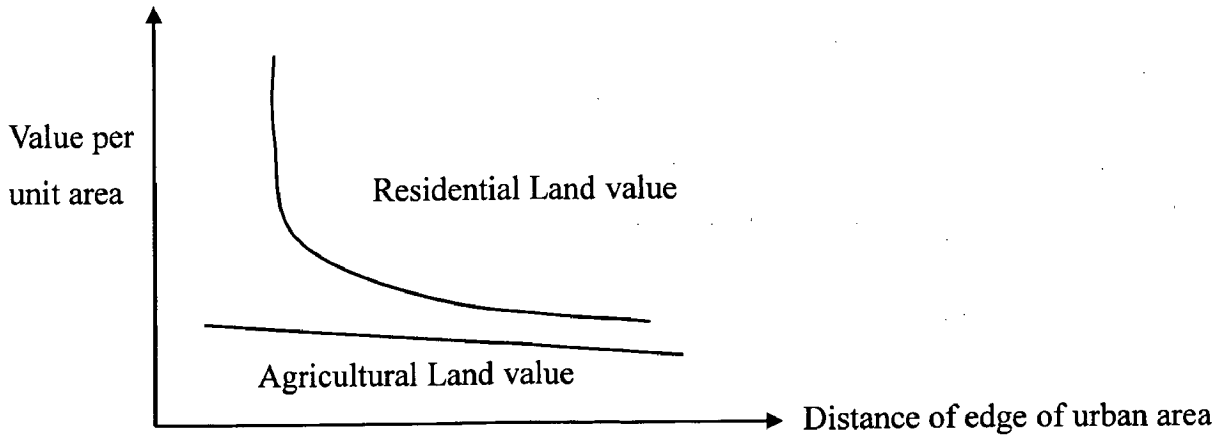


Fig. 2.3. Schematic representations of land values around cities.
(Source: *Per-Urban Development: Alternative models for Ahmedabad. SDR 9 5 Sept-Oct 2002)*

2.10. CHARACTERISTICS OF URBAN FRINGE

Area of mixed land use and diverse economic activities immediately adjacent to the city, with the characteristics of both rural and the urban. It has strong interactions with the city in terms of daily commuting and exchange of goods and services. It displays a strong metropolitan influence on its physical, occupational and demographic structure. Lack of services and facilities are combined with better environment quality. The settlements are mostly in the form of hamlets and villages.

Usually located outside the municipal corporation limits, it is a zone of transition at the edge of the city where because of urban growth pressures from the city there is a continuous intrusion of urban development in rural areas (both in the agricultural lands, as well as the habitats). Uncertainties in the fringe areas are caused mainly by the lack of urban services, a not so well developed land use and an indefinite employment pattern. However, these areas are highly dynamic and if monitored well, can grow into efficient and attractive suburban zone. Unfortunately, the fringe areas of Indian cities are often chaotic, agricultural land is not systematically converted into urban land. Frequently, agricultural land along the city limits is left fallow for speculation. Experience shows that when agricultural land is not cultivated for a long time, it contracts all the ills of urban pollution. To add to it, the misuse of land use like setting up of brick kilns for construction, or the motor repair centers, or sitting small-scale industries using chemicals along the city's periphery, makes it unfit for agriculture. Subsequently, as population increases and land values rise because of greater demands, this land is drawn into the city limits as "urbanisable", so that the city can expand beyond its physical limits to accommodate more people and activities. It has been observed that farmers hold on to peripheral agricultural land until the price of the land becomes more than the income from agricultural productivity, after which it is sold for urban use. The growth and extent of fringe areas depend on the rate of urban growth and the size of the city. The more the pressure of population, the greater is the need for city expansion and infrastructure development. and the faster is the fringe area formation.

Conversion of rural land to urban is usually influenced by scarcity of serviced land, high land values within the city limits, speculative land and/or the housing market, lower land values on the fringes, and the absence of building regulations outside the city limits of which people take advantage. Being outside the city's administrative area, physical Planning is not extended to these. Therefore, the growth of any fringe area is haphazard, until such time till it is drawn into city's jurisdiction and provided the support of planned development, giving way to new fringe formations.

The transformation, however, is gradual, with a distance decay function, displaying more urban developments closer to the city than farther away. As a demand on the land by a large population is more than those by a small population, metropolitan cities not only have larger fringe belts around them, but these belts also have diverse activities therein. The range of activities depends on two factors – the increase in the communication facilities/skills and the size of the population. For, the larger the population, the more varied are the activities; and the more efficient the communication facilities, the farther can urban activities travel.

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

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

2.11. DRIVING FORCES BEHIND URBAN FRINGE DEVELOPMENT

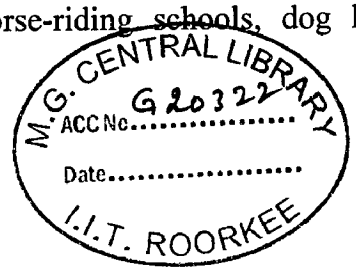
2.11.1. Centrifugal forces:

➢ Withdrawal of agricultural land uses and entry of urban ones.

➢ There are many urban land users who are not able to operate in more central locations. This include lorry-oriented factories, noisy, smelly and hazardous industries and also recreation facilities and home seekers.

2.11.2. Centripetal forces:

➢ Refers to that type of rural land use that are attracted most to the urban fringe. This include markets of gardening and intensive horticulture, horse-riding schools, dog kennels and piggeries.



2.12. REASONS TO ADOPT FRINGE CONTROLS

➢ To prevent neighboring towns from merging into one another.

➢ To encourage compact development of the city for optimum utilization of land and services and to reduce the commuting time from home to work.

➢ To preserve the special character of the town.

➢ To further check the growth of a large built up area beyond the unrealizable limit.

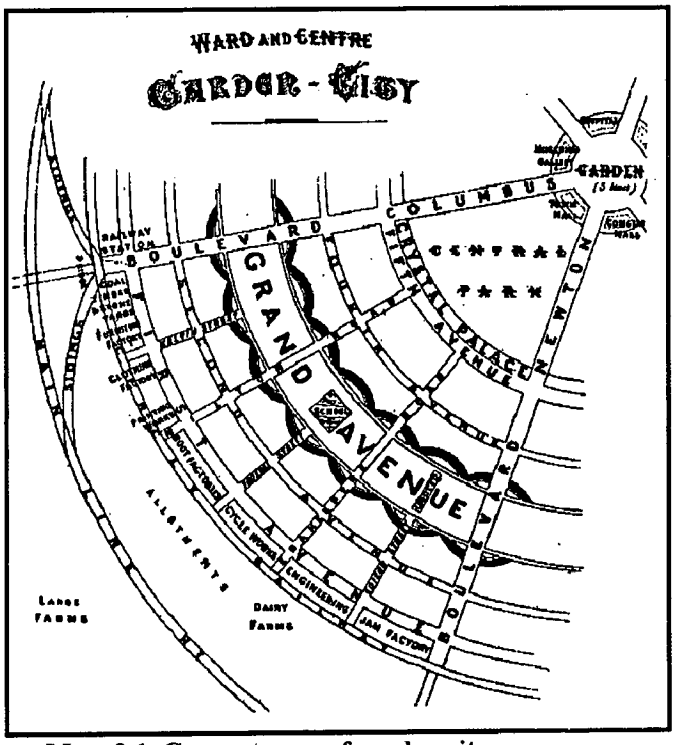
➢ To preserve the areas of scenic beauty and recreation.

➢ To preserve and improve the environmental conditions of the city.

2.13. DIFFERENT CONCEPTS TO CHECK URBAN SPRAWL

A. Garden city

In 1898 Sir Ebenezer Howard published his book 'To-morrow: a Peaceful Path to Real Reform', focusing on the creation of towns designed for healthy living. Garden cities were intended to be planned, self-contained, communities surrounded by greenbelts, containing carefully balanced areas of residences, industry, and agriculture.



Map. 2.1. Concept map of garden city

It would house 32,000 people on a site of 1,000 acres, planned on a concentric pattern with open spaces, public parks and six radial boulevards, 120 ft (37 m) wide, extending from the centre. The garden city would be self-sufficient and when it reached full population, a further garden city would be developed nearby. Howard envisaged a cluster of several garden cities as satellites of a central city of 50,000 people, linked by road and rail.

2.13.1. WELWYN GARDEN CITY

Established in 1920, Welwyn is a town in Hertfordshire, England, the second garden city in England. It was planned so that the average density was not more than 5, for a population of 40-50,000 on 4,536 acres. 608 acres of land was set apart as agricultural land. By 1947, the town had a population of 18,000 and 70 factories. There was a lack of metal led roads suitable for road traffic.

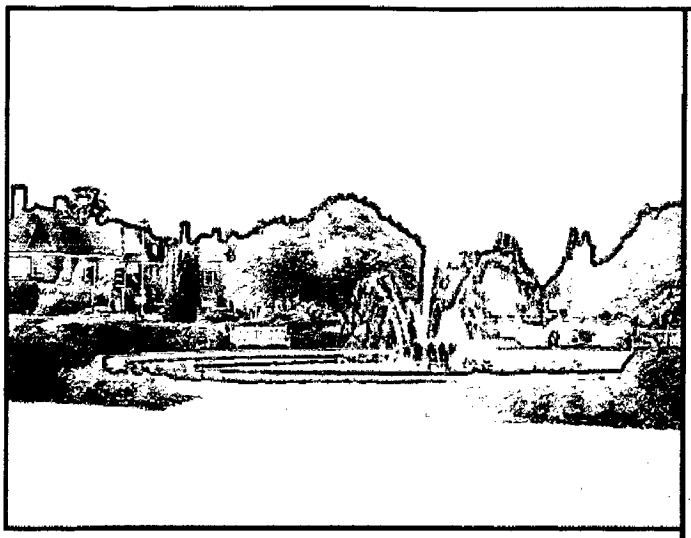
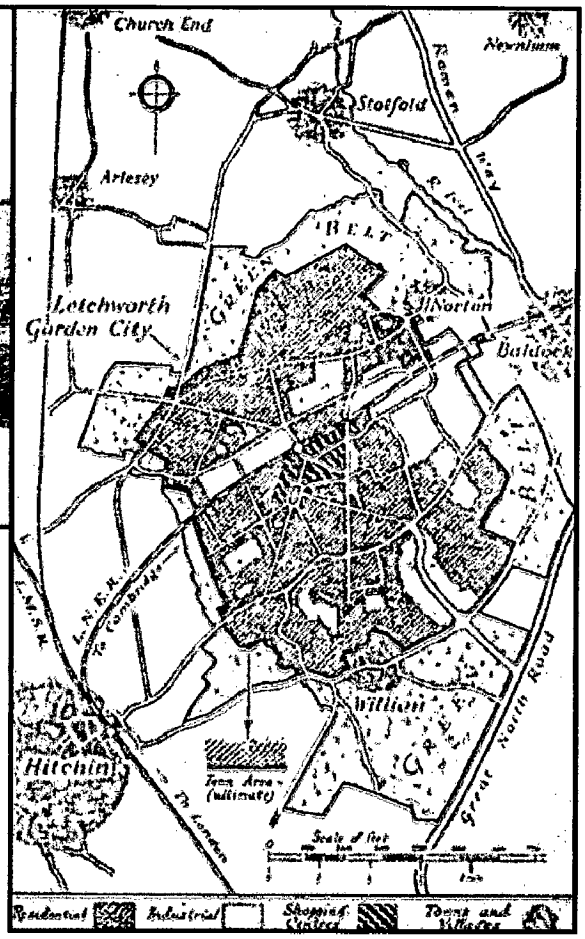


Fig 2.4. Welwyn garden city



Map 2.2. Welwyn garden city

Most of the roads had no visible curb stones or pavements and so the grass molded into the roads in a very country manner.

With the advent of motor traffic, a great amount of character has been lost. The actual houses in the residential districts had the purpose of built outbuildings, so that tenants don't erect unsightly sheds.

Cul-de-sacs were given to make maximum use of the land with minimum service expenditure. For a long time Welwyn lacked adequate means of socializing. No public houses were built, the council built a single community centre on the periphery of the town and a theatre with a departmental store.

2.13.2. LETCHWORTH GARDEN CITY

The first garden city was an experimental town on 3,818 acres, 35 miles away from London was established in 1903. The town area was about 500 acres and was designed for a population of 35,000. Of the total area, 3,000 acres was a green belt. Layout plan was based on the principles of land use with defined areas for commercial and industrial development, varied residential districts and an agricultural belt. By 1947, it had a population of 16,000 and 100 industries. Today, over 100 years on, the Estate is still managed in accordance with founding principles.

Fig 2.5 Letchworth garden city

B. Green belt/ periphery control concepts

Green belt is defined as an area predominantly agricultural in use located outside the urbanizable limit. It is a mean to arrest sprawl by designating a wide zone of green area. Green belt is helpful in providing the framework to city depending upon its tune, size and importance. It acts as a moderator of microclimate in terms of rainfall, temperature, humidity etc. It also acts as wind tunnels to draw the air into interior of city.

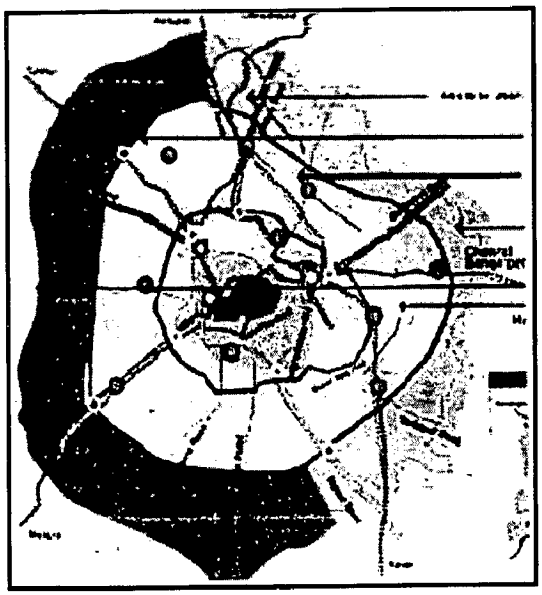


Fig. 2.6. Concept of green belt to check urban sprawl

Now days there is large hue and cry about the environmental pollution due to increasing rate of vehicles and industries. Green belt is being proposed to check the further degradation of environmental particularly air. The uses mostly permitted in the green belt like agriculture, horticulture, dairy, .poultry, cattle shed farmhouses, brick kilns etc are helpful in catering the needs of the people of city in terms of agriculture products, flowers, milk, eggs, bricks etc. The area under green belt should be properly managed otherwise it will be encroached by slums, unplanned unauthorized linear ribbon development because of no taxes being charged as development in the periphery.

Following criteria support vision and help define the actual extent of Outer Green Belt concept:

- **Landscape and landform**: To recognize and protect natural landscape and landform characteristics of the ridge system on the western side of the city.
- **Indigenous ecosystems and important ecological features**: To recognize and protect indigenous ecosystems and important ecological features, and in particular the streams and significant areas of indigenous vegetation from which a more continuous band of vegetation will grow.
- **Recreational places and linkages:** To identify and protect important existing or potential recreational sites and linkages (entrance points, tracks, routes and Destinations).
- **Cultural and historic places**: To recognize and protect important cultural and historic places and features identified within, the Outer Green Belt.
- **Urban environment edge**: To provide a western edge to the urban environment and a buffer of mainly open lands between the city's urban areas and the rural areas.
- **Continuity and integrity**: To achieve continuity and integrity in the definition and management of the Outer Green Belt.

PERIPHERY CONTROL

The concept of periphery control is not new even in case of ancient village we can find the periphery area. It is beyond the limit of village beyond which agricultural fields are there.

2.13.3. RAYMOND UNWIN-GREEN GIRDLE, LONDON

Raymond Unwin who was advisor to greater London Regional Plan 1929, saw the green belt as providing open recreational land on the edges of large urban areas to compensate for lack of space within the city boundaries. He estimated that 250 sq.km. of open space was required on the edges of London serve its 9 million populations. he later purchased land to form a green girdle, preferably continuous tract of land 3 or 4 km wide around London. In 1914, it had a population of 4 million.

Map. 2.3. Raymond Unwin-green girdle.

At the core of this area is the city of London, one mile square with 5000 people. The city is the financial and political heart of the British Common Wealth arming out from this center Greater.

C. Satellite town

Fringe areas may be developed as satellite towns/counter magnets so that they may attract population and activities to reduce pressure on the core areas, and will be achieving more efficiency to control and regulate human settlements both inside and at the fringes of the urban areas. Recently, the concept of development of satellite towns of million plus cities is considered by Govt. of India. The self-contained townships may be located at reasonable distance(40-50 km) from the mother city and may be developed by fast track and efficient

public transport, which could provide solutions to the problems of housing and infrastructure.

These townships may be planned for a perspective population of 5-10 lakhs and will fall within the urban agglomeration of metropolitan city or its fringe. Feasibility of up gradation of existing small size settlement to satellite towns should be there. Sufficient land and water resources should be available around the existing settlement. Satellite towns should form a part of the Metropolitan Regional Plan.

2.14. RESEARCH PAPERS

2.14.1. SPATIAL PLANNING FOR PERI URBAN AREAS (Nagerlok)

J.B. Kshirsagar and Pawan Kumar

Peri urban areas are either transitional areas or interactive areas where urban and rural activities are juxtaposed and natural features are subject to rapid modifications. These are characterized by various unacceptable land uses; transformed hydrological, ecological and geo-morphological and environmental systems, deteriorated built environment, variable socio-economical profile etc. and are generally neglected by both rural and urban local bodies. These areas are disorganized city expansions that involve high cost of service management, infrastructure maintenance, environmental protection etc due to large concentration of population and economic activities. The peri-urban area cannot be easily defined or delimited through unambiguous criteria.

Growth of fringe area is dynamic, interactive and transformative because it is directly related to landuse, socio-cultural transformation, demographic characteristics and propagation of urban attitudes. These areas are also effected by poverty, migration, provision of basic human needs, infrastructure, transport, disposal of wastes, atmospheric contamination of ecosystems, pollution of surface and ground water etc. environmental degradation in the peri-urban areas may threaten the sustainability of cities in respect of health and essential life support systems.

Hence spatial planning approach is required to formulate legislation to ensure healthy growth as well as to reduce vulnerability of stakeholders such as farmers, landless labours to prevent mushrooming of slums.

Typology of peri-urban areas:

- Village peri-urban area
- Diffused peri-urban area
- Chain peri-urban area
- In situ absorbed peri-urban area

In large urban agglomerations, peri-urban areas have the tendency to grow at a fester rate along various corridors such as:

- Transport corridors
- Nearby religious spots
- Heritage and archeological sites
- Scenic and natural beauty sites

Spatial Planning Approach:

- Planning legislation
- Controlled area development
- Perspective plan of peri-urban areas
- Peri-urban areas as satellite towns

Special urban planning and development authority

2.14.2. EXPANSION OF THE URBAN FRINGE: A SIMULATION EXPERIMENT

Richard l. Morrill, University of Washington

Cities the world over are growing, both in population and in real extent, characterized by a continual, but very uneven, spread of the urban frontier. Expansion of the city edge is a complex phenomenon, depending on the interplay of the demand for housing in the entire urban area by groups and preferences; site characteristics of the land at the edge; accessibility conditions of the area; and variations in the size of developments as well as other factors. This growth represents one of the largest, if most local, migration streams.

Simulation model of expansion of the urban fringe

Development is contingent upon a series of probability functions governing the location, size, and density of development, if any. The probability functions used and the nature of their effects are of general character. The steps involved in the model are:

- Random Selection of Parcels for Decision
- Probability for Development of a Location: Effect of Accessibility to Major Development
- Elimination of the occupied sites
- Effect of Site Quality Variations
- Effect of Proximity to Mixed Uses or Blight
- Effect of Neighborhood Amenity
- Kind of Development
- Size of Development
- Density of Development
- Probability of Vacancy
- Succession of Uses
- Schools and major shopping centers following residential development
- Process is repeated for the next time period by altering the distances from parcels to developments.

A real advantage of such a stochastic simulation model is the adaptability--both the ease of change to simulate more accurately either actual past development or ideal patterns and to assess future development under a variety of assumptions and planning alternatives.

2.14.3. SIMULATING SPATIAL URBAN EXPANSION BASED ON A PHYSICAL PROCESS

Lin Li, Yohei Sato, Haihong Zhub

The University of Tokyo & Wuhan University

Urban expansion as a dynamic process of land use change is a complicated social/economic phenomenon. It may be linked with details related to topography, transportation, land use, social structure and economic type, but it is generally related to demography and economy in a city. It is helpful for macro-planning and decision-making to have a simulation model available which considers these two factors. Since the spatial appearance of urban expansion is similar in some degree with a physical diffusion process, one easy way to model urban expansion under various scenarios is to build a simulation model based on basic diffusion. In this way, a clear mechanism of urban expansion is demonstrated. Population density is regarded as an internal driving factor and economy as an external push on urban expansion. Because of its computational features, this model is implemented with cellular automata.

These have an advantage in that they allow the model to be extended and to be incorporated with other geographical systems. By applying the model to an actual example for scenario studies, it is shown that it can produce some valuable results through simulations at various scenarios.

2.14.4. URBAN MORPHOLOGY AND PLANNING: THE CASE OF FRINGE BELTS

J.W.R. Whitehand*, N.J. Morton

School of Geography, Earth and Environmental Sciences, University of Birmingham

Urban morphological concepts are weakly represented in Anglophone city planning. Where local plans in the UK are concerned with historical landscapes, attention is devoted principally to individual buildings, sites and monuments, or small areas of special interest: concepts concerned with the historico-geographical structure of entire cities or sizeable parts of cities are largely ignored. Concern is with the fringe belt, focusing on the actions of local planners and others influencing the development of fringe belts after they have become embedded within urban areas.

The study of the Edwardian fringe belt of Birmingham, UK, suggests that there has been increased pressure since the 1960s to redevelop fringe-belt plots and use them more intensively, but the fringe belt has retained much of its identity despite its lack of recognition in the local plan. Decision-making about proposals to redevelop fringe-belt plots has frequently been protracted, reflecting the profitability of redevelopment, the large size of many of the plots, the large number of interested parties, and the scope for different interpretations of planning policies. Within the local authority, it has been characterized by changes in policies, and disagreements among those taking and influencing decisions. The piecemeal, poorly co-ordinated pattern of decision making underlines the need for planning to take greater account of the historio-geographical structure of cities.

The survival of fringe belts reflects a constellation of factors that has little to do with the recognition of fringe belts as entities. Many of the factors that account for the survival and changing character of fringe belts, such as the dependence on fringe-belt features that develops among other land users in the vicinity and the locational inertia induced by increased investment in sites, particularly by institutions, have been adduced in the past by the analysis of chronologies of landscape change (for example, Conzen, 1968; Whitehand, 1967) and the application of adaptations of bid-rent theory (for example, Barke, 1990; Whitehand, 1972).

Because of the large size of the fringe-belt plots relative to other types of site, especially house plots, their redevelopment affected a relatively large number of neighbours: commonly at least one boundary bordered, or was on the opposite side of the road from, numerous private householders. In addition, fringe-belt land uses tend to be relevant to several government, quasi-government or non-government organizations and related professional bodies. Not surprisingly, therefore, proposals for fringe-belt plots not only generated large numbers of consultations and representations through the formal development control process but also large numbers of informal communications.

In case of particular land uses, such as playing fields and allotments, and sites of special ecological or architectural and historical interest, planning policies have played a part in maintaining their character, and thereby, incidentally, aided the continued existence of the fringe belt. But in other cases, the survival of the fringe belt has been more a by-product of market forces, including cases in which occupiers of the fringe belt have been constrained by the lack of alternative sites to which they might move if they are to continue to fulfill their function.

2.14.5. THE ROLE OF LOCAL ACTORS IN TRANSFORMING THE URBAN FRINGE

Christopher R. Bryant

Department of Geography, University de Montreal, Canada

The urban fringe is characterized by relatively strong pressures for growth compared to more distant rural areas. However, within the urban fringe there is a strong differentiation of space both in the context of the agricultural and rural spaces within the urban fringe, as well as in terms of the social composition and economic bases of the different communities. Part of the differentiation can be traced to meso and macro scale forces, but local agency has an important role to play as well, either be individual and even selfish interests or collective community interests. This is related to the fact that the different interests get to play themselves out

through the local and regional power and influence structures even when there is an attempt to manage the process of change for the collective interest.

The segment model and approach described in the article has contributed significantly to understanding the dynamics by which differentiation takes place with the urban fringe. The uneven patterns of development and accumulation are reflected in differential accessibility to quality of life, services, housing, environment and employment. As in many environments, there is inertia and cumulative effects in the actual unplanned and planned processes of managing change. However, there are also continual changes occurring. This is particularly the case with respect to the interests present and perceived.

Changes in these reflect both the growing awareness of different values associated with the environment generally as well as the changing composition of the population in many communities in the urban fringe.

Finding ways to harness the energies and creativity of individuals and local actors generally in this dynamic environment will almost certainly involve recognizing the need to be prepared to alter planning and management strategies continuously and to organize planning and management in ways that recognize the important actual and potential segments that make up the mould within which the development process actually takes place.

The segment approach has the potential to contribute to this through its emphasis on the importance of identifying actual and latent segments or orientations and by showing how a more inclusive community planning and management process can be built around planning and management processes in each segment.

2.14.6. CONTAGION EXTERNALITIES AND THE CONVERSION OF LOW-INTENSITY LAND USES ON THE URBAN FRINGE

Dennis C. Cory and Mary B. Willis

Department of Agricultural Economics, University of Arizona

The last decade has been characterized by a growing concern over the conversion of important farmlands and unique natural environments to developed uses. Preservation of agricultural, recreation, and/or open space uses of land around expanding urban areas faces unique problems. The paper examines the impact of spatial considerations on preservation policy, for both short-run and long-run policy formation. It is concluded that failure to account for the external effects generated from urban development will lead to inefficient preservation strategies based on fiscal incentives and mis-specified preservation goals.

2.14.7. DEVELOPMENT CONFIGURATIONS AND PLANNING NEGOTIATIONS: A CASE OF FRINGE DEVELOPMENT IN SYDNEY, AUSTRALIA (Urban Studies)

Kristian James Ruming

Department of Human Geography, Macquire University, Sydney

The paper explores how formal and informal institutional arrangements are mobilized in unique ways to secure development approvals. The institutional configuration mobilized to secure approval rests on the identity and history of the developer, project manager and their relation with the state and development actors. The differential enrolment or formal and informal institutions are by those who officially operate within the area (local) and by those who have moved into the area from other regions (foreign).

It is obvious that the local development actors are more likely to mobilize informal arrangements to secure approval, while foreign actors are more likely to use formal

arrangements. However, the picture is complicated given that some foreign actors pursue local consultants in an effort to utilize existing development relations for their own purpose , while some local consultants avoid certain foreign developers for fear that existing relations will be damaged.

Residential development networks are never stable, as new configurations and alignments shift the translations and identities of actors. Development is facilitated through the enrolment of a number of factors and institutions, ranging from local developers, foreign developers, local consultants and local informal associations with individuals within Council, to formal policy rules in an effort to facilitate development.

From the literature review, it can be concluded that fringes should be judiciously managed, otherwise, in no time they would be encroached with unplanned and illegal slums, squatters, ribbon and mushroom developments because of the ample availability of land, low land prices, absence of municipal byelaws and taxes.

CASE STUDIES

3.1. STUDY OF SOUTHERN FRINGE AREA ACTION PLAN OF CAMBRIDGE

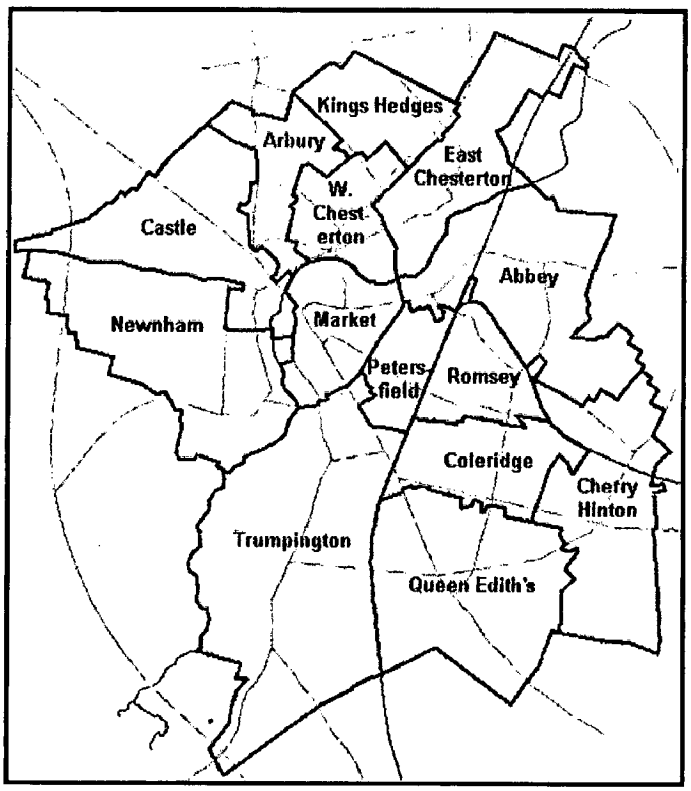
Cambridge City is a town in Jackson Township, Wayne County, Indiana, United States. It is located at 39°48′47″N and 85°10′15″W. It is a compact cosmopolitan city with outstanding architecture old and new. The beauty of its ancient centre is preserved with its walkable medieval streets, college courts, gardens and bridges.

Cambridge City is noted for its abundance in historic architecture, specifically in the Federal, Greek Revival, and Italianate styles. Famous structures include Rose Hill, the Martin Funk-Johnson House, the Fowler House, and many more.

Area	
- Total	1.0 sq mi (2.7 km^2)
- Land	1.0 sq mi (2.7 km^2)
- Water	0.0 sq mi (0.0 km^2)
Elevation	935 ft (285 m)
Population (2000)	
- Total	2,121
- Density	2,039.4/sq mi (787.4/km^2)
Time zone	EST (UTC-5)
- Summer (DST)	EST (UTC-5)

3.1.1. DEMOGRAPHY (census 2000)

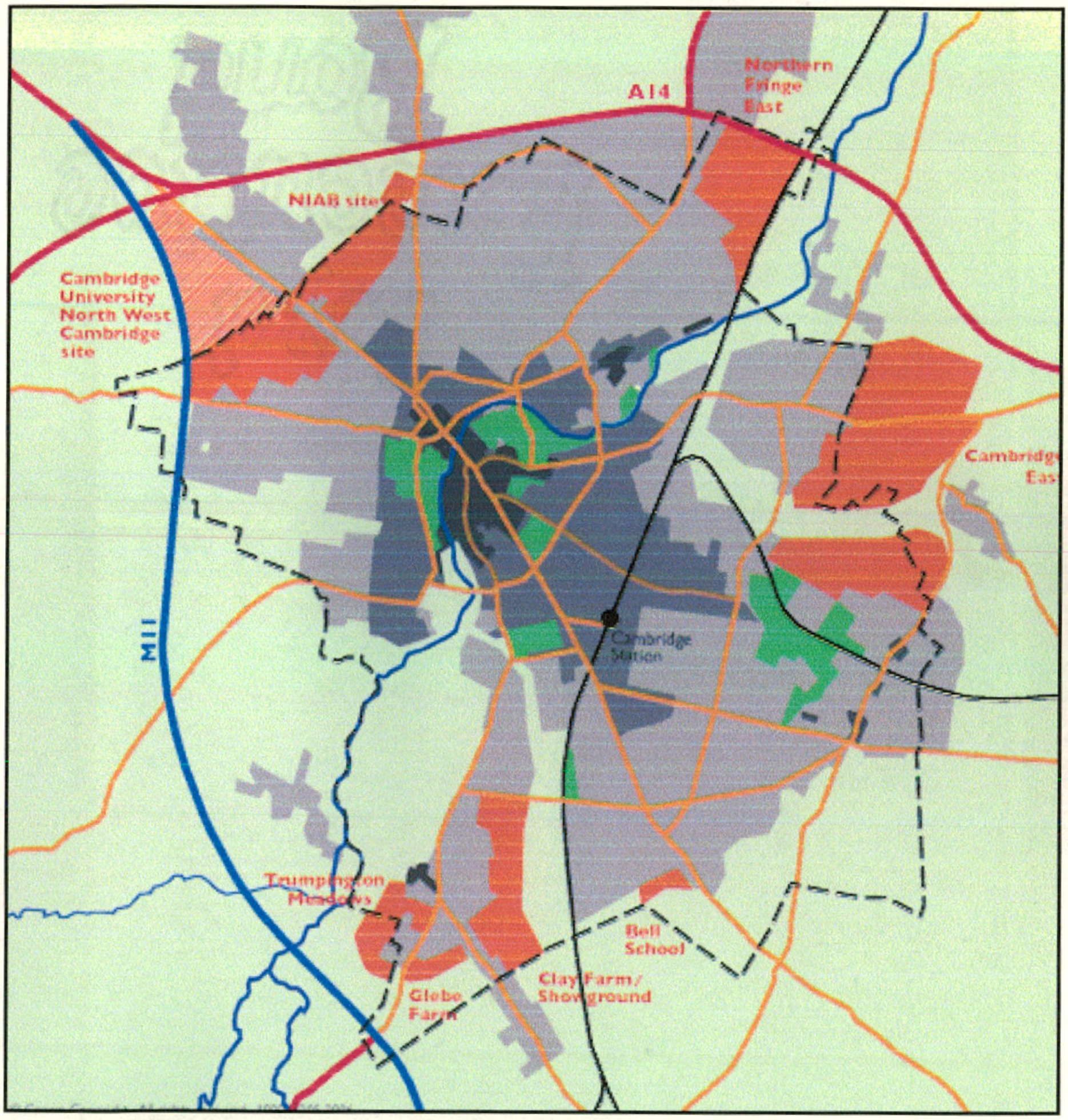
- 904 households, and 602 families residing in the town.
- 956 housing units at an average density of 354.9/km^2.
- Races - 99.34% White, 0.33% African American, 0.09% Asian, 0.05% Pacific Islander, 0.19% from others.



Map.3.1. Cambridge city
Source: Cambridge Southern Fringe Area Action Plan

Average household size is 2.35 and average family size is 2.85. 23.8% under the age of 18, 9.4% from 18 to 24, 26.2% from 25 to 44, 21.5% from 45 to 64, and 19.1% of 65 years or older. Median age is 38 years. sex ratio 88:100.

Median income for a household is $33,750, and that for a family is $41,731. 6.9% of families and 8.6% of the population are below poverty line.



Map. 3.2. Detailed Map Of Cambridge
Source: Cambridge Southern Fringe Area Action Plan document

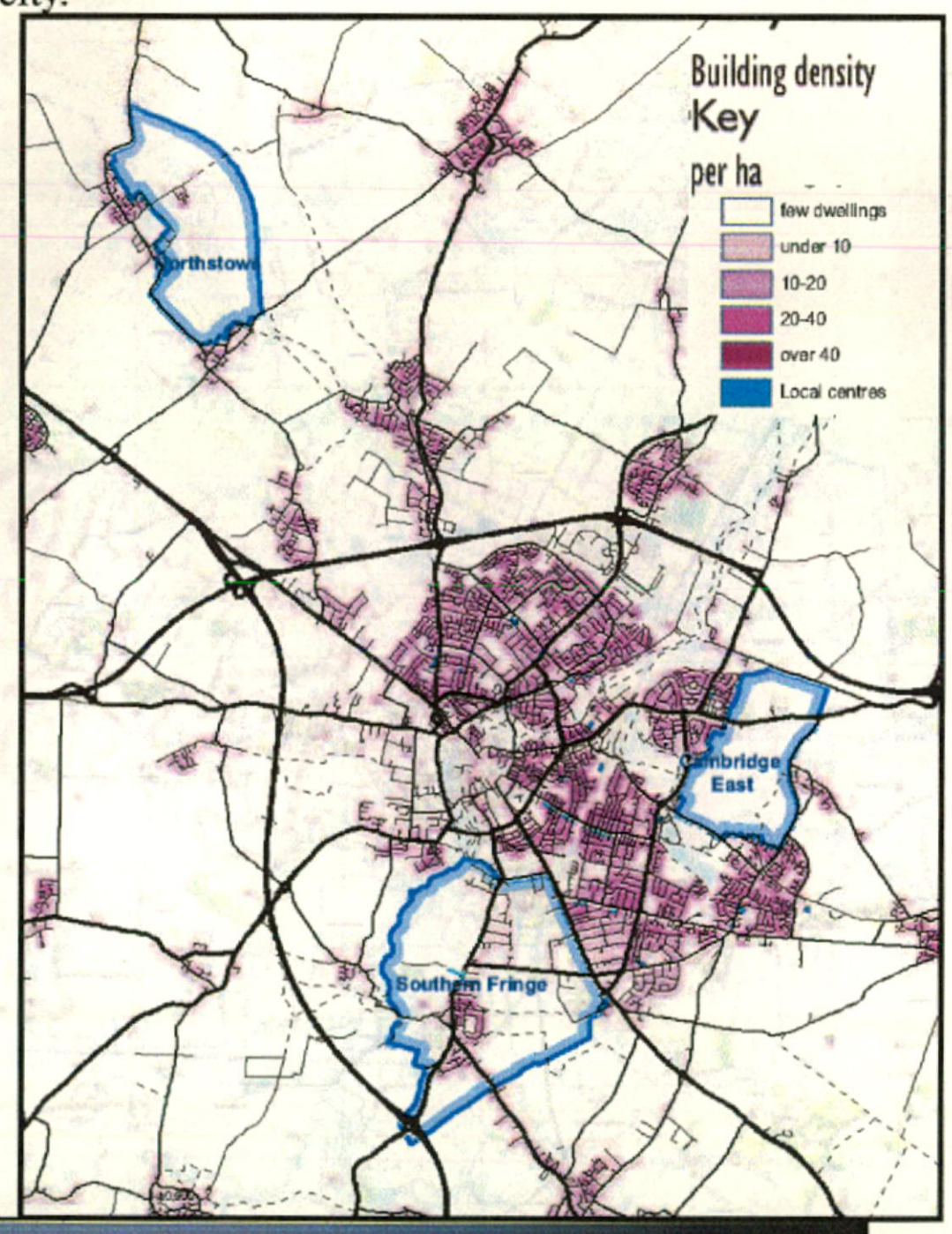
3.1.2. FACTORS RESPONSIBLE FOR THE GROWTH OF CAMBRIDGE

- Increase of employment opportunities with the establishment of technical firms attracting employees from the surrounding areas.
- Increase in job opportunities with restricted land supply has led to rise in property prices.
- People who are employed in Cambridge are forced to live beyond the green belt for cheaper accommodations.
- Population growth in the surrounding rural areas and towns.

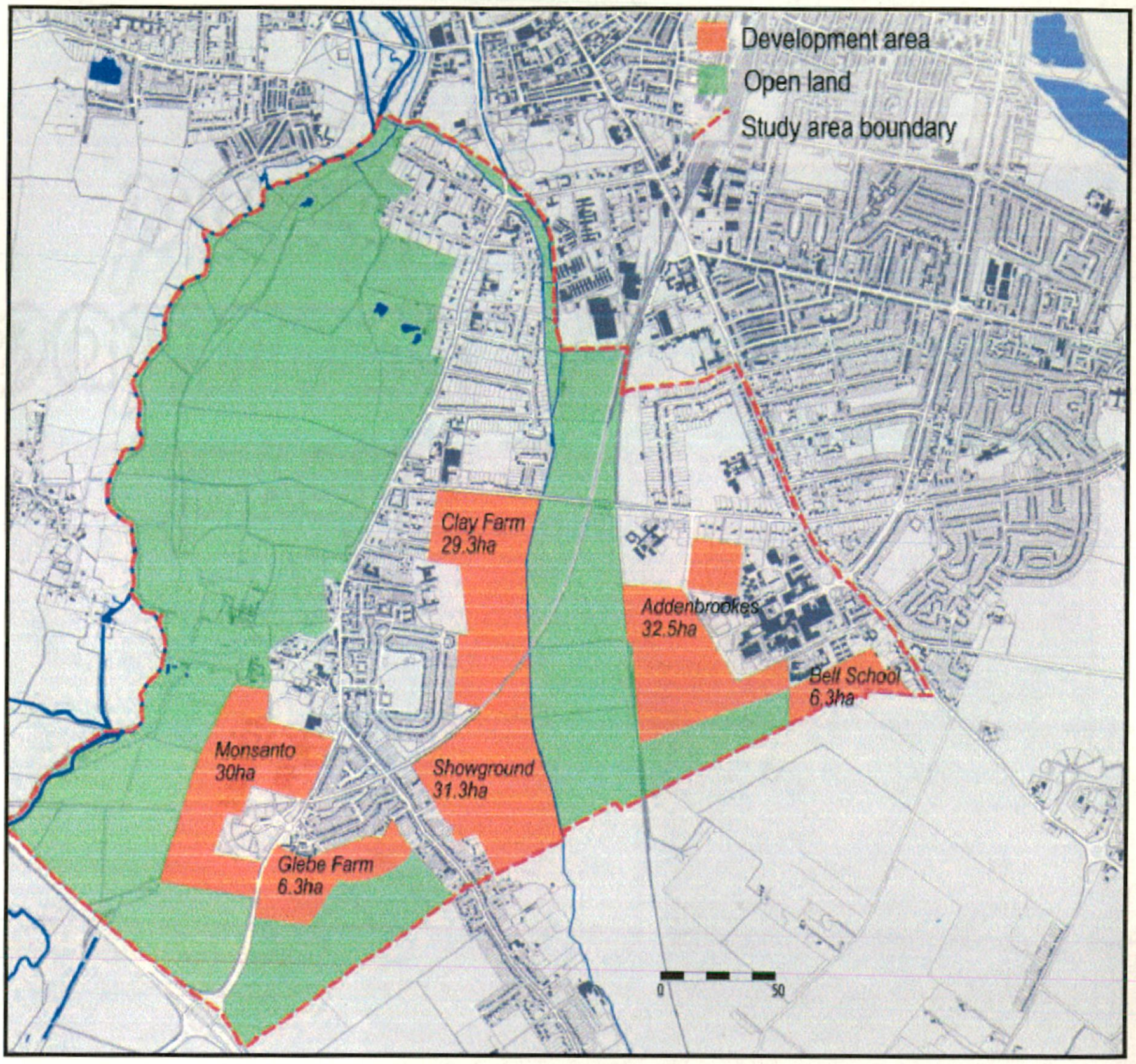
3.1.3. BUILDING DENSITY IN CAMBRIDGE

The city is radio centric in nature and is educational by character. The development in the city is restricted by the green belt around the city.

Study area	Southern Fringe	Cambridge East	Northstowe
Situation	Town extension	New district for Cambridge	New settlement and exurb
Households capacity	2,800	14,000	10,000
Distance from town centre	3.5km	3.5km	9km
Develop-ment area identified	120 ha	320 ha	430 ha



Map. 3.3. Building density map of Cambridge



Map. 3.4. Map showing study area boundary
Source: Cambridge Southern Fringe Area Action Plan document

3.1.4. NEED FOR DEVELOPMENT IN CAMBRIDGE'S URBAN FRINGE

Previous policy restrained development on the fringes of Cambridge in order to protect the historic character of the City. But this approach was having negative impacts on surrounding towns and villages and was causing high levels of in-commuting to Cambridge by car. The Cambridge Southern Fringe Area Action Plan (AAP) includes development of approximately 600 dwellings and appropriate employment, services, facilities and infrastructure that will form part of an urban extension to be released from the Green Belt to the south west of Cambridge.

'The vision for the Southern Fringe is to create a distinctive new urban extension to the City to meet a range of needs for the Cambridge area, including additional housing close to an existing employment area, new employment opportunities, the expansion of clinical facilities and biomedical and biotechnology activities, related higher education and research institutes, and improved access to the countryside. The extension will incorporate open space to serve the residents of the new development, Cambridge City and South Cambridgeshire and opportunities will be taken to enhance amenity, biodiversity and access to the Green Belt.'

(extract from Policy 9/5 Local Plan Redeposit Draft)

3.1.5. KEY ISSUES IN SOUTHERN FRINGE

- Southern Fringe study area includes the old village of Trumpington, which has grown into a suburban neighbourhood cell.
- To integrate the planned new development with the existing neighbourhood of Trumpington.
- To avoid further worsening of congestion and its environmental consequences along the main radial.
- To improve the level of services which are available locally, and reduce social exclusion.
- To plan the future of Addenbrookes so as to capitalize on its unique potential while avoiding imbalance in employment distribution.
- To increase urban capacity while safeguarding environmental capital.
- Much land has been allocated for further housing growth, doubling the spatial extent of Trumpington, but there remains extensive areas of open land

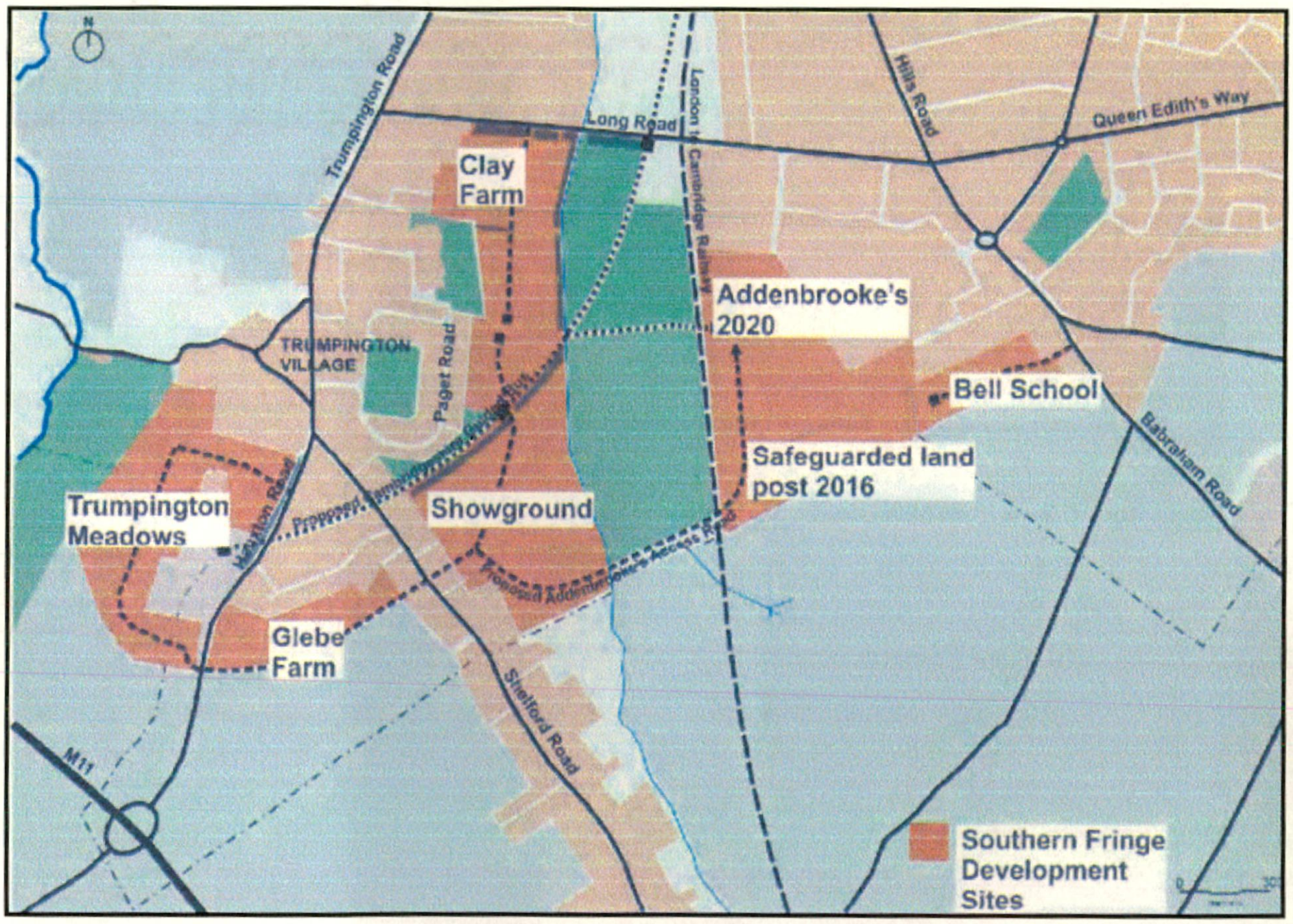
3.1.6. Principal land uses in Southern Fringe may be summarized as

- 65 hectares of housing, indicative capacity of 3,320 dwellings.
- Leisure and recreation facilities.
- 4.5 hectares for primary schools and a site for a secondary school.
- Around 10.3 hectares for NHS and private clinical development.
- 10.28 hectares of land safeguarded until after 2016 for future clinical development and research uses.

➢Up to 14.4 hectares of employment land, comprising biomedical and biotechnology research and development activities, related higher education and research institutes, local shopping and services in Trumpington centre and local neighbourhood shopping in areas of new development.

➢ A large-scale public open space of City wide importance.

➢ 1 hectare for a Household Waste Recycling Centre.



Monsanto (Trumpington Meadows) (600 indicative for South Cambridgeshire)	15.5 Hectares	750 homes within the City
Glebe Farm	6.88 Hectares	230 homes
Clay Farm/ Showground	60.69 Hectares	Up to 2300 homes
Addenbrooke's	57.93 Hectares	Clinical/ biomedical uses/ research and development
Bell School	7.61 Hectares	310 homes

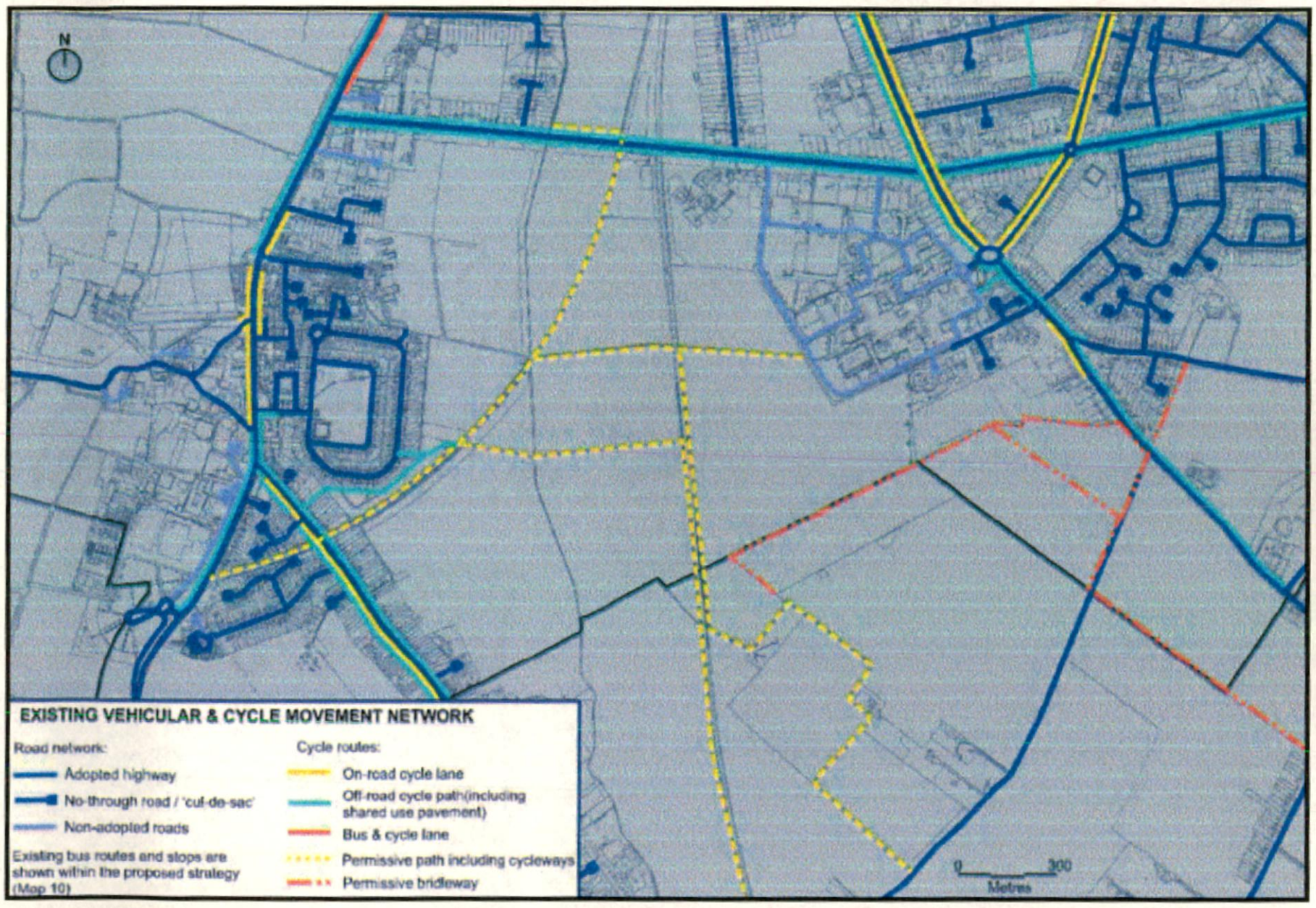
Map. 3.5. 5 major development sites in southern fringe

Source: Cambridge southern fringe area development framework: Cambridge city council

3.1.7. EXISTING MOVEMENT NETWORK

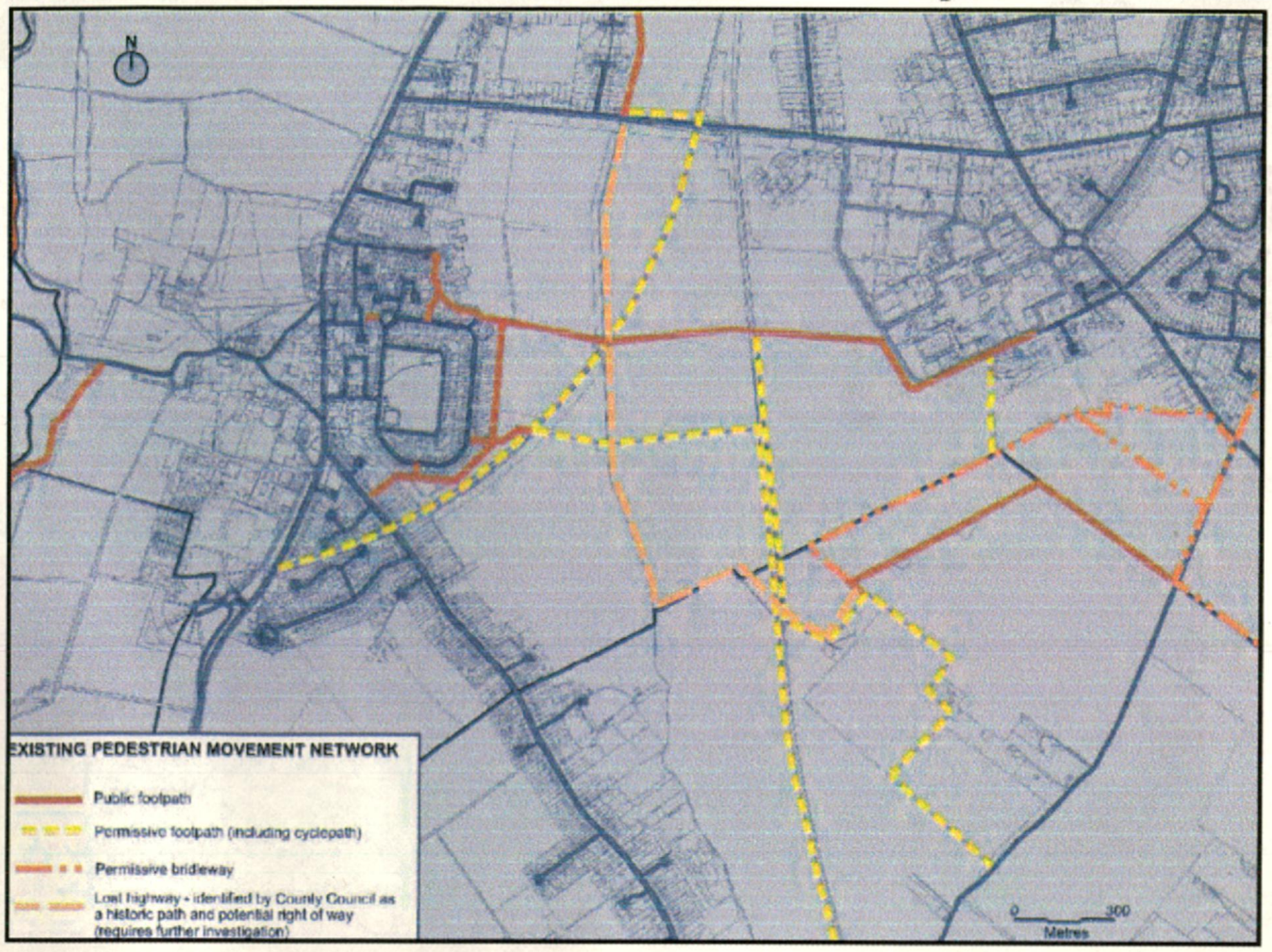
The Southern Fringe is currently served by three principal vehicle routes. These include Trumpington High Street and the two routes southward i.e. Shelford Road and Hauxton Road, Long road on the northerly edge and Hills Road/Babraham Road which comprise routes to the south east.

Cycle routes currently follow the principal vehicle routes, as well as following more informal paths outside of the developed areas. Additional routes are being proposed within the Southern Fringe and will be considered in Section 3 of this document.



Map. 3.6. Existing vehicular and cycle movement network
Source: Cambridge southern fringe area development framework: Cambridge city council

Current pedestrian routes within the Southern Fringe include public footpaths and permissive footpaths, cycle ways and bridleways. One of the key public rights of way is the path connecting the Foster Road estate and Addenbrooke's Hospital.



Map. 3.7. Existing pedestrian movement network

Source: Cambridge southern fringe area development framework: Cambridge city council

3.1.8. RECOMMENDATIONS

- Boundary by Green Belt, which will constrain further growth to ensure that the city will not merge with any of the surrounding villages.
- No encouragement for further growth of the city.
- Steps to retain and enhance the strategic green corridor, natural features and key views.
- Creation of distinctive gateways, mitigation of disruption of the green corridor from transport routes.
- Key provisions for transport.
- Integrate new development in a sensitive way into existing development.
- Concentration of development as much possible in Cambridge city.
- Provide good quality community facilities.
- Ensure a high quality of urban design.

➢ Use sustainable development principles, including energy efficient design/buildings, sustainable drainage, and reduced car dependency.

➢ Provide an integrated, accessible system of open spaces, parks, trails, cycle routes and biodiversity spaces.

➢ Control the impact of traffic increases on existing residents.

➢ Ensure that developments do not become dormitories for commuters going to other destinations to work but are homes for those who will live and work locally.

3.1.9. INFERENCES FROM SOUTHERN FRINGE AREA ACTION PLAN OF CAMBRIDGE

➢ Physical separation from surrounding villages is maintained.

➢ Connection of the development to green spaces is there.

➢ Landscape is an attractive feature and the local landscape is reinforced.

➢ Increase of public access by walking, cycling and horse riding to the wider countryside.

➢ Linkage to the urban fabric of Trumpington.

➢ Creation of distinctive urban character, providing a strong sense of local identify and well developed sense of community spirit.

➢ Provision of high quality housing and sustainable living.

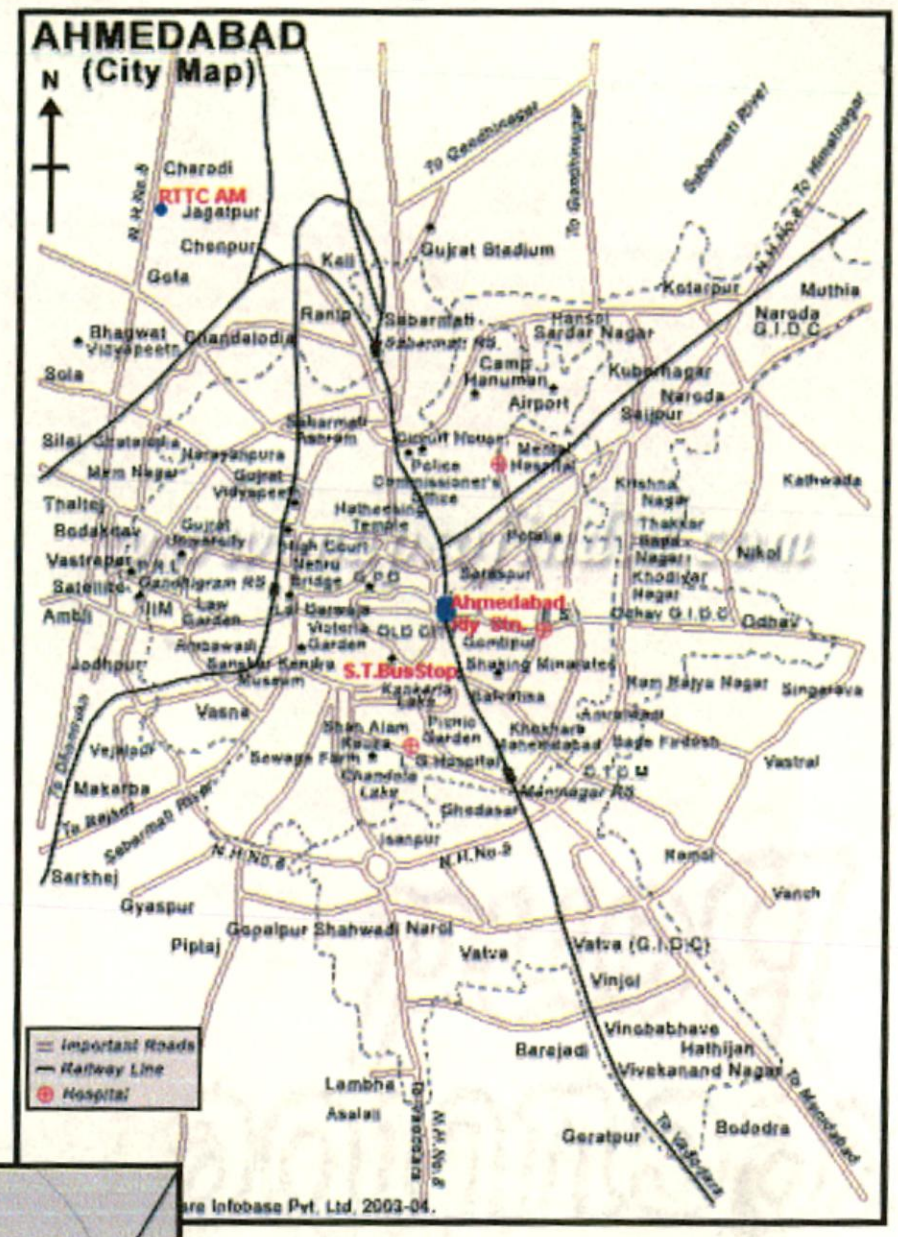
➢ Enabling residents to live a healthy lifestyle in a safe environment.

➢ Highest quality built form and open space throughout is designed.

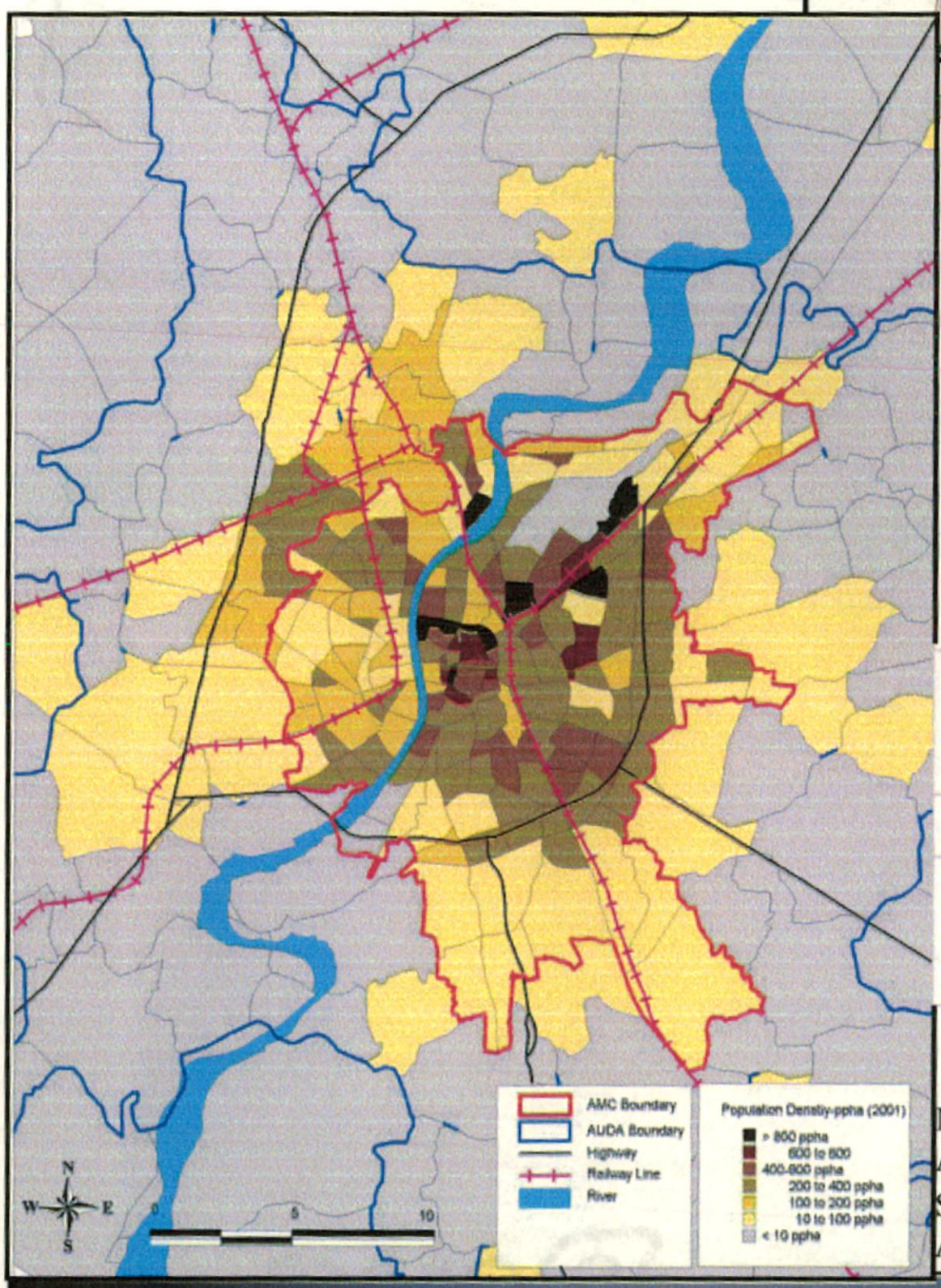
Car traffic generation is minimised at Trumpington West by ensuring that housing development and associated services and facilities are well connected by public transport and cycleways to most employment areas in Cambridge. Cambridge Southern Fringe is a more equivocal case. In the shorter term, it could form part of a compact city strategy or cellular corridor. In the long run, if the more ambitious schemes were to be adopted, it would be contribute to the compact city only. Improvement of the environment requires greater changes in the existing physical fabric.

3.2. STUDY OF PERI- URBAN AREAS OF AHMEDABAD

Ahmedabad stretches as far back as to 1411 AD, was founded as an area with enclosing wall defining a periphery to the city-limits. Ahmedabad is divided by the Sabarmati into two physically distinct eastern and western regions. City within the wall got structured into wards, organized by 12 main roads. Ahmedabad city offers a unique style of architecture, which is a blend of Hindu and Islamic styles.



Map. 3.8. City map of Ahmedabad



7th largest metropolis today, Ahmedabad remains the cultural and commercial heart of Gujarat and much of western India. Ahmedabad has grown 33times than its original limits.

Population	4,525,013 (2001)
• Density	• 22,473 /km^2 (58,205 /sq mi)
• Metro	• 6,167,589 (7th) (2009)
Time zone	IST (UTC+5:30)
Area	205 km^2 (79 sq mi)
• Metro	• 10,000 km^2 (3,861 sq mi)
• Elevation	• 53 m (174 ft)

Map. 3.9. Population density map of Ahmedabad

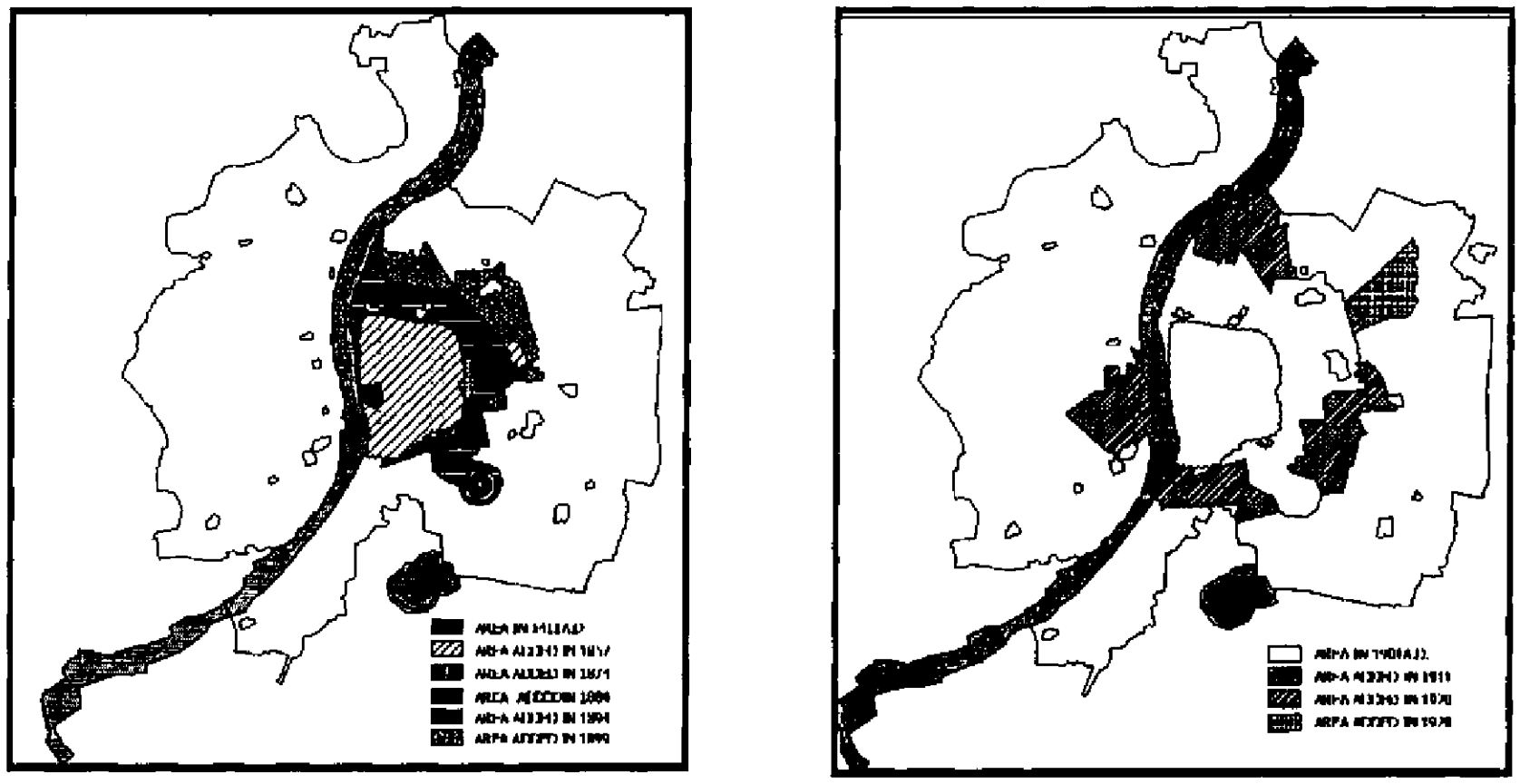
Source: City development plan, Ahmedabad

3.2.1. DEMOGRAPHIC PROFILE

Ahmedabad Municipal Corporation (AMC) grew from an area of 52.49 Sq.Km. (1950) to 190.84 Sq.Km. (1991) over 43 wards.

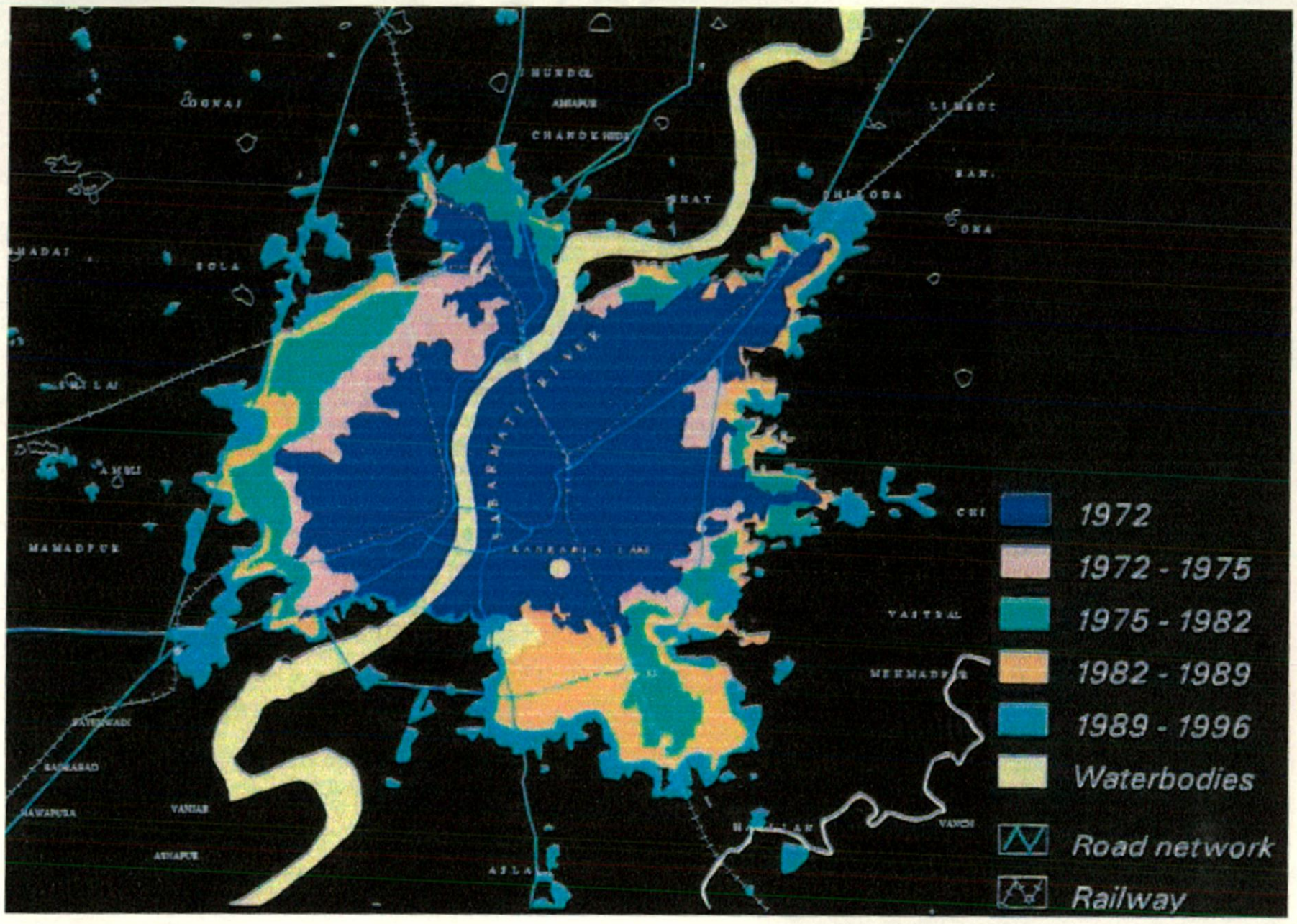
The urban agglomeration is spread over 259.63 Sq.Km. In 2001, the population of Ahmedabad Urban Agglomeration was 4.51 million (25%) while the AMC area was 3.51 million.

Average decadal growth rate of population in AMC since 1901 has been 37.55%. Population in AMC area is expected to double by 2011.Average density of population in AMC area is 18,420 persons/Sq. Km.



(1) 1411 to 1900
(2) 1901 to 1930
(3) 1931 to 1950
(4) 1951 to 1960

Map. 3.10. Phases of growth of Ahmedabad



Map. 3.11. Growth of Ahmedabad
Source: City development plan, Ahmedabad

3.2.2. GROWTH OF AHMEDABAD

Analysis of the fringe areas of Ahmedabad show that much of the development is around a cluster of villages in the western side. Upto 1981, increase of population was concentrated within the old AMC, in the eastern part. Expansion of the peripheral areas began in 1980s. Earlier only eastern parts and peripheries registered faster growth rate, but since 1980s the western periphery has also grown rapidly.

A no. of historical constraints have pushed the formal CBD towards the western side of Sabarmati while industry and LIG housing is has developed in the eastern side. Population growth is rapid in fringe areas due to saturation of population within the city and consequent large scale housing development in the fringes. The periphery had low population size compared to the core and available land in the periphery to absorb this population. Rapid ribbon development happened along Sarkhej- Gandhinagar highway in 1990s. Spatial expansion of Ahmedabad is largely contiguous and relatively compact.

3.2.3. LAND USE

AUDA is responsible for landuse planning within its jurisdictions. Total area of AUDA is 1294.65 sq.km, of which about 50% is residential.

No major industrial development is allowed within 24km of AMC in AUDA area. Water bodies and wastelands cover 12 % and 17% of area respectively. Industries cover 9 % of the area.

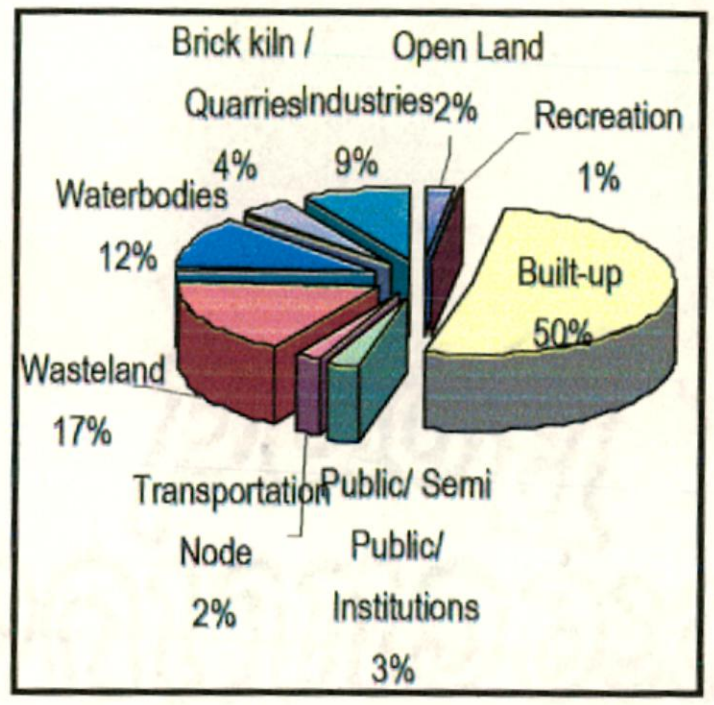
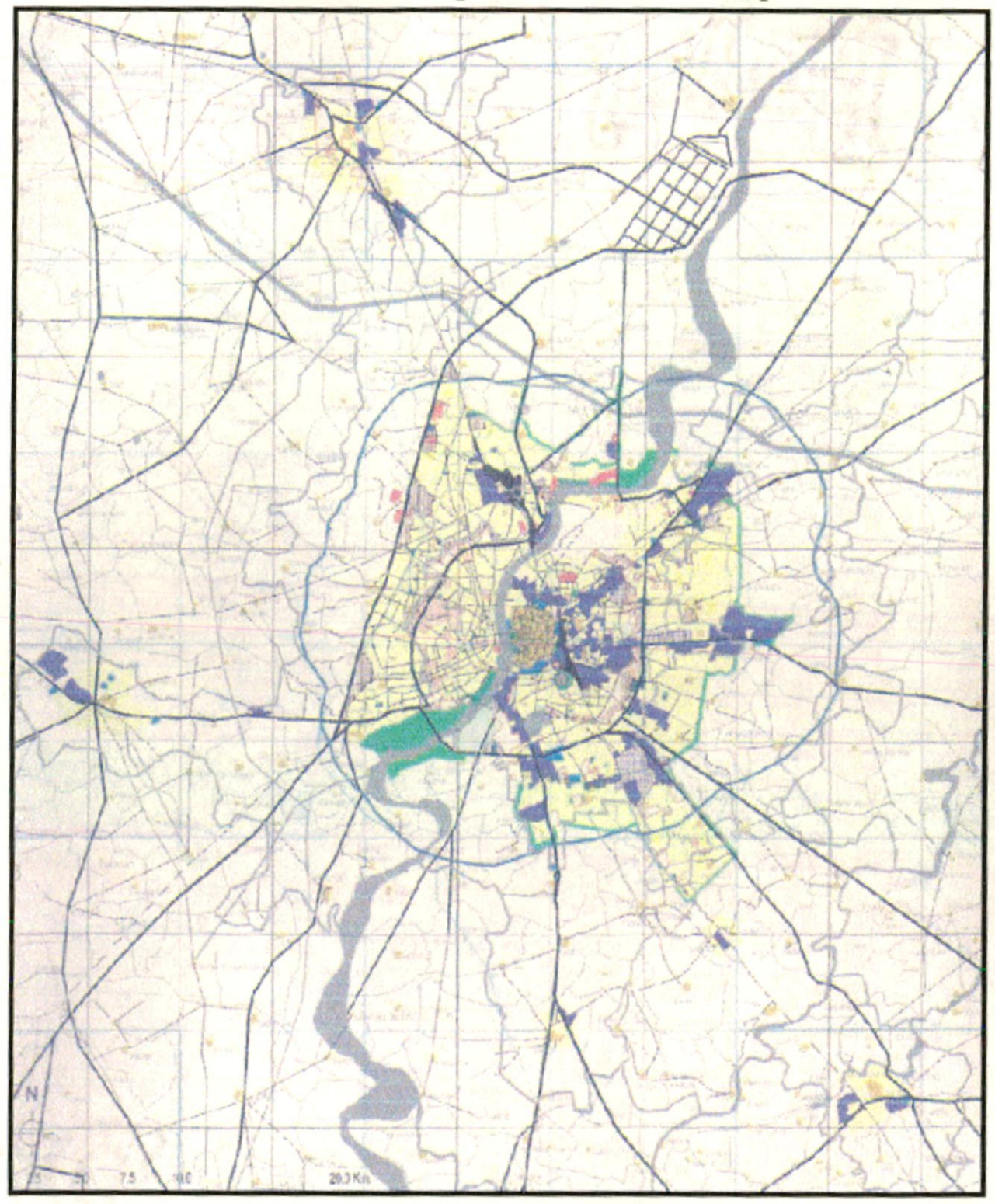


Fig. 3.1 Landuse break-up of Ahmedabad

Map. 3.12. Landuse map of Ahmedabad

Source: City development plan, Ahmedabad

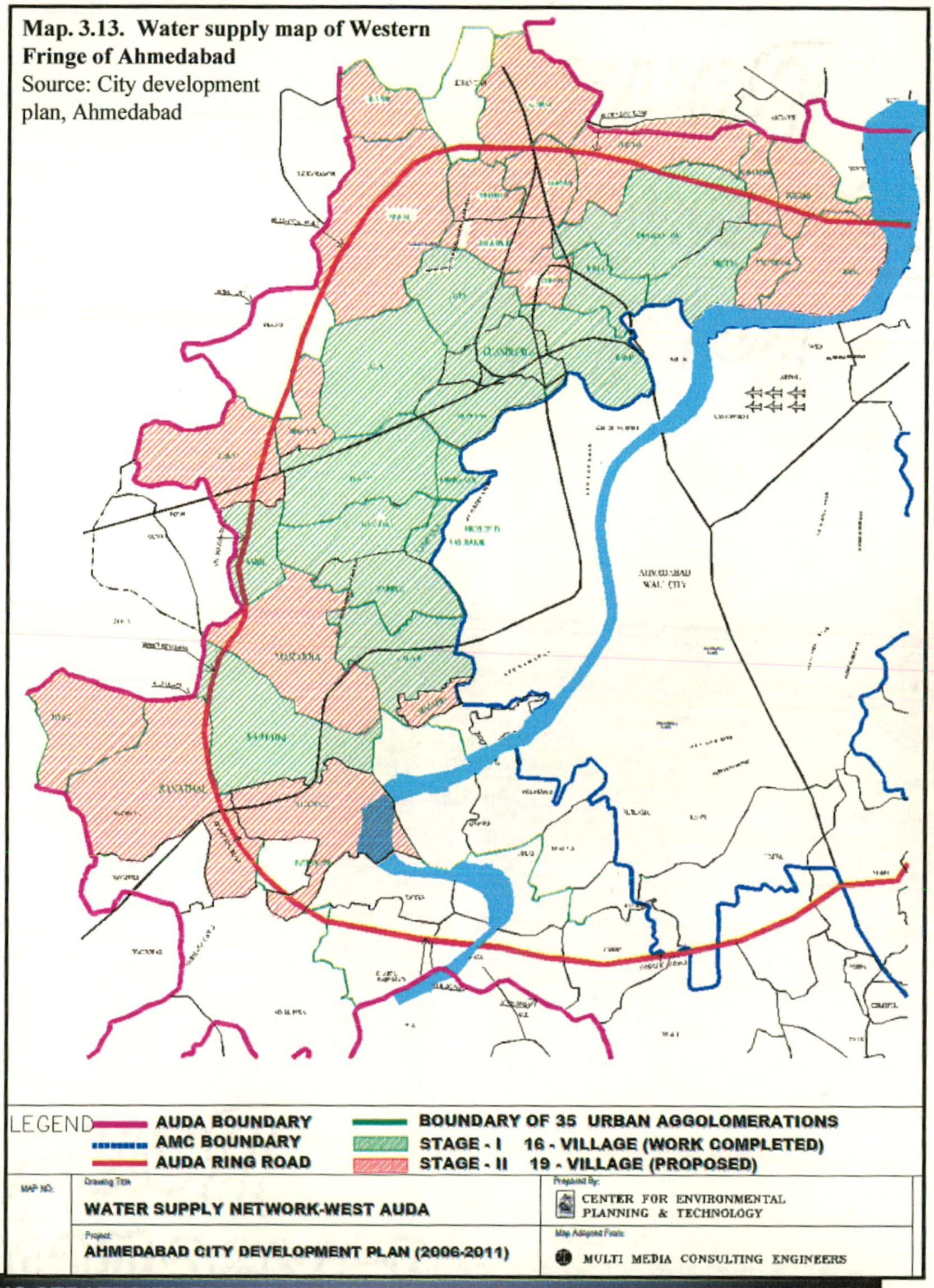


3.2.4. WATER SUPPLY

Water supply in the fringe areas covering less than 10% of the population is largely limited. Due to steep increase in the population and multi-storied buildings in the fringe, the local bodies are not able o provide requisite water. The societies maintain their own bore wells.

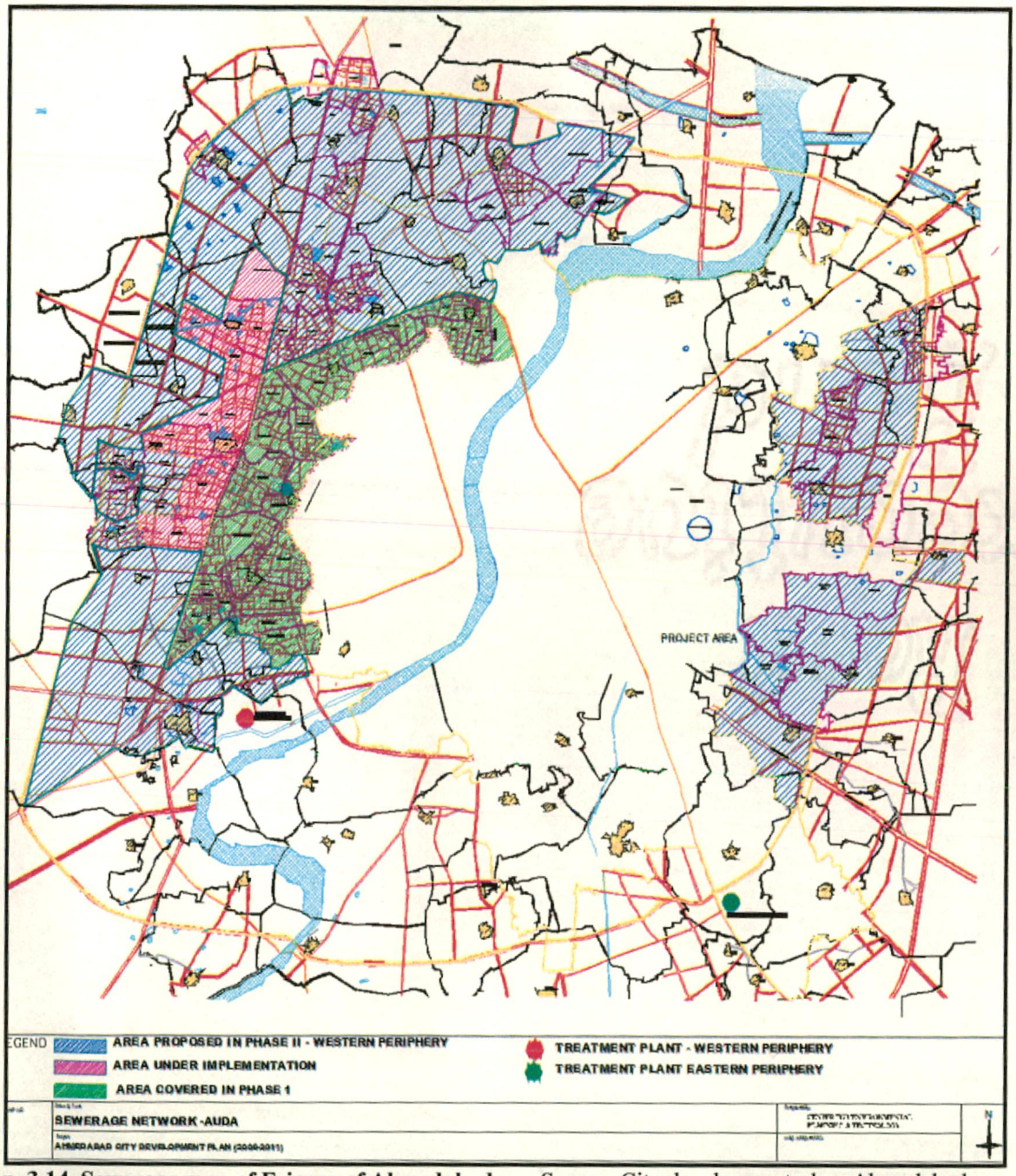
They face problems of excessive draw down in water levels, functional problems and deteriorating water quality. Other alternatives sought are bottled water and supply tankers. In the eastern fringe, water is drawn from tube wells by individual societies and local bodies as well. Providing Water Supply in 19 Urban Agglomerations in the Western Periphery at an estimated cost of Rs 117 crores.

Map. 3.13. Water supply map of Western Fringe of Ahmedabad
Source: City development plan, Ahmedabad



3.2.5. SEWERAGE

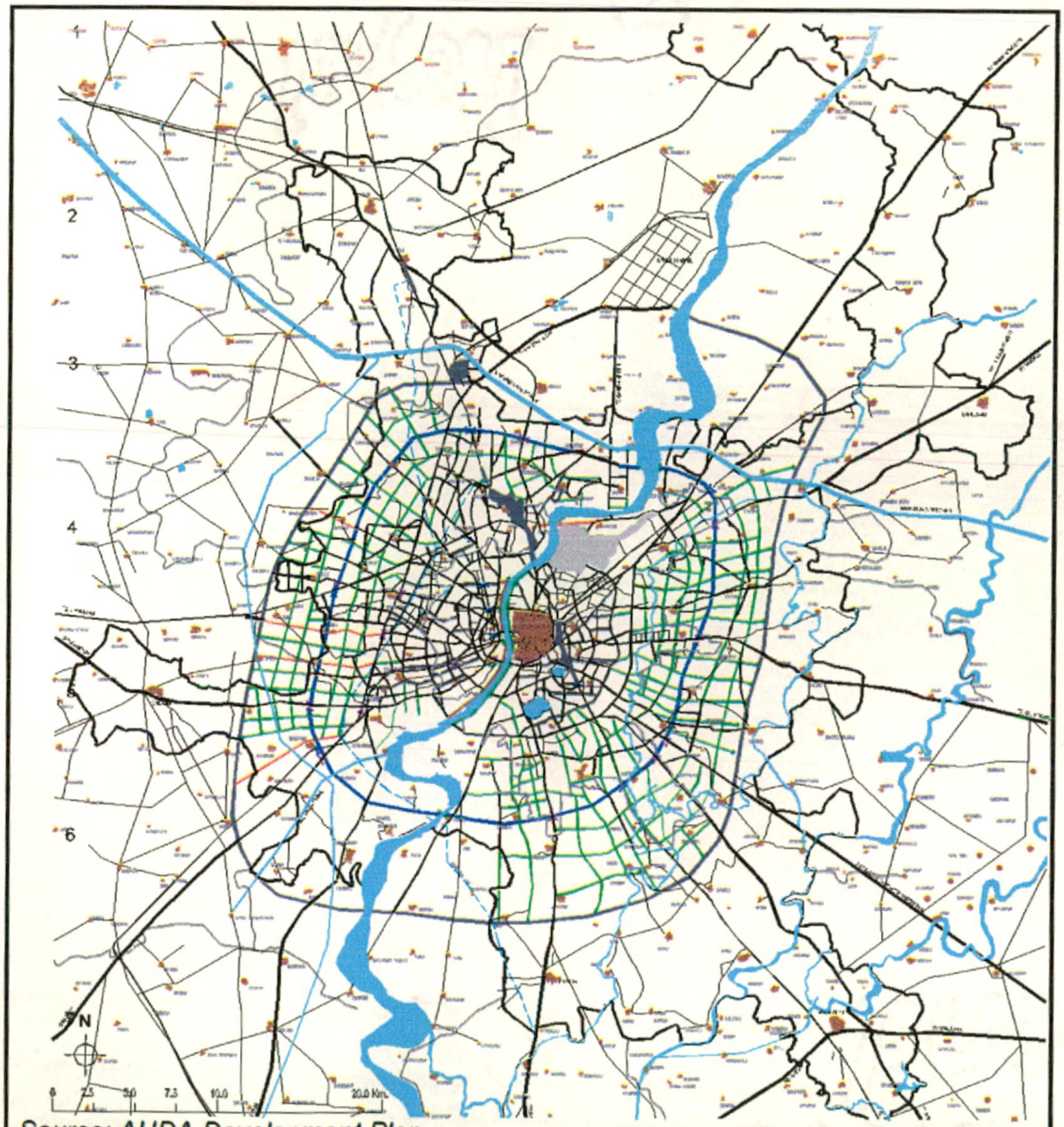
In the periphery systems is very limited and has to be built for most part. Further, untreated waste was disposed in to River Sabarmati. Some polluting industries are also disposing off their wastes either in Kharicut canal or within the estate. The rest of the industries are pumping their effluent into the GIDC main sewer line. Cases of industries putting their effluents into the manholes have also been reported. Mixing of storm water with sewerage during monsoons was also a major issue.



Map. 3.14 Sewerage map of Fringes of Ahmedabad Source: City development plan, Ahmedabad

Projects:

- Developing Common facilities for collection of construction debris: **Rs. 800. Lakhs.**
- Equipment for the purchase of tools and equipment for primary collection, secondary storage and transportation of waste: **Rs.700 Lakhs.**
- Treatment and Disposal System with additional equipments needed: **3900 Lakhs**
- Phase I : 76 Sq. Km of West AUDA is experiencing rapid development. Of this 44 sq. kms of sewerage network is completed covering a population of 6.5 Lakhs including a Treatment plant at Vasna (90 Mld UASB).
- Phase-II of 34 Sq. Kms, Sewerage network is being planned along with Treatment Plant of about 90 MLD. (Network + Treatment) at a cost of Rs.104 Crores.



Source: AUDA Development Plan

Map. 3.15. Road network map of Ahmedabad

3.2.6. SOLID WASTE MANAGEMENT

In fringe areas, the urban local bodies have initiated daily door-to-door collection of solid waste. In the rural local body areas initiative is limited. Disposal of waste is also a major area of concern. 35 settlements in the west and 15 settlements in the periphery, under jurisdiction of AUDA are experiencing the problem severely. Total estimated waste is 343 TPD.

Projects:

- Developing Common facilities for collection of construction debris: Rs. 800. Lakhs.
- Equipment for the purchase of tools and equipment for primary collection, secondary storage and transportation of waste: Rs.700 Lakhs.
- Treatment and Disposal System with additional equipments needed: 3900 Lakhs.

3.2.7. REASONS BEHIND DEVELOPMENT OF WESTERN FRINGE

Dominant factor behind the developments within the city has been the private sector. Their role has been limited to implementing development or town planning schemes. The major problem is that the private sector has to reshape the development plans before their implementation, which becomes increasingly complicated and expensive in terms of time and effort. The factors behind fringe development in Ahmedabad are:

- Low price and availability of land.
- Proximity and easy access to Ahmedabad city by road and public transport.
- Greener areas and freedom from congestion and pollution of the city.
- Minimal planning regulations, freedom from approval and permission problems from AUDA and AMC.
- Major lacking in synchronization of urban planning schemes and actual development.
- Developments have taken place before development plans came out leading to the provision of infrastructure later.

3.2.8. FEATURES OF EXISTING DEVELOPMENT IN THE WESTERN FRINGE

- Development continues without any guidelines due to absence of any statutory body.
- Regulatory mechanism for haphazard development is coming up in residential colonies in the vicinity of industrial areas.
- Residential developments are occurring along the transportation corridors showing ribbon development.
- Development of social facilities, open spaces and infrastructure are not in pace with the rapid residential progress.
- Low density and luxurious developments are observed at frequent intervals.
- Overall built up environment lacks character and cohesiveness.
- Physical environment and infrastructure are inadequate.
- Minimum requirements needed to sell plots are provided by the promoters including access.

3.2.9. STRATEGIES TO IMPLEMENT FRINGE DEVELOPMENT

- Increase in jurisdiction limits of the urban development authorities.
- Creating separate urban development agency for fringe areas.
- Revising planning norms and regulations in fringe areas.
- Revising regulatory measures pertaining to land and housing development.
- Delineating high pressure zones.
- Promote private sector participation on land development.
- Financing and implementation mechanism for fringe development, measures to ensure public and private partnerships.

3.2.10. INFERENCES DRAWN FROM WESTERN FRINGE OF AHMEDABAD

Expansion of he city is obvious, but it should be in a systematic manner with the provision of zoning regulations. Planning of small CBDs can be one of the solutions to reduce pressure on the main city. Preservation of environment has to be kept over personal gains. A minute and detailed analysis is required for developing policies and draft plans.

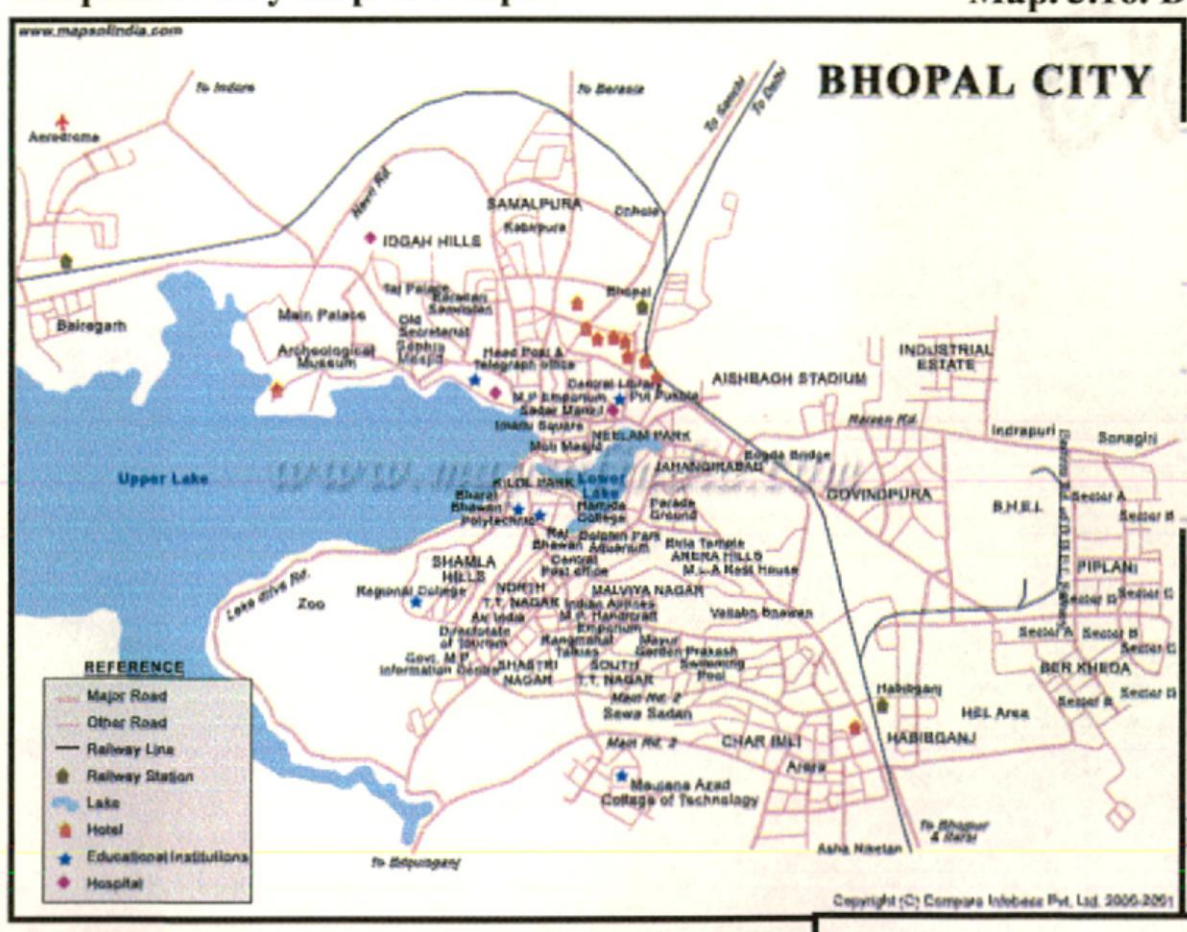
3.3. PLANNING STRATEGIES FOR DEVELOPMENT OF URBAN FRINGE OF BHOPAL

Bhopal, the *Lake city* as its landscape and dotted with a number of natural lakes. Bhopal is also one of the greenest cities of India.

Bhopal is one of the fastest growing cities in India. It is a city of inhabited pockets with open areas and natural barriers in between. Bhopal district is 80% urbanized with most people living in the city. Located on hilly terrain within the Malwa plateau 23 16'N, 77 22'E.

Map. 3.16. District map of Bhopal

Map. 3.17. City map of Bhopal

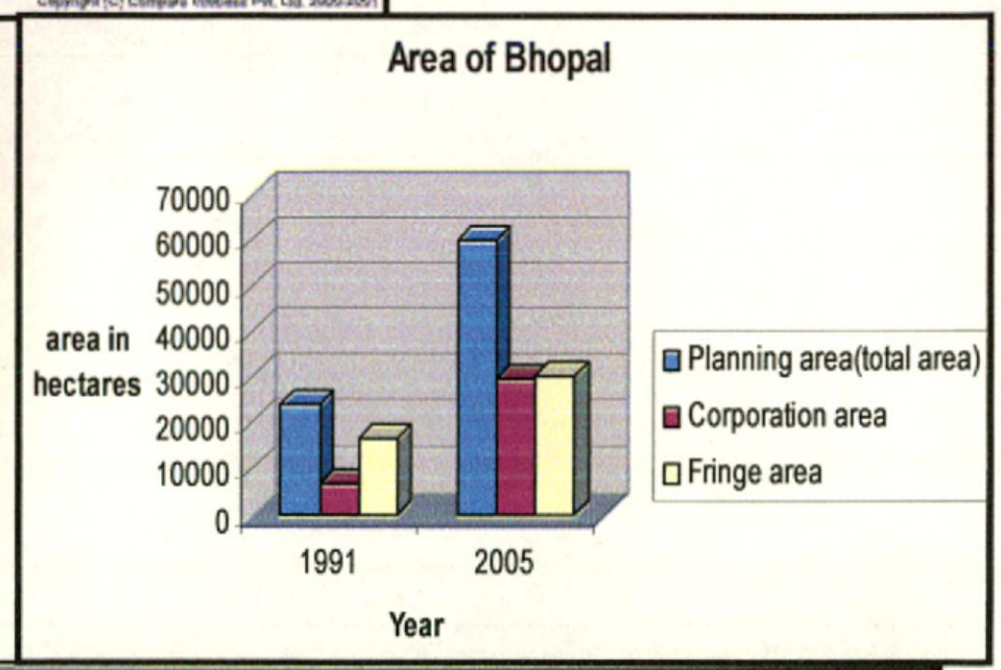


Population	1,458,416[1][2] (2001)
• Density	• 4,886 /km² (12,655 /sq mi)
Time zone	IST (UTC+5:30)
Area	298.48 km² (115 sq mi)[2]
• Elevation	• 427 m (1,401 ft)

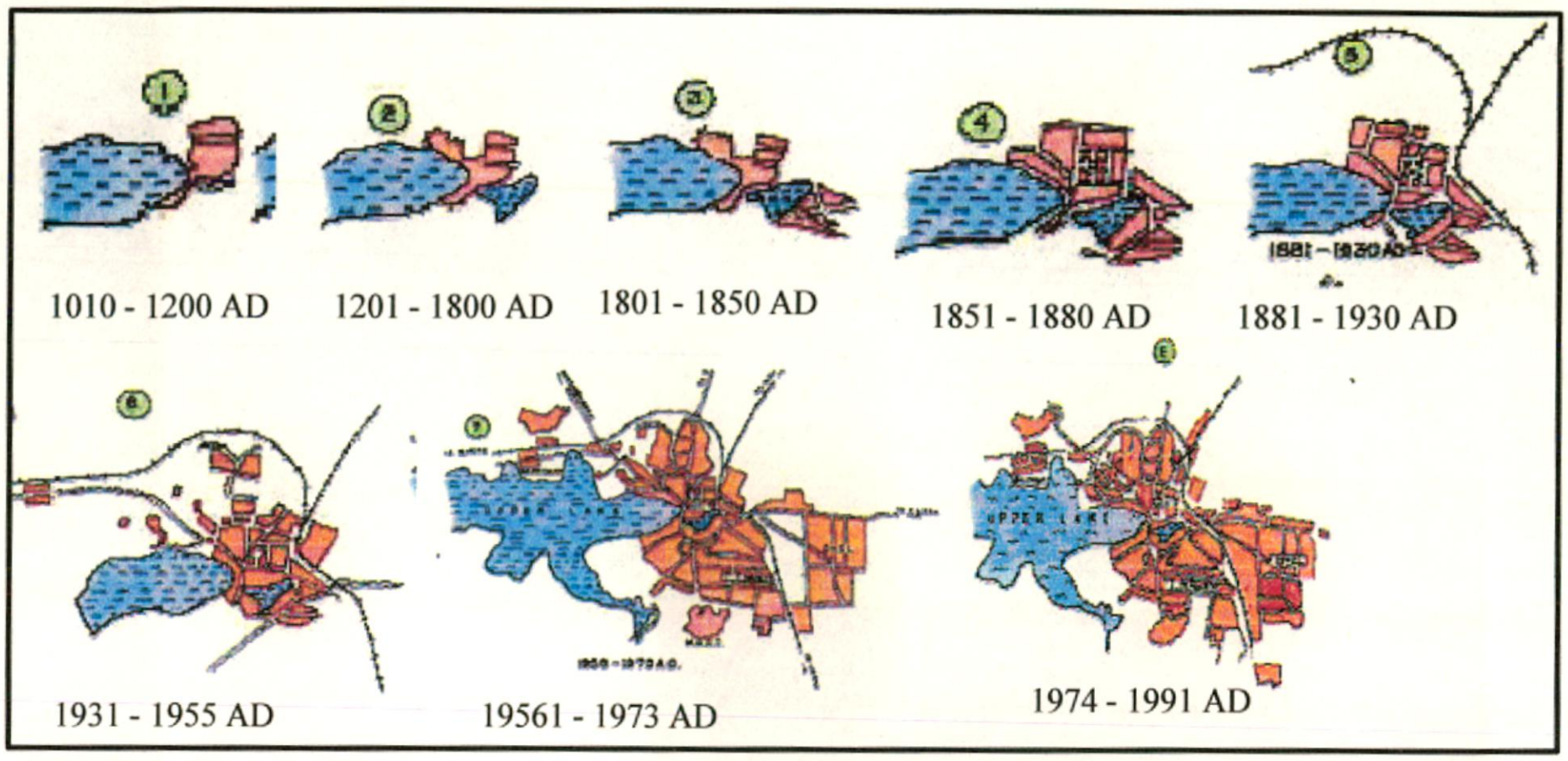
Fig. 3.2. Area of Bhopal

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. 3.3. Direction of growth of Bhopal



3.3.1. GROWTH OF THE CITY



Map. 3.18. Growth of Bhopal
Source: Master plan 1991

3.3.2. THE URBAN SPRAWL

Bhopal has not grown as one settlement but as discreet town ships, with sparse out growth in between, such as

- The original city and its periphery
- BHEL Town Ship
- Capital project area (Tatya Tope Nagar)
- Bairagarh
- New Out Growth

a) Kolar Road

b) Hoshangabad road

c) Ayodhya Nagar

Fig. 3.4. POPULATION CHANGES

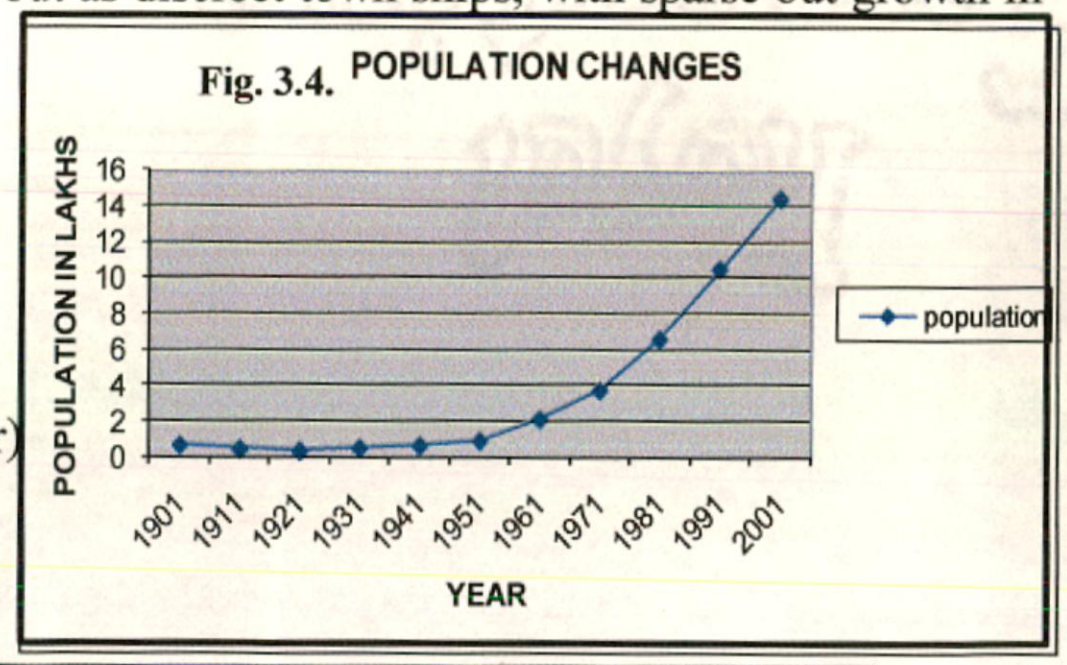


Fig. 3.5. land use allocation in 1961

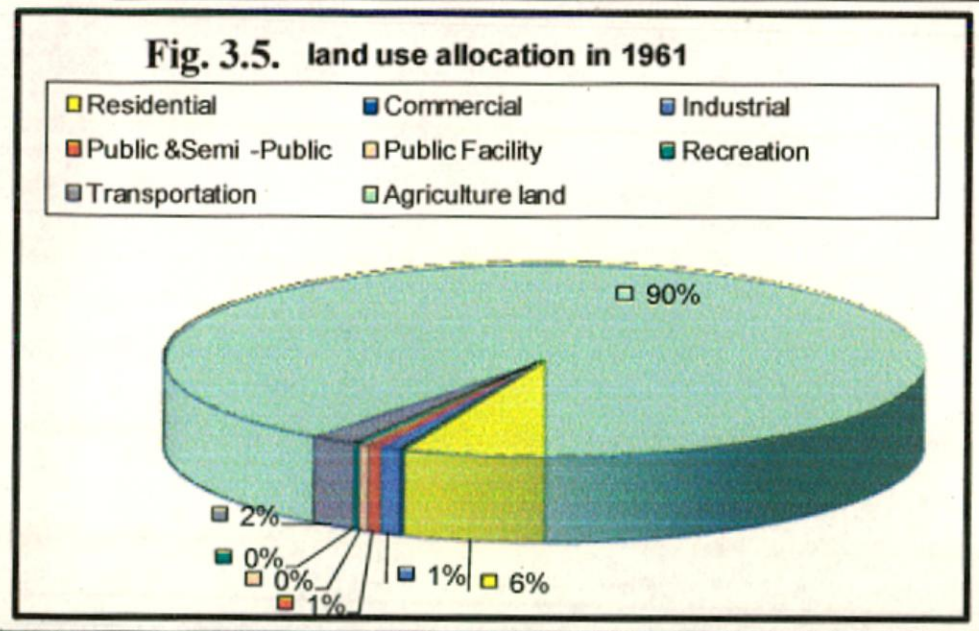


Fig. 3.6. land use allocation in1994

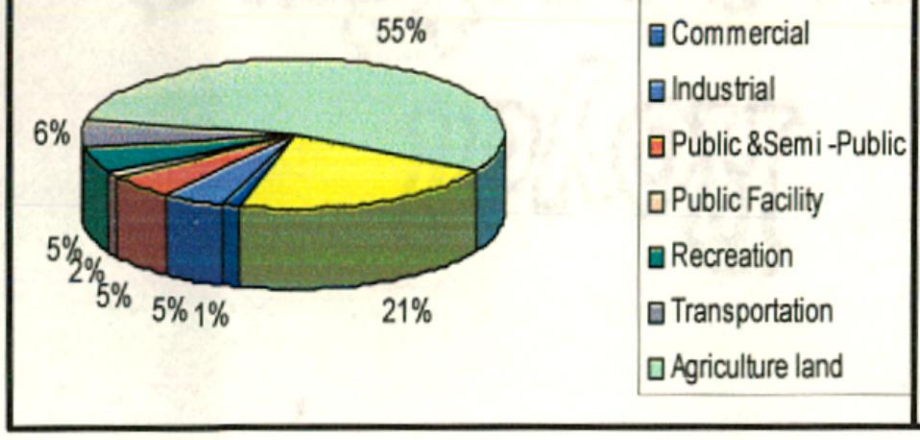
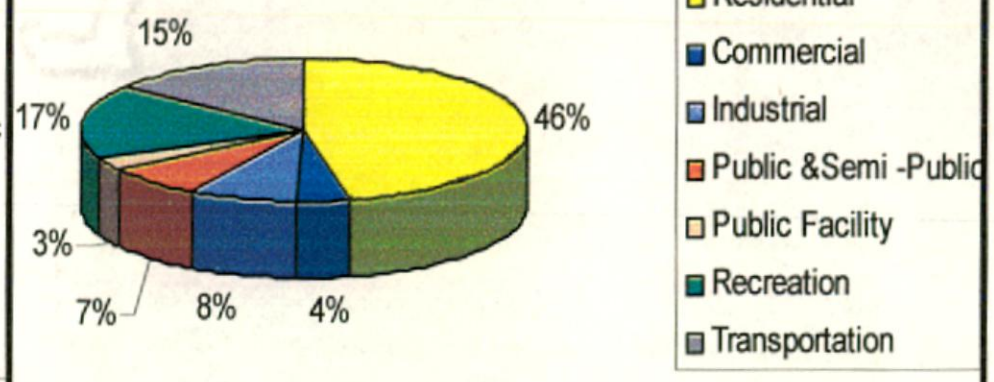
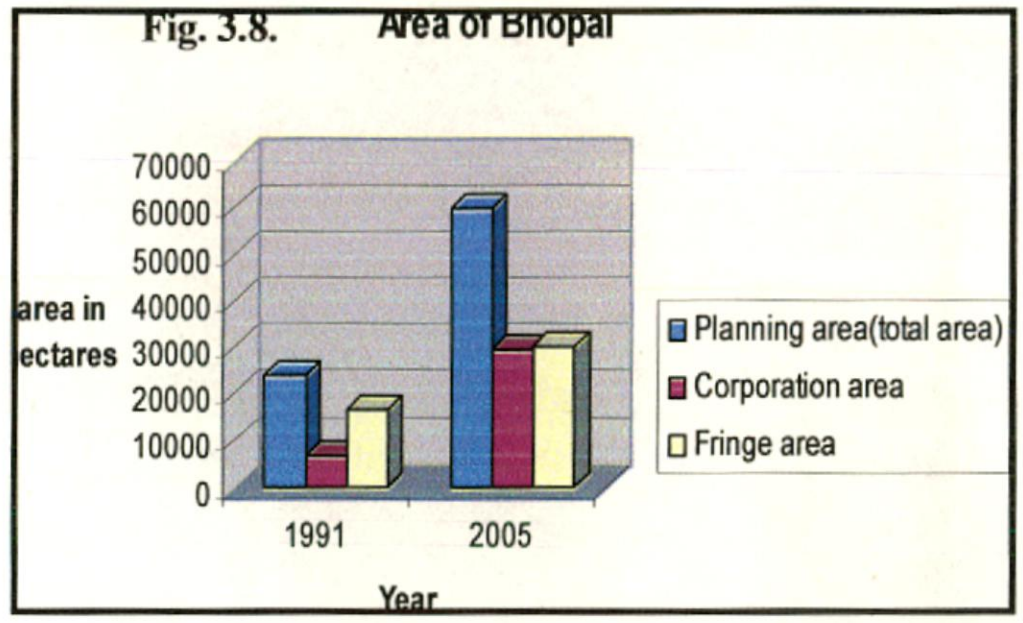


Fig. 3.7. Land Use Allocation in 2005



3.3.3. LAND USE TRANSFORMATION ON BHOPAL FRINGES (general)

Fig. 3.8. Area of Bhopal



➢ 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 impact of this change on the fringe area is analyzed on the components of urbanization.

➢ **Land Use:** Major change of land use is from agriculture to residential settlement. Also the commercial, recreational, and service industry are cropped along the major roads.

➢ **Transport Network:** The traffic on the Major link has become heterogeneous reducing the speed of thorough traffic and increasing accident rate.

➢ **Movement:** Frequency of short trips between the fringe area and city is increased tremendously .

➢ **Employment and Work places:** are generated in cities and fringe area as well.

➢ **Housing:** Unauthorized colonies are sprawling in fringe area.

3.3.4. REASONS BEHIND FRINGE DEVELOPMENT IN SOUTH BHOPAL

➢ Habitable areas in plans increased from 33.25 sq.km to 79.22 sq.km mostly in southern direction.

➢ Population increased from 3.85 lakhs to 15 lakhs, mostly in southern areas.

➢ Higher increase in density with more social and physical infrastructure.

➢ Though northern part shows a high density and congestion, spill to the hinterland did not occur due to absence of any major road.

Northern areas have a declining population growth rate as opposed to that in southern side.

➢ Shift in population towards the northern side leading to rise in and prices in southern areas. (350/ sq.ft in southern while 125/sq.ft in northern area)

➢ High land values in he planning areas have lead to increase of land prices in peripheral agricultural areas.(21 lakhs /acre)

➢ This lead to subdivision and sale of agricultural land and its conversion to other landuses.

➢ Preference of the southern fringe is due to:

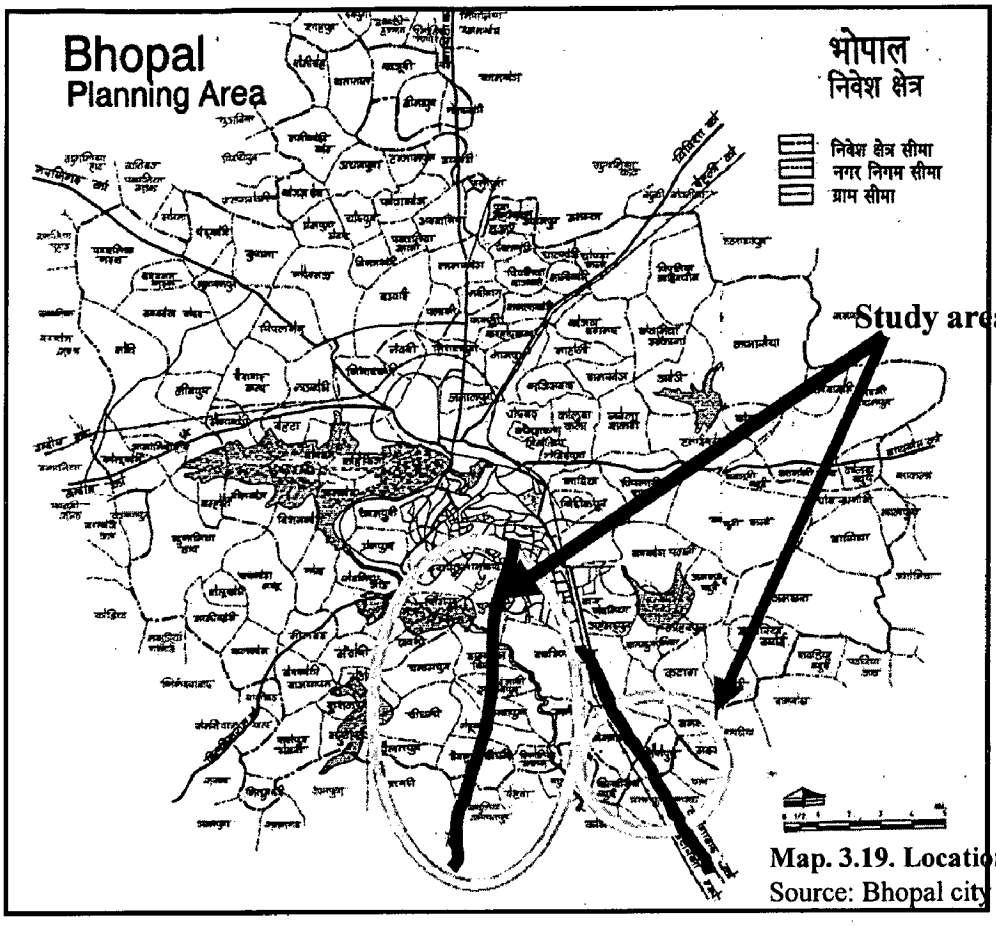
➢ Easy accessibility, proximity to work centers and infrastructure available.

➢ Good living environments and residential colonies.

➢ Suitable flat land without any barriers.

3.3.5. STUDY AREA: KOLAR ROAD FRINGE

Areas around Kolar road are emerging as a new potential pocket for residential development. Urbanization is increasingly continuous. Substantial land 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 city's contemporary styles.



Map. 3.19. Location of study area
Source: Bhopal city development plan

The colonizers are catering to all sections of society- individual bungalows and 3-4 storied apartment complexes. The major villages falling to urbanization: Damkhena, Banjari, Nayapura, Akbarpur and Bairagarh Chichli.

3.3.6. ANALYSIS OF EXISTING SITUATION

- Water supply connections are not provided by municipal authorities.
- Developers are providing boring wells in the colonies.
- City itself is lacking in sewer, scenario in the fringes being worse.
- Individuals build their own septic tanks.
- Sweepers are engaged by the residents for disposal of garbage to some vacant plot which is burnt later.
- Road network is very poor and the situation is getting worse with temporary

encroachments which turn into permanent structures.

- Social infrastructures like educational and health institutions also fall in short.
- Village households are facing problems of changing character. Farming and associates activities are fast depleting.
- Village characters are vanishing fast and high raised structures are coming up.
- Mixed land use due to absence of proper guidelines.
- Developments of slums. .
- Lands lay vacant for comparatively long time as the owner waits for infrastructure to develop.

3.3.7. OBJECTIVES OF CONTROLLING FRINGE DEVELOPMENT

Preservation of the existing character of the fringe areas.

- Designate some areas for preservation.

Control of the activities occurring in the fringe.

- To prevent degradation of the built environment.
- To facilitate easy assimilation n the future development processes.
- To achieve fair distribution of the cost development between the agencies and the people.

Growth of the activities occurring in the fringe

- Providing proper location of social and higher level infrastructures to give positive stimulation to growth.

3.3.8. STRATEGIES TO BE IMPLEMENTED IN THE FRINGE AREAS

- Identification and utilization of existing vacant areas with full service which will prevent patchy developments at intervals.
- New growths are to be encouraged to take place within the existing city fabric at planned

locations or nodes and should be discouraged at other locations.

- Facilitation of private sector participation in land development..
- Creation of separate development agencies for urban fringe areas.
- Provision for infrastructure services and improvement of the existing ones are to be made.
- Discouragement of plots to lie vacant for a longer period.
- Categorization of the areas based on urban and rural characters and then make provisions for their development accordingly are to be made.

3.3.8. INFERENCES DRAWN FROM KOLAR ROAD FRINGE DEVELOPMENT

Leapfrog development is found in the study area with patchy development on the outskirts of the community and numerous overlooked vacant parcels. It is difficult to further allot distinct classes for the vacant sites as it leaves behind narrow and irregular land. One of the most strategic way to limit this is to identify and utilize vacant land with full services. As opposed to the spontaneous growth, new growth should be encouraged at planned locations.

Private townships with their own infrastructure, rather than scattered developments is preferable. Because of the high pace of urbanization and infrastructure requirements in urban fringe areas and to mitigate the overlaps in the functions of Panchayat, Municipalities and other development agencies, creation of a specialized Urban Development Authority for fringe area is necessary. Rapid commercial, residential and institutional developments have caused encroachment on agricultural land and thus these areas in the surrounding villages are depleting. Influx of people from rural areas for employment has accelerated the loss of green space and contributed to pollution. Fringe areas need to be treated as separate entities with proper linkages to the mother city.

NEW TOWN, KOLKATA

4.1. SITUATION OF LAND MARKET IN KOLKATA

Land market in Kolkata has been witnessing government intervention since the post independence period through township development. State intervention in land development is governed by the Land Acquisition Act (1894) in India enacted by the British government more than 100 years ago to acquire land for public purposes such as planned development, provisions for town or rural planning, provision for residential purpose to the poor or landless and for carrying out any education, housing or health scheme of the government.

Land had been a sensitive issue in Kolkata and became a scarce resource during the 1940s when the city received a huge influx of migrants during the India-Pakistan Partition in 1947 as mentioned before. New migrants occupied every conceivable place in public buildings, market places, open spaces and roads. The newly independent city had practically no financial or institutional base to support such a large population. There was neither time nor any institutional mechanism to develop and implement any land use planning and control. Deteriorating civic and infrastructure facilities and grossly inadequate housing conditions gradually turned Kolkata's situation very bad. The extent of the housing problem was such that one dwelling per Government intervention and land development in New Town, Kolkata Fourth Urban Research Symposium 2007 household was a rare privilege for the majority of the population. It has been observed that only 7% of households had an exclusive place to live in with separate facilities of bathroom, lavatory, kitchen, etc., and 88% of households lived with more than two persons per room. Such conditions not only affected privacy and general quality of life, but also threatened the health of many, leading to a widespread cholera epidemic in 1958. Consequently, Calcutta Metropolitan Planning Organization (CMPO, later CMDA/KMDA) was established in September 1962 under the executive direction of the World Health Organization. Public planning and intervention on any formal scale practically began from thispoint with CMPO preparing a Master Plan for the first time for water supply, sewerage and drainage in the Metropolitan area.

Later in the same decade Basic Development Plan (BDP) was published in 1966 outlining different strategies for development and a perspective plan. The Perspective Plan advocated a binodal strategy of development in the CMA by focusing on the government intervention on the two centres Calcutta-Howrah and Kalyani-Bansberia. Perspective Plan prepared in 1986 that looked into the development need up to 2,011 showed a housing requirement of over 1.3 million and an estimated 25,000 acre land.

The document set out provision for supplying a third of the total land through public procurement. Large tracts of buildable land in Kolkata or its immediate environment had always been short in supply in Kolkata. To overcome this, the State government is found to intervene in the land market by creating townships. Initiated by the first Chief Minister Bidhan Chandra Roy, Kalyani and Salt Lake were conceived as satellite townships built on the principles of recycling brownfield land and minimal or no displacement of the farming community. Kalyani township was built on non-agricultural land and Salt Lake was built on the salt laden marshy land deemed not fit for agriculture. New town is the latest addition in the list of townships build to relieve kolkata of the tremendous pressure of population and exhausted infrastructure.

4.2. BACKGROUND OF NEW TOWN

Planned urbanisation in the Indian context, generally takes place on the periphery of an existing urban or metropolitan agglomeration. The principal driving forces are often quite similar - relieving urban pressure, augmenting housing stock and deconcentrating old central business districts, as in New Jammu and Navi Mumbai. Occasionally, planned urbanisation can arise due to political decisions to create or relocate administrative capitals (Gandhinagar, Bhubaneswar) away from older, often unplanned, metropolitan zones. The New Town, Kolkata, is no different. Its objectives include: lessening urban pressure on the main metropolitan zone; preventing unplanned urban growth; creating a new CBD and increasing the housing stock, particularly for the economically weaker sections.

Urban planning in Kolkata has traditionally been the domain of the Kolkata Metropolitan Development Authority which has been responsible for the development of urban perspective plans for Kolkata and its surroundings. According to the KMDA, only a poly - centric urban structure with Howrah and Kolkata as hubs would be suitable for handling the expansion of the Kolkata metropolis in a planned manner. It was also felt that future urban growth would largely have to be channelled to new settlement areas or towns within the KMA , but immediately outside the main metropolitan centre.

Ten such zones were identified including, Sonarpur (District- South 24 Parganas), West Bank of the Hooghly (District- Howrah), Bhatpara, Kanchrapara, Kalyani (North 24 Parganas and Nadia), Barasat, Nabapally (North 24 Parganas). Though initial attempts were made, most of these options did not crystallise. This was mainly due to problems of land assembly, local political resistance and a possible unwillingness on part of the KMDA to push really hard. At this stage, sometime in 1992-93, the state government entrusted the development of the New Town, Kolkata to the Housing Department in the Rajarhat/ Bhangore zone overlap-ping the districts of South 24 Parganas and North 24 Parganas.

Up to that point in time, the housing department was almost exclusively engaged in constructing houses for government employees and barring a few large housing complexes by the West Bengal Housing Board, had little exposure to township development. The latter in turn, was probably a direct consequence of the enormous dislocation caused by the largely unplanned urban growth along the main road from the city to the international airport. Most of the land identified for the New Town lay in a zone of smallholdings, poor irrigation intensity and low agricultural productivity .

The area was prone to water logging and periodic ingress of brackish water, which further impaired agricultural operations. It was adjacent to areas experiencing a tremendous, yet unplanned and haphazard urban growth and most locals were

Table. 4.1. Comparative agricultural yield

Crop	Average Yield in the Project Area (kgs/acre)	Average Yield in the State (kgs/acre)
Aman (winter) paddy	441	771
Boro (Summer) paddy	729	1210

facing severe pressures to sell their land to real estate and unscrupulous middlemen. These factors made it easier to mobilise favourable public opinion and thus expedited land assembly. The project area, though outside the KMA, fit in well with the settlement pattern recommended by the KMDA. It was found to be functionally integrated with the main metropolitan and settlement structure as well as the spatial functional structure. Immediately accessible from two sides, it was well clear of the East Calcutta Wetlands and Waste Recycling Region.

4.3. LAND ASSEMBLY

The New Town, Kolkata went for negotiated purchases from land owners, not through builders, since it was felt that the asymmetry in the bargaining powers could prove disadvantageous to the poor land owners, but through its joint ventures of West Bengal Housing Board and WBHIDCO, it persisted with public agencies having noted the strong imperfections in the land market. In the New Town, Kolkata, a multi - pronged strategy was used to expedite orderly land assembly without the problems of law suits and dharnas. It must, however, be admitted that the low productivity of land helped in as much as it accentuated the willingness of the project-affected persons to alienate their land for attractive prices, in spite of the adverse land-man ratio.

The next step was to secure the support of the local Panchayati raj institutions (PRIs), the urban local bodies (ULBs) and the peasants' organisations. There was an extended period of consensus-building through which the project authorities tried to highlight the various positive features of the project. The desired level of cooperation was eventually obtained. However, there was a strong local feeling against the quantum of compensation under the Land Acquisition Act. This arose from the fear that the land prices arrived at under Land Acquisition Act would be insufficient. This was a well-justified apprehension since Land Acquisition Act rates are often much lower than the market rates, a circumstance which in turn arises out of the general tendency to understate sale prices with a view to evade registration fees and stamp duties. To deal with this issue, the government set up a land purchase committee in 1995 under the chairmanship of a respected former civil servant with strong links to the peasants'

organisations. The purchase committee was fairly broad-based and included representatives from the PRIs and the ULBs, from all the major political parties as well as a number of opinion-makers from within the community.

The main task of the purchase committee was to procure land through direct negotiations with the project-affected persons. It was also supposed to fix land prices for the various categories using an open, transparent and participatory pro-cess, keeping well within the broad parameters fixed by the Land Acquisition Act.

The purchase committee was expected to (a) negotiate with the land owners and determine purchase prices; (b) ascertain the actual owners and (c) determine the strategy for taking over possession of the land in a peaceful and orderly manner. The purchase committee commenced its operations from 1995-96 and was able to mobilise about 214 acres of land from 812 sellers. Average purchase price was Rs 5.13 lakh per acre. Thereafter, the purchase committee involved various organisations like the West Bengal Housing Board and the joint venture companies set up to promote housing activities in the state and organised direct land purchase. These agencies were especially empowered by the government to buy land at rates determined by the purchase committee. Though quite innovative, the direct purchase procedure proved somewhat cumbersome and was able to mobilise less than 10% of the total requirement of land.

Nearly 55% of the main workers in and around the project area were found to be engaged in agriculture and other activities in the primary sector. Cultivators (47%) and others (fisheries, etc - 8%). 38% of the population in the project area and its immediate vicinity were SC/ST, much higher than the overall state average of about 30 %. The average landholding was found to be quite small. Only about 1% of the total land owners in the project area were found to own more than 3acres. The project area was characterised by low levels of agricultural incomes. The EIA report estimated the total annual net agricultural income from the project area, an area of 6,032 acres (gross cropped area - 10,351 acres) to be in the range of 89-90 lakh. It also stated that production costs had probably been underestimated by 30%. The total net annual

income from agriculture is at a maximum of Rs 250 lakh. Once again, using the actual number of cultivators, the maximum net annual agricultural income per cultivator comes to Rs 3,800-3,900. Total incomes were also very low. Pre-project field surveys set it at Rs 25,500 per annum. Incidentally, this figure in quite close to the state-specific absolute poverty lines set by the Planning Commission (Rs 18,000- 20,000 per year for a family of five). Thus it is possible to conclude that a vast majority of the local inhabitants, in particular the project-affected persons, were poor people and any policy measure targeted at them was bound to be strongly pro-poor in general. The compensation data also bears out the above conclusion. In all, 37,556 out of 43,209 awardees have been awarded a total sum of Rs 132.23 crore. The per family compensation thus works out to Rs 35,208 and the per capita landholding acquired to only 0.076 acres. The highest amount awarded to a single awardee is Rs 20.16 lakh . Average land price per acre comes to just over Rs 4 lakh.

Table.4.2. Compensation Award Data

Total awardees	43209
Awards verified	37556
Amount involved	Rs 132.23 crore
Amount per awardee	Rs 35208
Awards < Rs 100,000	35769 (95 per cent)
Awards between 1 and 10 lakh	1782 (4.74 per cent)
Greater than 10 lakh	5 (0.013 per cent)

Table.4.3. Landholding pattern in New Town

Landowner Cultivator (Nos)		Landowner Non-Cultivator	
Less than 3 Acres	More than 3 Acres	Less than 3 Acres	More than 3 Acres
6448	126	12209	54

Source: Table 5.5.2, EIA.

A large number of families were saved the trauma of physical displacement. Only a few isolated dwelling units located far away from the main habitations were affected. Broad estimates indicate that nearly 5,000 families were allowed to retain their ancestral places of residence. Once again, a vast majority of those benefited were from the poorer sections of the society. The broad guidelines were:

- No project affected person should be left with a standard of living lower than his/ her pre-project status;
- Forced displacement should be minimised;
- If absolutely unavoidable, each case of displacement would have to be preceded by satisfactory arrangements for alternative accommodation to be provided by the project authorities;

Design/Size/Value of such alternatives would be decided in consultation with the project affected person(s);

- Rented accommodation would be provided in case of emergent displacement;
- Participation and cost-sharing in the construction of and procurement for the R and R dwelling units would be mandatory;
- The income disparities within the project affected person community would be recognised and the scales of benefits adjusted to consciously favour the poorer segment;
- Measures would be taken to guard against loss of avocation, including skill up gradation, preferential participation in project activities.

The New Town, Kolkata has been projected as 'urbanisation with a human face'.

4.4. ROLE OF THE GOVERNMENT

The Government sought to assure the small holders of a remunerative price for their land, distinguish between project affected persons on the basis of their economic status, prevent unnecessary displacement, encourage non-farm employment through preferential participation in project activities and provide alternate accommodation. The government went even further. It provided earmarked land to the project affected persons, instituted a system of reservations for such persons in government housing for the weaker sections and created service villages. Even the physical planning process was modified to cater to the poor. For example, the entire transport planning of the New Town is based on public transport. Land prices for the project affected persons , in the EWS/LIG segments have been heavily subsidised. While general land prices for the MIG has been set at cost-plus, those for the HIG bear a stiff premium.

Normally government townships are slow starters. The New Town, Kolkata has had a different experience. Due to carefully planned steps designed to ensure peaceful, orderly and uninterrupted land assembly, public perception regarding the future of the project was always

positive. This impression was strengthened by the professionalism displayed by the government in creating and thereafter sustaining an enabling environment. the government has truly facilitated and enabled. Starting with the formal amendment to the rules of business permitting the housing department to engage in township development, the government, amended the Land Reforms Act to allow project entities land in excess of ceilings; issued an order under the Registration Act banning speculative transfers; passed orders under the T and CP Act declaring the project area as a planning area.

Table. 4.4. Share of different income group on residential land

Income groups	%
EWS	4
LIG	17
MIG	35
HIG	44

Source: Bysack (2004)

Table. 4.5. Various components of land development costs breakdown

Tasks	Estimated costs (in billions)
Land Procurement of 3,000 ha of raw land (excluding 75 ha land covered by Bagjola and smaller canals) @ 150,000 per ha including incidentals expenses	4.5
Land filling cost – An average fill of 1.5m @80 per cubic meter	3.17
Roads and bridges – includes 11Km of major arterial roads, 60 Km of Arterial and suburban roads, 150Km of collector and local road and five bridges	3.25
Outfall system	1.07
Internal drainage system	1.35
Water supply system	1.63
Sewerage system	1.43
Solid Waste management system	0.12
Power system	1.88
Transport terminus	0.50
Parks, open space and landscaping	1
Total	19.91.90

Source: HIDCO (1999: p. 35)

4.5. INTRODUCTION TO NEW TOWN, KOLKATA

The city of Kolkata constitute the heart of the KMA, the dominant urban centre of a vast hinterland of Eastern region, Kolkata acts as the main producer and distributor of goods and services. In the entire region of the eastern India, there is no city which can act as major metropolitan centre in the region in respect of national and international trade, traffic and other economic activities. Kolkata is the main business, commercial and financial hub of eastern India and the northeastern states.

Kolkata experienced a steady economic decline in the years following India's independence due to the prevalent unstabilised political condition and rise in trade-unionism. Between the 1960s to the mid 1990s, flight of capital was enormous as many large factories were closed or downsized and businesses relocated. The lack of capital and resources coupled with a worldwide glut in demand in the city's traditional industries added to the depressed state of the city's economy. The liberalisation of the Indian economy in the 1990s has resulted in the improvement of the city's fortunes. Until recently, flexible production had always been the norm in Kolkata, and the informal sector has comprised more than 40% of the labour force. Like other metropolitan cities in India, Kolkata continues to struggle with the problems of urbanisation: poverty, pollution and traffic congestion.

The 300 year old city of Kolkata is bursting at its seams with congestion, over-used infrastructure and a burgeoning human population. It was thus felt that an area should be earmarked that could evolve into a city of the future. A place close enough to Kolkata to take away some of its load and yet one that would be self sustaining, planned, eco friendly and complete. Thus was born New Town, the future of all cities, conceived by Government of West Bengal and nurtured by its own company set up in 1999, the West Bengal Housing Infrastructure Development Corporation Limited (WB HIDCO), under the administrative control of the Department of Housing.

The New Town is located just outside of the Kolkata Metropolitan Area (KMA).

The New Town, Kolkata is planned on some Mouzas of Rajarhat Block in North 24-Parganas and those of Bhangar-I & Bhangar-II Blocks in South 24-Parganas. The central area of New Town is 10 km. from Kolkata's Central Business District and about a kilometre from the International Airport. The New Town is being planned as a major hub for business, trade, industries, IT, institutions and culture. Though it is planned as a self-contained nodal growth centre, the New Town will be integrated fully with the future spatial/ functional structure of the metropolis.

Fig. 4.1.View of entrance to New Town

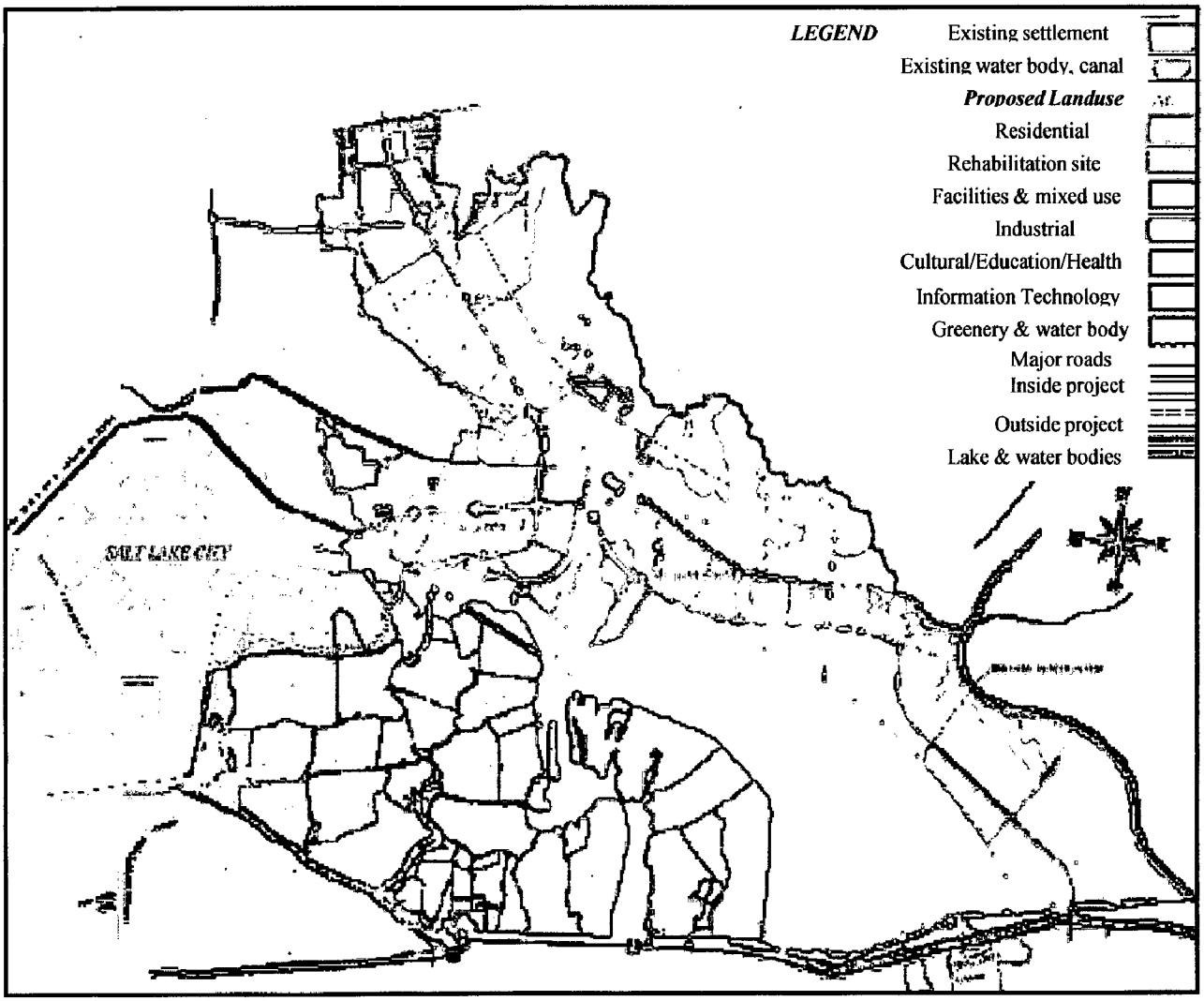
The New Town aims at providing sufficient build able land for the construction of dwelling units for all income groups, with particular emphasis on the low and middle income segments. It will have high quality infrastructure like wide roads, bridges, large public open spaces including water-bodies, educational institutions, medical facilities, sports and cultural facilities in addition to basic infrastructure like water supply, power supply, sewerage and drainage.

	Use Under	Area in hectares	Percentage of total project area	Percentage of project area less area under item (vi)of col.1
(i)	Residential including service village with local collector sheets, local open spaces and community facilities.	1555	50.5	70.2
(ii)	Industries	200	6.5	9.0
(iii)	New business districts & other commercial areas	140	4.6	6.3
(iv)	Regional cultural, educational & health Facilities	20	0.7	0.9
(v)	Major arterial road, Arterial road, Sub-arterial road, LRT and Transport Terminals	300	9.7	13.6*
(vi)	Large open spaces, Green areas, water bodies etc.	860	28.0	-
	Total:	3075†	100.0	100

Source: WBHIDCO report, 1999

Table.4.6. Proposed land-use break-up of New Town

The New Town, with a green and eco-friendly city built around water bodies, parks and other ingredients of beautification will have several town level activity focus areas such as a new Central Business District, major sports complex with world class facilities, a technology park, a central recreational park around the new CBD located in the heart of the New Town, a permanent exhibition/trade fair ground, a large institutional complex including a civic convention center, an environment-friendly industrial complex, hospitals, business schools, technical colleges /university and entertainment centers.



Map. 4.1. Proposed Land-use of New Town

WBHIDCO Ltd. has already developed its first action area AA-I covering around 660 Ha. Major connectivity already achieved through construction of North South Major Arterial Road covering a distance of 10.57 KM length which is already providing an alternative to EM Bye-pass & VIP Road, leading to the airport. Major Arterial Road will, in addition to cater to the need of the people of New Town, connect South 24-Pargans and North 24-Parganas Districts

and a big portion of Kolkata, creating a high speed alternative corridor. It will also connect National Highway 34 and National Highway 35 via VIP Road. Dum Dum Airport will be connected with the Central Business District of Kolkata through this road. This Major Arterial Road thus stretching the benefit to a large number of people has, to all intents and purposes, got the status of a state level highway.

Fig. 4.2.View of a junction in New Town

Accessibility shall further improve with construction of the flyover on EM Bye-pass at Chingrihata & 6-lane approach road to Krishnapur Canal bridge starting from Salt Lake Bye-pass. Allotment of over 5550 plots were made in AA-I and part of AA-II and WBHIDCO Ltd. have started handing over possession of plots Apart from this, one housing complex for economically weaker section by WBHIDCO, one housing complex for all sections by WB Housing Board, one by a joint venture company have already come up. With the object of enabling low and middle income groups and cross sections of the society as such, to acquire a house/flat of their own at affordable cost, WBHIDCO Ltd. intends to allot plots in Action Area-II and Action Area III for residential purpose.

4.5.1. Population and Density

- The New Town is planned for a total residential population of 10 lakhs.
- The overall density will be 264 pph persons per hectares.
- The CBD and the commercial sub-centers, as well as industries will account for a floating daytime population of about 2.5 lakhs.

4.5.2. Residential Areas

- The land for residential use being 1555 hectares (50.5% of total project area) the gross residential density will be 482 persons per hectares.

➢ The residential area will consist of groups of residential clusters (i.e. group housing and plots) in which different section of people of different income levels can live harmoniously without being fragmented from whole community.

➢ A neighborhood unit, based around some services and amenities like parks, schools, convenient shopping etc, will be planned for a community of 20,000 to 30,000 people. Groups of such 3 to 5 communities may be served higher education and health facilities.

4.5.3. Service Villages

The service villages will provide facilities for work and living for the service population. The location of the service villages will be near the existing settlements within the project area. The following points have been taken in view during the planning of these villages-

➢ Development should ensure low rise and high density settlement pattern. The dwelling units should be affordable to the low income people and should be planned to have scope of incremental development.

➢ The settlement pattern should be functionally and aesthetically integrated with the existing settlement pattern in the surrounding area.

➢ There should be adequate provision for the basic facilities and services.

4.5.4. The **residential sectors** will be provided with adequate social and community facilities including

➢ Educational facilities: primary schools and secondary schools

➢ Health facilities (including specialty hospital)

➢ Market as well as local level convenient shopping and neighbourhood shopping facilities.

➢ Post and telegraph facilities.

➢ Cultural Centers and Community halls including library, gymnasium, auditorium etc.

➢ Parks and organized open space of different sizes, to be used as tot lots. Children's parks, Neighbourhood parks, playgrounds.

4.5.5. New Business District and Other Commercial Areas

• The New Town will provide a Business District to act as a supplementary CBD of the metropolis and located along the Major Arterial road.

• The total land area to be used for the New Business District and the two commercial sub-centers will be 140 hectares.

• The major facilities to be provided in these centers will be:

➢ Office complex, both for the public and private sector.

➢ Head Quarters and/or regional offices of banks, insurance companies, financial institutions.

➢ Major offices of airlines organizations

➢ Hotel complex

➢ Major cultural complex and commercial and recreation facilities.

4.5.6. Industrial Areas

➢ The new town will provide 200 hectares of land for development of non-polluting, in offensive and non-hazardous industries.

4.5.7. Open Space System, Recreational Areas and Landscaping

• 28% of the total land of New Town is used for bulk open space system with green areas, water-bodies, large lakes etc.

• The facilities include:

➢ Golf Course

➢ Motor Sports Complex

➢ Rowing and Swimming facilities

➢ Picnic Spots and Outdoor recreational areas

➢ Parks and planned Open Spaces

➢ Dairy Farm, Poultry Farm

➢ Pisciculture

➢ Urban Agriculture

➢ Urban Horticulture, Urban Forestry

➢ Ecological Parks etc.

Apart from these bulk open spaces, there will be provision of local open spaces including neighborhood level parks and playgrounds.

4.5.8. Other Major facilities

- Central cultural complex
- Permanent exhibition complex
- Modern hospitals
- Major education centers
- Technology Park
- Market and shopping complexes
- Fire, police and other services
- High quality infrastructure and services.
- Efficient drainage with proper landscaped canal system.
- Captive water supply system
- Adequate supply of power
- Hygienic sanitation system
- Effective solid waste management system
- Good roads and street system with cycle tracks and pathways in neighborhoods
- Effective public transport services with bus services and electric trolley bus/light
- Rail transit with connection to metro rail, if feasible
- Telephone exchange

4.5.9. Land Price at New Town

Eligible Group	Eligible Gross Family Income Limit / month (in Rupees)	Approx. Size of Plot in Sqm. # in Cottah (within bracket)	No. of Plots (Approx.)		Plot Price Rates / Cottah Tentative (in Rupees)	Tentative Total price per Plot (in Rupees)	Application Money (in Rupees)
			AAII	AAIII			
MIG (I)	9001-18000	150 (2.24)	350	520	175000	392000	40000
HIG(I)-I	18001 and above	200 (2.99)	150	225	200000	598000	60000
HIG(I)-II	18001 and above	300 (4.485)	100	150	225000	1009000	100000
			600	895			

Table.4.7. Details of individual plots and prices thereon

Eligible Group	Eligible Gross Family Income Limit / month (in Rupees)	Approx. Size of Plot in Sqm. & in Cottah (within bracket)	No. of Plots (Approx.)		Plot Price Rates / Cottah Tentative (in Rupees)	Tentative Total price per Plot (in Rupees)	Application Money (in Rupees)
			AAII	AAIII			
LIG(C)	Upto 9000 (every member)	270 (4.035)	70	110	100000	403500	40000
MIG(C)	From 9001-18000 (every member)	335 (5.01)	80	120	130000	651300	65000
HIG(C)	18001 and above (every member)	400 (5.98)	100	150	165000	986700	100000
Large Coop.	Any Income Group	1400 (20.93)	20	30	165000	3453450	345000
			270	410			

Table. 4.8. Details of Cooperative plots and prices thereon

4.5.10. HOUSING

One of the most modern residential places of the country, several renowned real estate companies have already built luxurious high-rise apartment complexes in Action Areas I and II, with the partnership WBHIDCO. Among many there, few important to name would be:

- Greenfield Heights by Bengal Greenfield
- Greenwood Elements, Rosedale and Greenwood Park by Bengal Shrachi Housing.
- Greenfield Ambitions by Bengal Greenfield
- Sankalpa by West Bengal Infrastructural Development Finance Corporation
- Elita Garden Vista by Keppel Magus
- Sunny Fort by Fort Group and Bengal Sunny Rock
- Utsa and Ujjwala by Bengal Ambuja Housing.
- Akankha and Tin Kanya by Bengal Shelter Housing at Action Area -II.
- Hiland Willows and Hiland Woods by the Hiland Group (United Credit Belani Group)
- Shree, Rabi Rashmi, Uttara, and Malancha by Bengal DCL Development Consultants Limited.
- Air, Cascade, and Horizon by Unitech Real Estate Developers.
- Tata Eden Court
- 5 Star Property by Shristi

- Sunrise Point by Bengal Park Chambers in Action area II-C
- Animikha and Alaktika by Bengal Peerless Housing Development Company Limited, a Joint Sector Company of West Bengal Housing Board and The Peerless General Finance & Investment Company Limited.

All these housing estates have been constructed in vast green fields with 75% of each estate remaining open. This makes these estates one of the most airy ones in Kolkata. Moreover, in 5 acres (20,000 m^2) of land, each estate has their own club houses with modern sports and cultural complexes, community and shopping centres, swimming pools and others. This area, according to governmental plans, also caters to the residential needs and standards of high-profile NRIs.

4.5.11. EDUCATION

Some major national schools have already been established here in this megacity including ABC EuroSchool. Higher education colleges, especially engineering and business management colleges, have also been established here. The Indian Institute of Technology, Kharagpur is planning to set up a new campus here. The Government had established Derozio College for the villagers of the Rajarhat - Gopalpur section in the 1980s.

The West Bengal National University of Juridical Sciences, one of India's premier law schools, the National Institute of Fashion Technology, the Satyajit Ray Film and Television Institute, the West Bengal University of Technology (WBUT) and the West Bengal State University are all located in the New Town - Salt Lake adjacent area, i.e., on the southern fringes of the Eastern Metropolitan Bye-Pass. Also on the plan is the establishment of a postgraduate section of the St. Xavier's College, in its southern fringes, in the adjacent area to the Eastern Metropolitan Bye-Pass. Rajarhat-Gopalpur has the second-highest number of Islamic Madrassahs in West Bengal. There is one special school for the mentally challenged, hearing challenged and multiple challenged students, located at Village Kanjialpara, Rathtala, under Rajarhat P.O. & P.S. And is managed by TITIRSHA, an NGO.

4.5.12. HEALTH FACILITIES

Though major hospitals are yet to be built, this area has good connectivity with other parts of Kolkata which have sophisticated health centers. A handful of million dollar healthcare facilities are under projection, and most of them will be completed within the years 2010-2012. The most notable to mention would be the proposed intensive care hospital and state-of-the-art Cancer Research Centre by Ratan Tata.

The area needs more healthcare facilities of its own, to be established both by private organisations, and by government which will ensure good health facilities at a reasonable price.

4.5.13. LEISURE & ENTERTAINMENT

The area has one of the best entertainment facilities in the state of West Bengal. Apart from private clubs of every offices and estates, the area has a good number of children's parks and clubs. Notable mention among those will be a water park Aquatica; a children's park called Nicco Park; a huge picnic spot consisting of waterbodies called Nalban; and a club for adults with traditional Indian yoga and spa facilities, called Vedic Village.

Several international shopping malls are being constructed in the area, a few of them being already completed. Notable malls are Axis and City Centre. The Rajarhat - New Town area is a shopper's paradise in the real sense of the term, but all these malls have been planned especially keeping in mind the needs of the elite class.

International five-star hotels like ITC Sonar Bangla, Hyatt Regency, and Airport Ashok are situated nearby. These hotels have good multicuisine and pub facilities. Some more five-star and super luxurious hotels are planned, including one being the chain of Ginger hotels. But in general, the New Town area till date seriously lacks good restaurants and pubs of reasonable prices.

4.5.14. OTHER SALIENT FEATURES

New Town is conceived for 750 thousand people with the objectives of decongesting older areas of the city and preventing chaotic urban sprawl. It has been projected to accommodate 1.5 million by 2015. For the city the primary aim of the New Town land development has been to address the serious shortage of developable land to accommodate renewed surge in housing demand and forthcoming housing investments in the post-reform era.

The New Town comprises 3,075 ha of vacant low yield agricultural land at Rajarhat and Bhangar blocks of the districts of north and south 24 Parganas. When fully developed the New Town is expected to accommodate 750,000 resident population and 250,000 floating population. Over the years the project area has been expanding to include adjoining areas to accommodate new facilities. It is expected to cover some 5,000 ha land area with 2 million permanent population and 500,000 floating population. New Town set an ambitious goal to achieve 15 per cent of the total shortfall in the housing stock.

4.6. MERITS OF NEW TOWN

The New Town will be able to prevent the ills of unplanned growth. The benefits include:

- The New Town will prevent unauthorized settlements that are likely to grow near the city of Kolkata.
- The New Town will check chaotic urban sprawl in the fringes. The emerging industrial and economical activities in West Bengal will be boosted up by the New Ton through provision of a new centre of business, trade and industry and also employment infrastructure as well as residential accommodation.
- The New Town will check further intensification of congested Kolkata city. In the absence of such a new town, the existing central are will experience problems of circulation and

accessibility which in turn will severely affect the efficiency of the Central Business District (CBD). In the absence of the New Town, unplanned urban expansion will create severe drainage problems. The New Town will be able to create an efficient drainage system which will benefit the entire sub-region.

➢The New Town will provide social infrastructure, better education facilities, markets, cultural and recreational centers etc. unplanned urban growth will aggravate the existing deficiencies.

➢ The New Town will ensure effective utilization of land and energy efficient settlement area with provision for recycling resources.

➢ Importantly the conceived project is dovetailed with the government of India's declaration towards establishing 100 new towns of population 0.5 million by 2021.

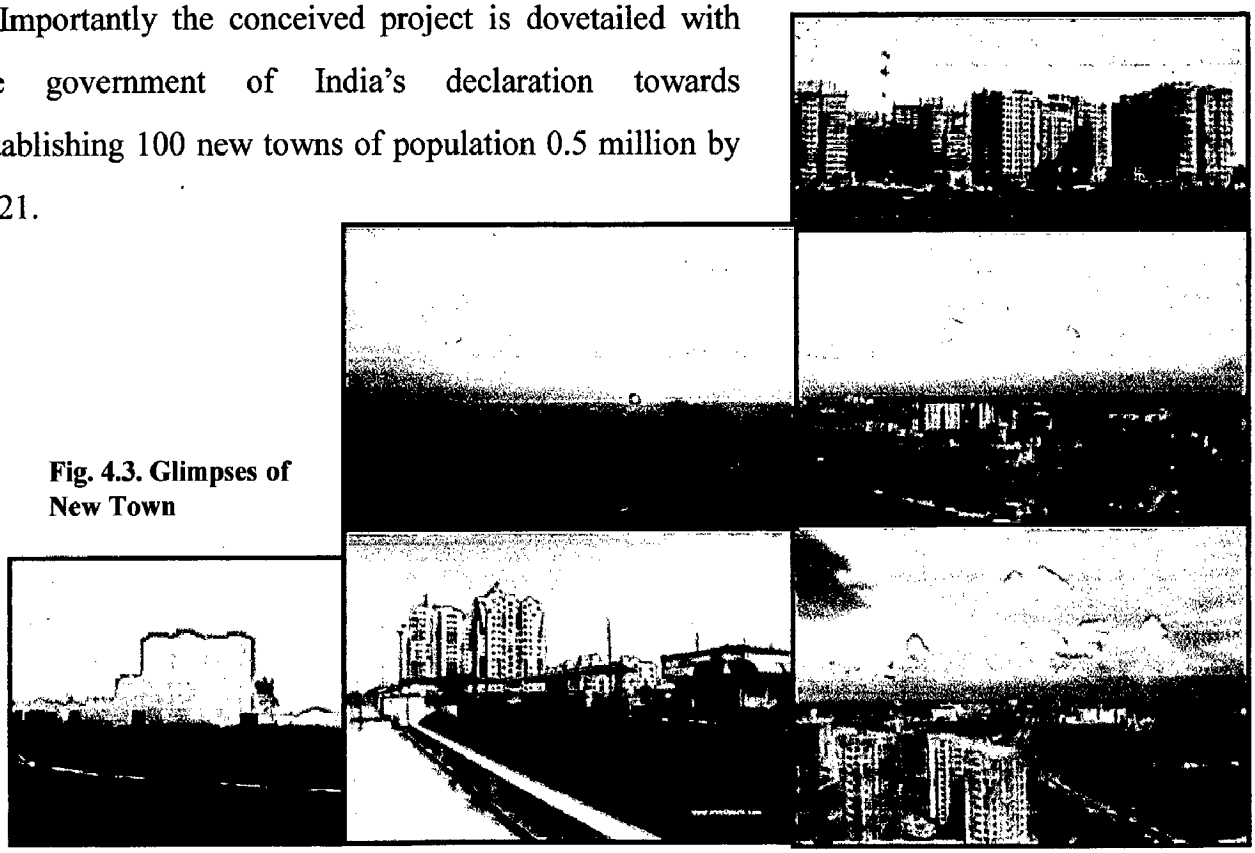


Fig. 4.3. Glimpses of New Town

"The New Town has been planned to grow as an organic city producing a composite fabric of different uses that are needed for the people of various categories of different income groups to live, work and invest in an efficient, attractive and healthy environment. The conventional land use planning practice of creating separate zones for exclusive use has not been encouraged. Instead, efforts have been made through careful planning to promote a development pattern that will encourage environmentally acceptable mixed use in a selective manner for ensuring efficiency, comfort, attractiveness and economy."

4.7. EMERGING PROBLEMS IN NEW TOWN

The analysis in the previous section showed high land development multiplier in the New Town indicating high premium for land development, constrained windfall profits in and the complexity of the development process.

4.7.1. LEGAL ISSUES

The complexities associated with land assembly and compensation process arising from lack of transparency, mistrust and eventual legal battle prolonged the implementation and increased the costs of development. Although these costs are internalized through different forms of market organization, these forms do not imply an alternative to efficient enforcement of regulation. Historically, ineffective policies on urban land acquisition have led to steep land price inflation as flows of finance expand in Indian cities. Legal problems, small individual land holdings, untraceable records experienced in the process of land assembly in the New Town could continue to be barriers to future projects unless relevant government laws and regulations are amended. The government reluctance to amendment of ULCRA, gives rise to speculations and creates the impression of "opportunistic" government officials and developers. The absence of a clear direction on land

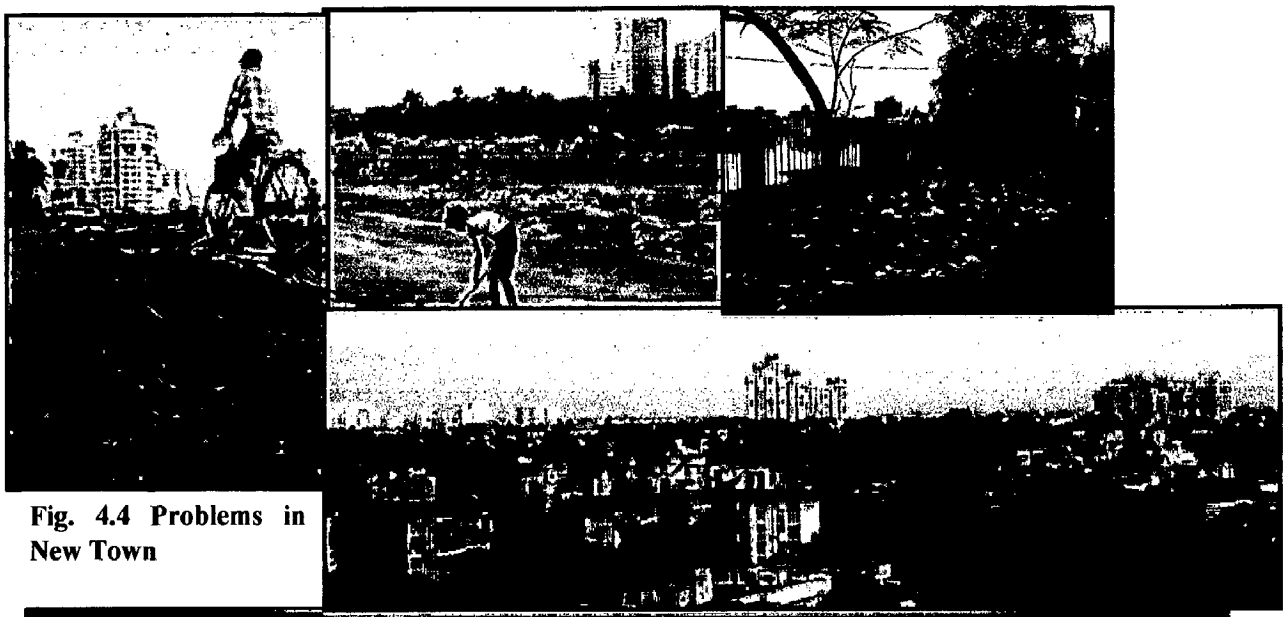


Fig. 4.4 Problems in New Town

assembly and conversion/ development will inevitably result in steep price rise and fuelled by speculation thereby creating a biased land market. This process will make formal urban housing an extremely scarce and expensive commodity for a large proportion of the population.

4.7.2. CREATION OF A BIASED LAND MARKET AND EXCLUSION OF SMALL AND MEDIUM DEVELOPERS

Small and medium developers are priced out of the market making land development exclusive prerogative of few national players. The prices at which developed land parcels are being sold in the New Town shows more of profit-seeking. Disposition of land through open market competition rather than through a reasoned and strategic invitation to the developers/investors, the government has managed to avoid the 'under pricing' in the emerging market. To maintain that profit level large developers will either pass on the high premiums to the consumers or will sit on the land by exercising their own monopoly in the market until such times when the desired profit levels are achieved.

In both instances the majority urban population will be priced out of the market. With the commercialization of urban land markets land conversion business is often usurped by organised syndicates and clandestine collusions which make huge profits out of the housing needs of low-income groups. There is an increasing risk that the New Town could fall into the trap which manifests into exceptionally high land prices coexisting with much vacant land.

Fig. 4.5. Contradictory characters in New Town

4.7.3. LOW SHARE OF LIG/EWS

An unfortunate outcome of the high land development multiplier is that developed land in the New Town is only available at a price that is beyond the reach of the majority urban population. In New Town, the price of highly developed land to income ratio is high even with the subsidy.

The high prices of unsubsidized land can be justified to sustain the cross-subsidy approach, but, the levels of subsidized prices relative to median income indicate a potential upper income bias. In the New Town land made available at subsidized prices that could potentially cater to the LIG and EWS population is negligible. A marginal increase in the share of EWS and LIG in the project has been achieved in the New Town, however, against the proportion of some 80% EWS and LIG population in the city, it is very low.

Fig. Share of different income group in various township projects

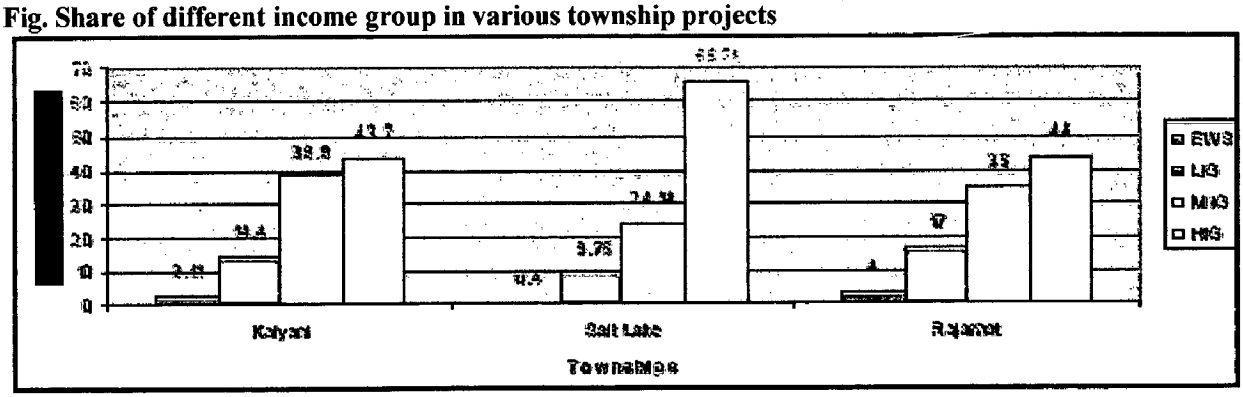


Table. 4.9. Assessment of job generation during the development of New Town

Sl no.	Development	Developed by	Generation of jobs	
			Skilled	Unskilled
1.	Basic infrastructure including land filling	HIDCO and other govt agencies	10 lakh man day	30 lakh man day
2.	Development of building and complexes	West Bengal Housing Boaard and there joint venrtures agency	15 lakh man day	25 lakh man day
Total			25 lakh man day	55 lakh man day

Other than these jobs there will be more jobs in the commercial, administrative and other sectors. In addition there will be a need for the various types of service people for the residential population on New Town. This service people will have to come from neighbouring village area. In fact there is a proposal for developing a service village in the New Town.

4.8. INFLUENCE OF NEW TOWN ON SURROUNDING RURAL AREAS

New Town is having regional and city level facilities, industries etc. This is generating employment for all sectors of society. Support stuffs for offices and commercial establishments are available from nearby villages. Other than engagement in commercial offices, administrative offices, industries and large facilities, a major portion of employment is generated from the huge capital investment on the building industry. The offside infrastructures like road, rail made for the new Township is giving an impetus for the growth of the rural and semi rural fringe areas. Besides the improved infrastructure of New Townships has created a sudden increase in construction activities in the market of the region generating employment options.

4.8.1. Change in livelihood of the rural population

- People, whose land are acquired / purchased by authorities, are being engaged in other sectors of economy.
- People have intentionally changed there livelihood from agriculture to tertiary sectors after selling their agricultural land to other private developers.
- People who are residing in the nearby villages are getting employment in various sectors in the development of the New Town.

4.8.2. Economic and physical development of the fringe

The development of New Town has a direct influence in the economy in surrounding fringe areas. The participation in the jobs in the New Town both in the skilled and unskilled jobs will increase the economic standards of the people and accordingly the purchasing power will be increased. This will attract new development potentials on the village area. Initiatives are also been taken to develop the connectivity of the neighbouring villages as a scheme under neighbourhood development. This will make the village more viable alternative for investors.

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4.8.3. Emerging Issues In The Development Of The Region

Firstly, interdependence of rural and urban area is going to change in the present scenario. Due to provision of regional transport networks and facilities the rural areas are becoming the centre of all attraction day by day. Rural people are more eager to have their machinery and other inputs required for the agriculture etc in the rural area itself. The banking sector, school and other facilities are attracting developers in the rural fringes.

Secondly, the development control in the rural areas in the fringes are also another issue as these are growing very rapidly and with less control due to its location under Panchayat area. This has to be looked after in the regional scale.

Thirdly, Industries are being located in environmentally safe location in respect of the New Town and immediate surroundings. In course of time this will be in the centre of developed area as the surrounding rural areas are also getting developed.

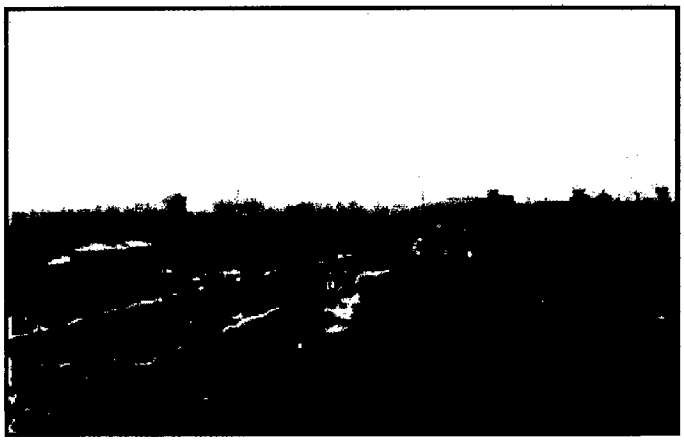


Fig. 4.6. Various township projects

Transport linkage in the region reflects another area of attention. In the prevalent rural fringe area the existing transport facilities are not so good. With the development of the fringe area the transport system has will be improved.

LEGAL CONTROLS

5.1. LEGAL CONTROLS FOR LAND DEVELOPMENT IN WEST BENGAL

Land reforms are a major policy focus of India's under the Ninth Plan and Tenth Plan. Yet, few Indian states are making significant land reform achievements. Because West Bengal is widely recognized as having relatively exceptional land reform success among Indian states, it warrants attention. Over the past few decades, while land reform has made little headway in most of India, West Bengal has achieved notable land reform progress. The progress has occurred in three areas:
redistributing agricultural land ownership, regulating sharecropping relationships, and distributing homestead plots. It is widely acknowledged that West Bengal's land reforms have had a positive impact on agricultural production, poverty alleviation, and economic growth, although the extent of the impact and the causation is a matter of some controversy.

The West Bengal Land Reforms Act is the key piece of legislation addressing land reform and land rights in West Bengal. The Act covers a range of land-related topics, but most significantly it:

(1) defines the rights and obligations of landowners and bargadars;

(2) prohibits fixed rate leasing of land;

(3) places a ceiling on the size of landholdings;

(4) defines how land taken by the government should be distributed; and

(5) limits the transferability of land held by Scheduled Tribe members as well as much of the land obtained through redistribution.

5.1.1. Post-Independence

Since independence, West Bengal's land reform progress can be described as occurring in three phases. The first phase (1953-1966) saw the adoption of the basic legislation, little progress in above-ceiling redistribution, and virtually no progress (in fact a deterioration) in protecting

bargadars (sharecroppers).

In the second phase (1967-1976) West Bengal made most of the overall achievements above-ceiling redistribution, and made little progress in protecting the rights of bargadars.

In the third phase (1977-present) tremendous progress was made in recording and protecti the rights of bargadars, and the redistribution of above-ceiling land continued, but at a slow pace.

One of the major factors contributing to West Bengal's land reform success in the po Independence period has been its favourable legislative provisions spelled out in the Lar Reforms Act. While the Act contains many noteworthy provisions and established a suitab framework for West Bengal's successful land reform program, some modifications of the la would enhance the Act's positive impact on equitable distribution of land and agricultur production. It can be thus seen that inspite of a number of acts and rules regarding land beir issued, there are basically no control measures as far as fringe areas are concerned. Fring continue to grow in an unplanned, uncontrolled and unprecedented manner. There is no act control the type of landuse, its size, compatibility to adjoining structures and quality construction in the fringe areas.

5.2. ACTS RELATED TO LAND DEVELOPMENT IN WEST BENGAL

A number of acts and legislation related to land development are there in West Bengal, but t now no regulations have been prescribed for land development in the fringe areas. **Calcut**

5.2.1. Improvement Act, 1911

- To foster planning and development in Kolkata Municipal Area;
- To provide support for civic amenities in the said Area;
- To provide housing facilities to the working women, economically weaker section (EWS) c the community etc.

5.2.2. Howrah Improvement Act, 1956

- To plan and develop civic infrastructure in the district of Howrah.
- To develop fringe areas.

5.2.3. WB Urban Land (Ceiling & Regulation) Act, 1976

- To identify and declare vacant urban land above the prescribed ceiling as vested in the state and to utilize the same for various public purposes.
- Facilitate the availability and affordability of urban land by increasing its supply in the market and by establishing an efficient land market.
- The ULCRA provided for imposition of a ceiling on both ownership and possession of vacant land; acquisition of excess vacant land by the state government with powers to dispose of the land for the common good; payment of compensation for the acquisition of the excess land; and granting exceptions in respect of certain specific categories of vacant land.

5.2.4. Town & Country (Planning & Development) Act, 1979

- To identify potential urban growth centers all over West Bengal;
- To notify those areas as Statutory Planning Areas;
- To set up Statutory Planning Authorities for integrated planning for those Areas;
- To set up Development Authorities for those Areas for integrated planning & development of those Areas;
- To control land use and development to arrest haphazard growth;
- To act as a catalyst in economic, social and cultural development of those Areas;
- To preserve environmental balance in those Areas etc.

5.2.5. Kolkata Metropolitan Water & Sanitation Act, 1979

- To provide water supply network in Kolkata Metropolitan Area and to develop and maintain sewerage and drainage in the said Area.

Table-5.1: ACTS RELATED TO LAND IN WEST BENGAL	YEAR
Calcutta Improvement Act	1911
The West Bengal Estates Acquisition Act West Bengal Act I of 1954	1953 1954
The West Bengal Land Reforms Act West Bengal Act X of 1956	1955 1956
Howrah Improvement Act	1956
Slum Area Improvement and Clearance Act	1956
The West Bengal Land Reforms (Amendment) Act West Bengal Act 18 of 1965	1965 1965
The West Bengal Land Reforms (Amendment) Act West Bengal Act 11 of 1966	1966 1966
The West Bengal Land Reforms (2nd Amendment) Act West Bengal Act 23 of 1969	1969 1969
West Bengal Panchayat Act	1973
WB Urban Land (Ceiling & Regulation) Act	1976
The West Bengal Estate Acquisition (Amendment) Act West Bengal Act 36 of 1977	1977 1977
The West Bengal Land Holding Revenue Act West Bengal Act 44 of 1979	1979 1979
Town & Country Planning & Development Act	1979
KMW & SA Act	1979
The West Bengal Land Reforms (Amendment) Act West Bengal Act 41 of 1980	1980
The West Bengal Town & Country Planning (Advisory Board) Rules	1980
The West Bengal Land Holding Revenue (Amendment) Act West Bengal Act 33 of 1981	1981
The Calcutta Thikka Tenancy (Acquisition and Regulation) Act (West Bengal Act 37 of 1981).	1981
The West Bengal Land Holding Revenue (Amendment) Act, West Bengal Act 23 of 1982	1982
The Calcutta Thikka Tenancy (Acquisition and Regulation) (Amendment) Act West Bengal Act 41 of 1984	1984
West Bengal Metropolitan Planning Committee Act	1994
The West Bengal Premises Tenancy Act	1997
West Bengal Town & Country Planning (Development of Township Projects) Rules	2008

5.2.6. WB Govt. Premises (Regulation of Occupancy) Act, 1984

➢ This Department acts on the W.B. Govt. Premises (Regulation of Occupancy'1984 and administers the matters of Salt Lake Project).

5.2.7. West Bengal Metropolitan Planning Committee Act, 1994

➢ To constitute Metropolitan Planning Committee in every metropolitan area in West Bengal for preparation of draft development plan for the metropolitan area as a whole and also for performing such functions relating to planning and coordination for the metropolitan area as the State Government by notification may assign to it.

5.3. ASPIRATION FOR DEVELOPMENT AT A NEW PLACE

A successful development scheme has to take into consider that the physical potential is developed in accordance with plans and aspiration of the people.

5.3.1. Aspiration of a Dweller in a new place

➢Employment or proximity to it.

➢Security of tenure.

➢Better housing with infrastructure.

➢Potential for financial gain.

While a permanent dweller is investing in better housing the other interest groups like speculators or intermediaries or unauthorized users are interested only in the financial gain. The expectation the expectations and motivation for the land to be developed of these parties are:

5.3.2. Developers

➢ Get infrastructure support as soon as possible.

➢ Get a rise in land values as soon as possible.

➢ Avoid land-use related taxes.

➢ Development of own plans and avoids land-use restriction.

5.3.3. Speculators

- Hold land for short test period.
- Unconcerned about later land use of land.
- Avoid land-use related taxes.
- Maximize the sale price.

5.3.4. Existing Dwellers

- Indifferent of surrounding development.
- Have low tax liabilities/recurring expenses for continued occupation

5.3.5. Illegal squatter & unauthorized settlements:

- Permanent or temporary support for continued occupation.
- Become de-facto permanent settler.
- Prolong official development as long as possible.
- These all aspirations of the interest groups seem to be often conflicting and all can not be satisfied. The regulators need to give priority to the aspiration of the would be settler, (employment, security, housing & entertainment)
- The regulation need to control one aspiration which is common to all i.e. the increase the land value.

Chapter 6

THE STUDY AREA: RAJARHAT

6.1. SELECTION OF STUDY AREA

The development of greater Kolkata has been accelerated by the proposal of New Town; especially the Eastern part of Kolkata is being affected directly by this development. And to know the fringe of this New Town, the surroundings must be considered. This township is developing in the eastern side of Salt Lake City (Bidhan Nagar). The northern tip is connected with Rajarhat-Gopalpur Municipality. East Kolkata Wetlands are forming the southern boundary for the New Town. And the eastern part is covered by some mouzas, part of them comes under Rajarhat (of North 24 Parganas) and the remaining are from Bhangar-II (of South 24 Parganas).

6.2. DELINEATION OF THE FRINGES OF NEW TOWN

The southern fringe i.e. East Kolkata Wetland is managed by the respective Wetland Management Department. The development in this area comes under the East Kolkata Wetlands (Conservation and Management) Act, 2006. So, for any development to take place their one has to take permission from that respective department. So in this process, this area is not taken.

In the north, the Rajarhat-Gopalpur Municipality is preparing their own development plan to control the development, as that area is also facing a rapid development due to New Town. Bidhan Nagar (Salt Lake City) Municipality constitutes the western boundary; this is a planned development. So in the delineation process these two municipality areas are not taken in consideration. The remaining parts are the two blocks along the New Town. Rajarhat and Bhangar- II, both are rural in nature, comes under jurisdiction of Panchayats. These areas don't have any proper development control regulation. So, there are chances of unplanned development, which will obviously put a negative impact and unnecessary stress on New

Town's infrastructure and so on its development, along with this a declination in living condition of the fringes. So the fringes, which needs development control are mainly these two blocks.

6.3. LIST OF MOUZAS (VILLAGES)

6.3.1. North 24 Parganas: Block- Rajarhat

1. Bhatenda
2. Khamar
3. Kalaberia
4. Basina
5. Ganragari
6. Jhalgachhi
7. Kasinathpur
8. Kalikapur
9. Umarhati
10. Jamalpara
11. Chhota Chanpur
12. Bishnupur
13. Mobarekpur
14. Bagdobamachhi Bhanga
15. Panapukuria
16. Chandapur Champagachhi
17. Sikharpur
18. Bazetaraf
19. Arbelia
20. Bagu
21. Nawabad
22. Hudarait
23. Raigachhi
24. Rekjuani

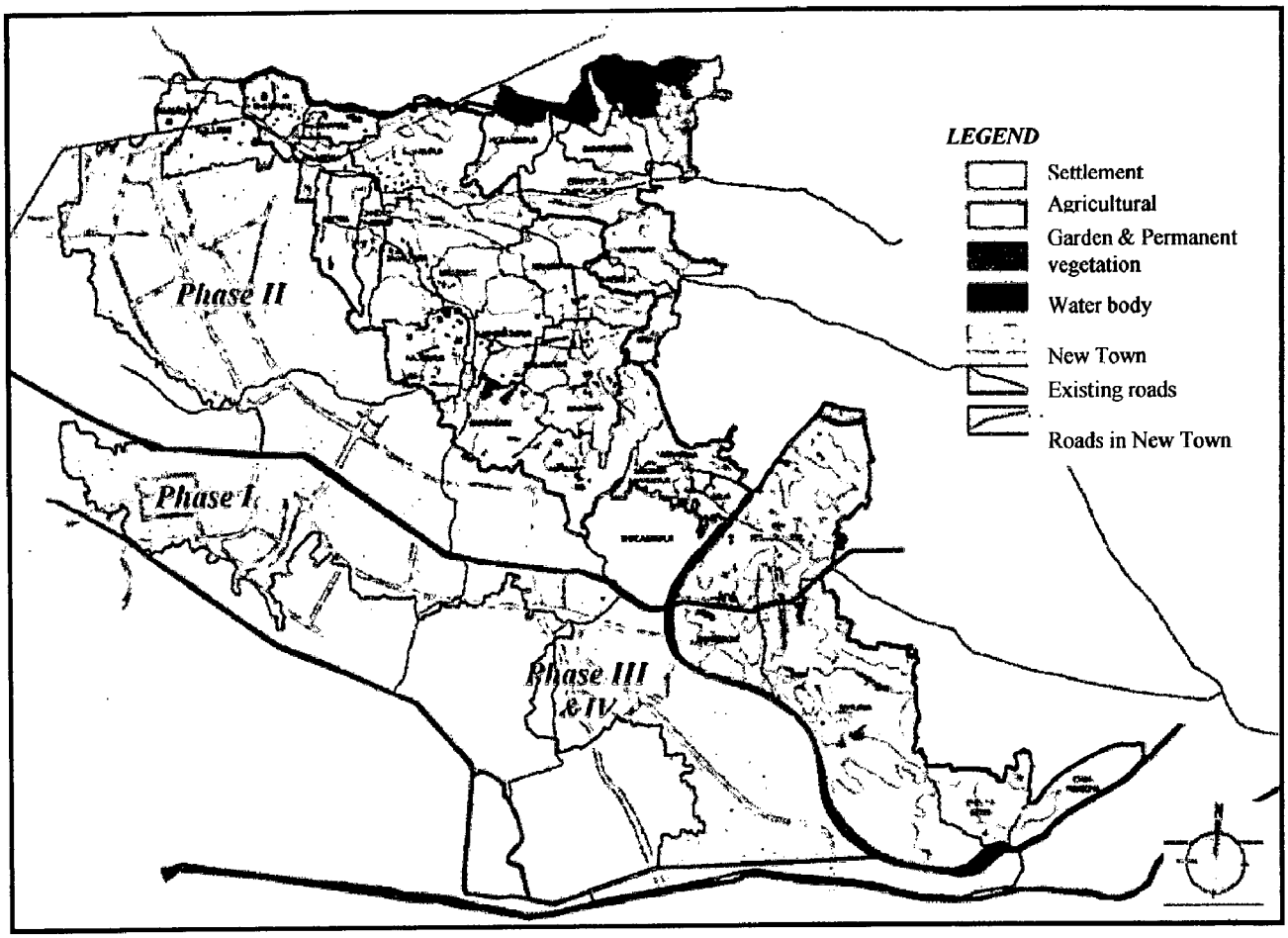
Fig. 6.1.Glimpses of the mauzas

6.3.2. South 24 Parganas: Block- Bhangar II

1. Abua
2. Dakshin Khayerpur
3. Tara Hadia
4. Pitha Pukuria
5. Jiran Gachhi
6. Bamunia
7. Chalta Beria
8. Chak Maricha
9. Bhagbanpur

6.4. SELECTION OF STUDY AREA

The adjacent two blocks, Rajarhat and Bhangar-II; have the direct impact of New Town. But looking at the phase wise development of New Town, the area adjacent to Rajarhat comes under first and second phase of development and the area adjoining Bhangar-II is third and



Map. 6.1. Present landuse of fringes of New Town

fourth phase of development which is now developing in lower pace.

On the other hand, all though the decadal growth (in population) of these two blocks have less difference, peri-urban characteristics is much more predominant in Rajarhat than in Bhangar-II, as it is much more nearer to the city and also have good connectivity within this region.

Considering these factors, the block Rajarhat is taken as the Study Area, which has a decadal growth of 26.2%, nearer to the city and well connected within the region, and also adjacent to the area of New Town which is developing in faster pace.

THE STUDY AREA: RAJARHAT

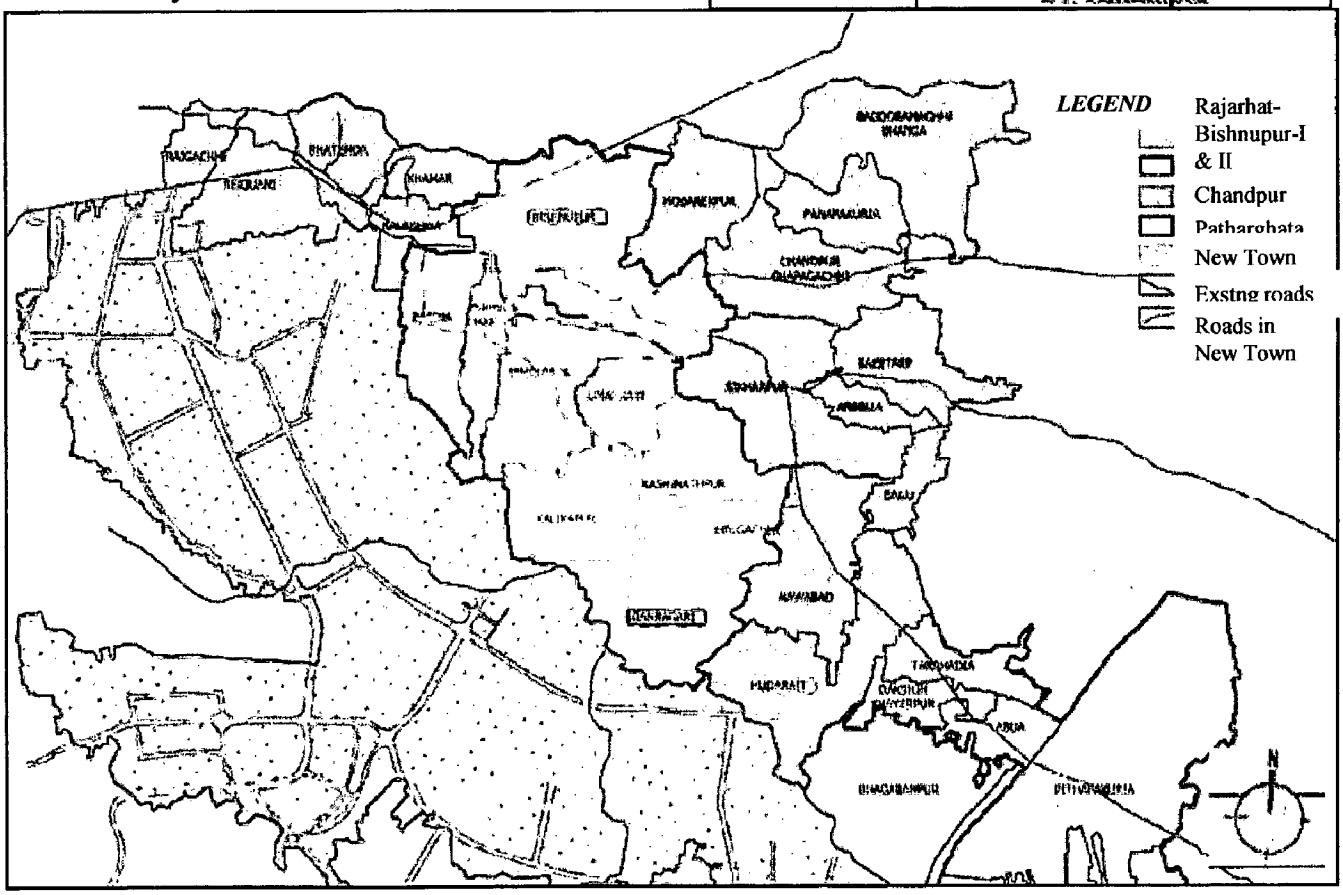
The Study Area, Rajarhat is consisting of 24 villages and in under jurisdiction of different 4 Village Panchayats. Beside that a new area development authority (Bhangar Rajarhat Area Development Authority) has formed taking 15 villages from this area to control the development within the area.

6.5. LOCATION

Geographically area is between longitude of 88°28"E and 88°33"E and latitude of 22°38"N and 22°33"N. The western side of this block is bounded by the New Town.

Table. 6.1. List of Panchayats & Mauzas

Panchayet	Mauzas
Rajarhat-Bishnupur I	1. Raigachhi
	2. Rekjuani
	3. Jagadishpur
	4. Bhetenda
	5. Khamar
	6. Kalaberia
Rajarhat-Bishnupur II	7. Basina
	8. Umarhati
	9. Jamalpara
	10. Chhoto Chanpur
	11. Bishnupur
Chandpur	12. Mobarekpur
	13. Bagdobamachi Bhanga
	14. Panapukuria
	15. Chandpur Champagachhi
	16. Sikharpur
	17. Bazetaraf
	18. Arbelia
	19. Bagu
	20. Nawabad
	21. Hudarait
Patharghata	22. Gantragari
	22. Jhalgachi
	23. Kashinathpur
	24. Kalikapur



Map. 6.2. Present division of Rajarhat under 4 Panchayats

The southern part is connected with the boundary of 24 Parganas South.

The Noai canal has developed the natural as well as administrative boundary for the northern part of the block, and the area comes under Rajarhat Gopalpur Municipality. The remaining eastern side is part of 24 Parganas North, this part is mainly having rural characteristics with some important node like Haroa, Khadibari, Aminpur etc.

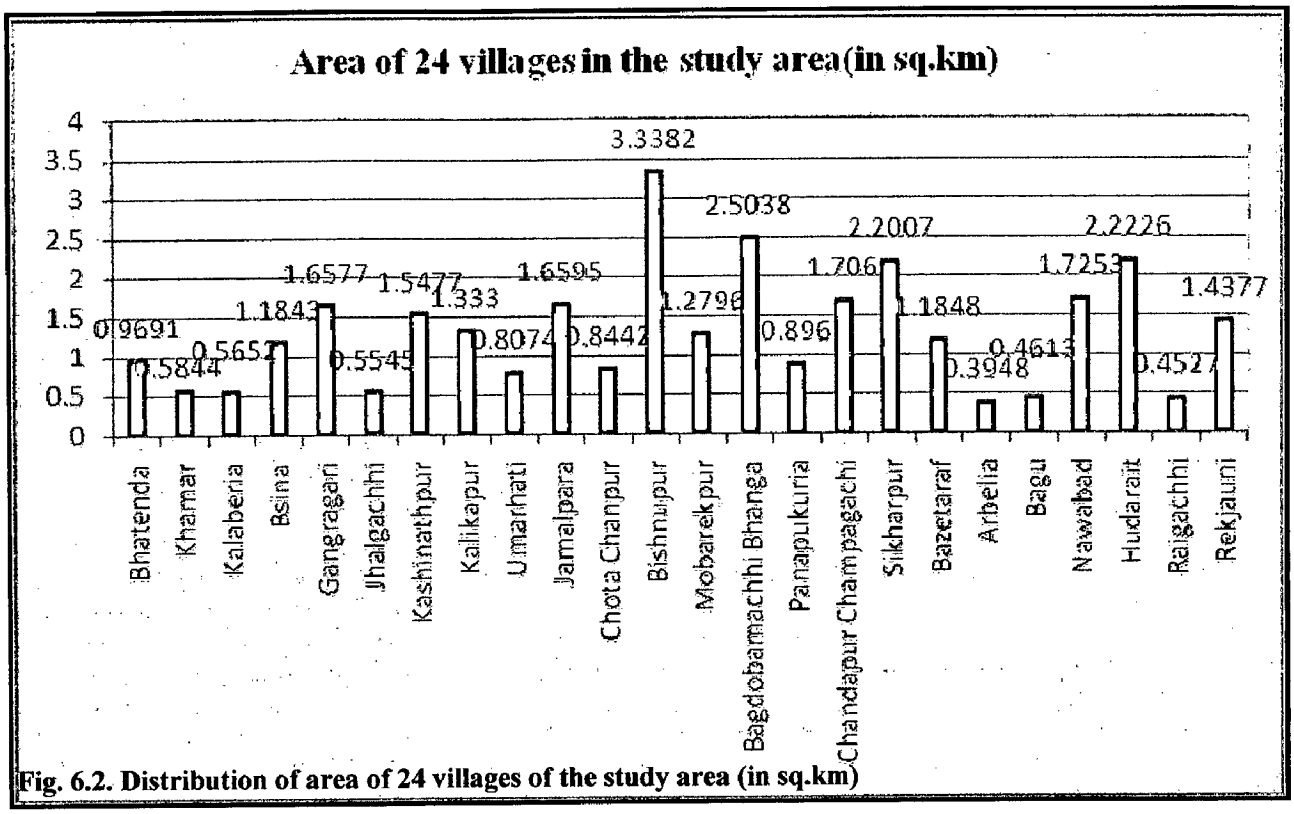


Fig. 6.2. Distribution of area of 24 villages of the study area (in sq.km)

6.6. AREA

The total area is about 3150.95 ha or 31.51 sq.km.

6.7. CLIMATE

Climate is humid and tropical characterized by hot and humid from March to May, monsoon from June to September and moderately cool pleasant winter from October to February.

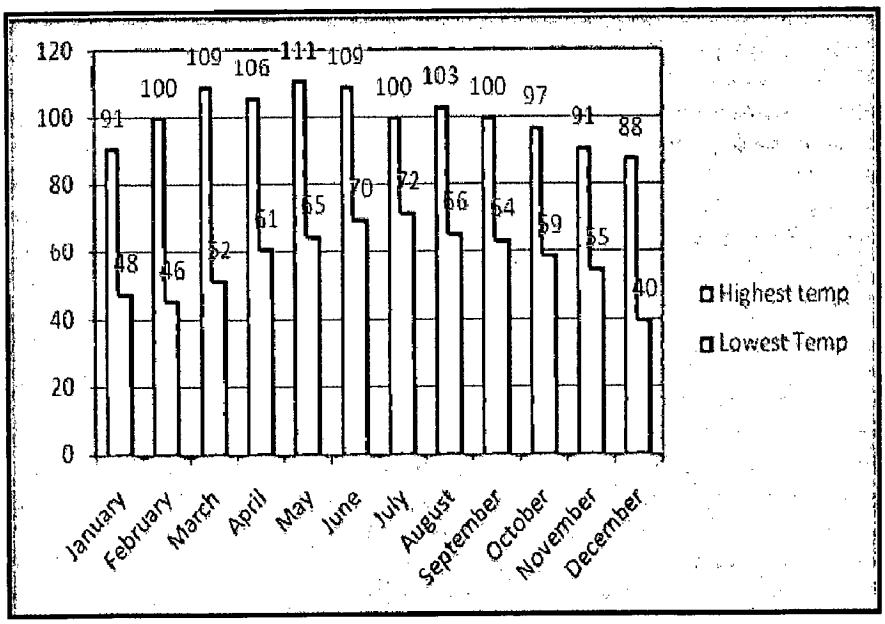


Fig. 6.3. Temperature in farenheight in 2009

Average highest temperature in April is about 35°C and during December-January, it's about 13°C.

In rainy season the precipitation is 10-13 cm.

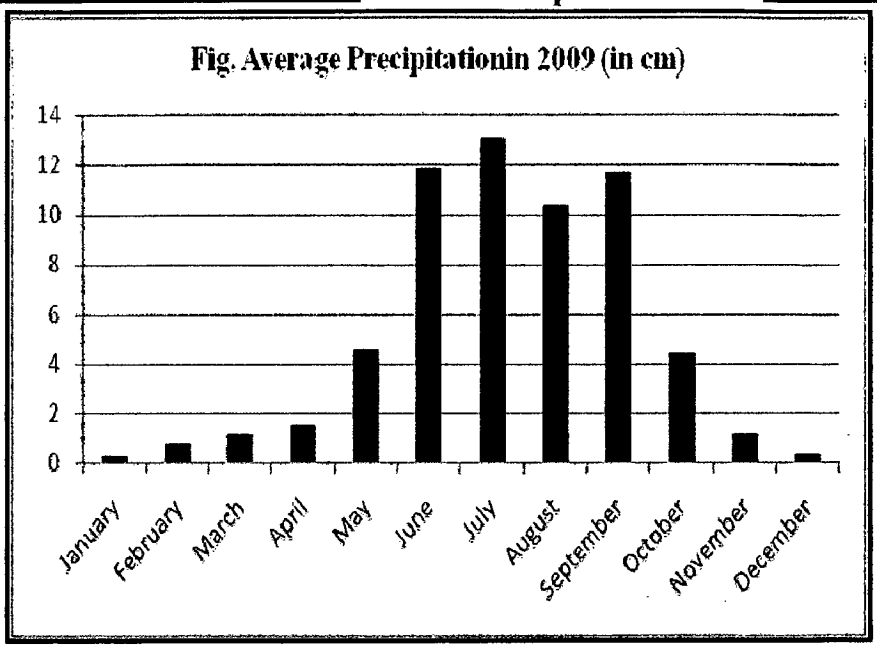


Fig. 6.4. Average Precipitation in cm in 2009

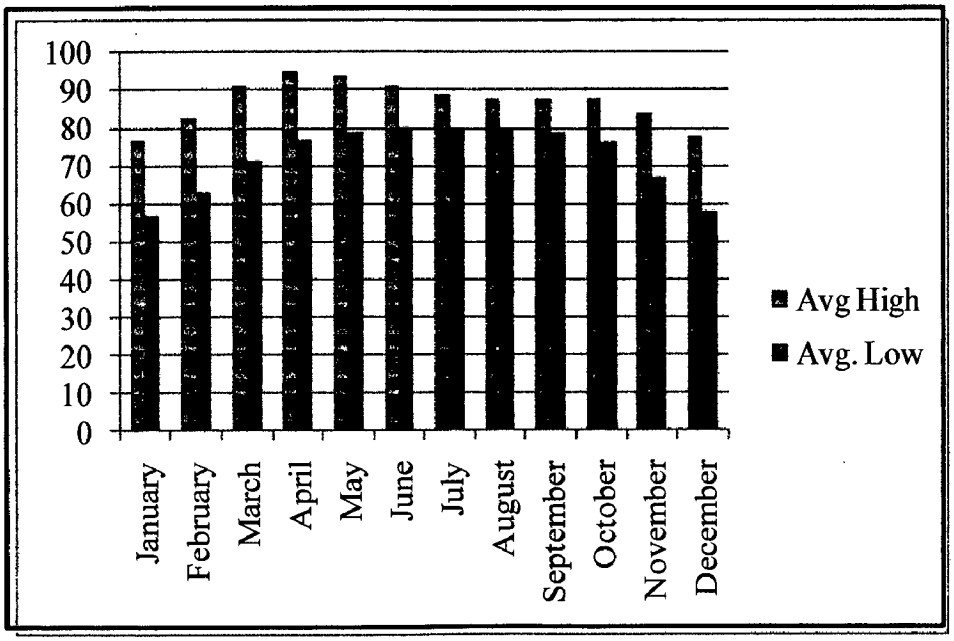


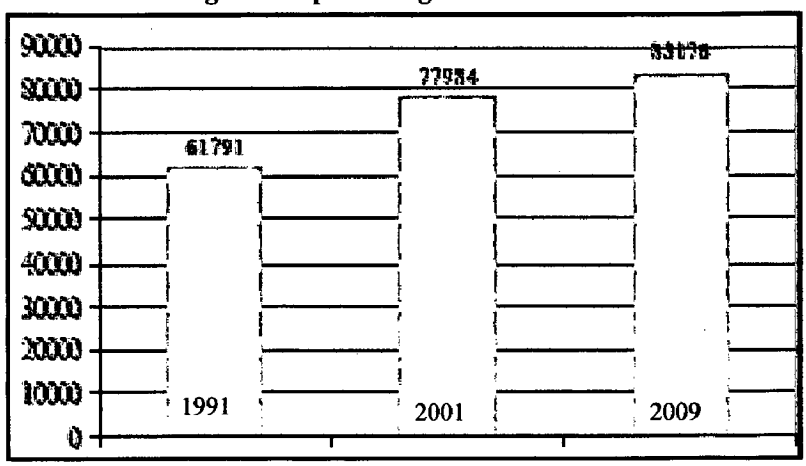
Fig. 6.5. Average Temperature in farenheight in 2009

6.8. DEMOGRAPHY

Total population of the study area according to 2001 census is 77,984.

In the year 2009 the population has become 83,176 approximately. This area has shown a continuous growth in terms of its total population so as in density.

Fig. 6.6. Population growth



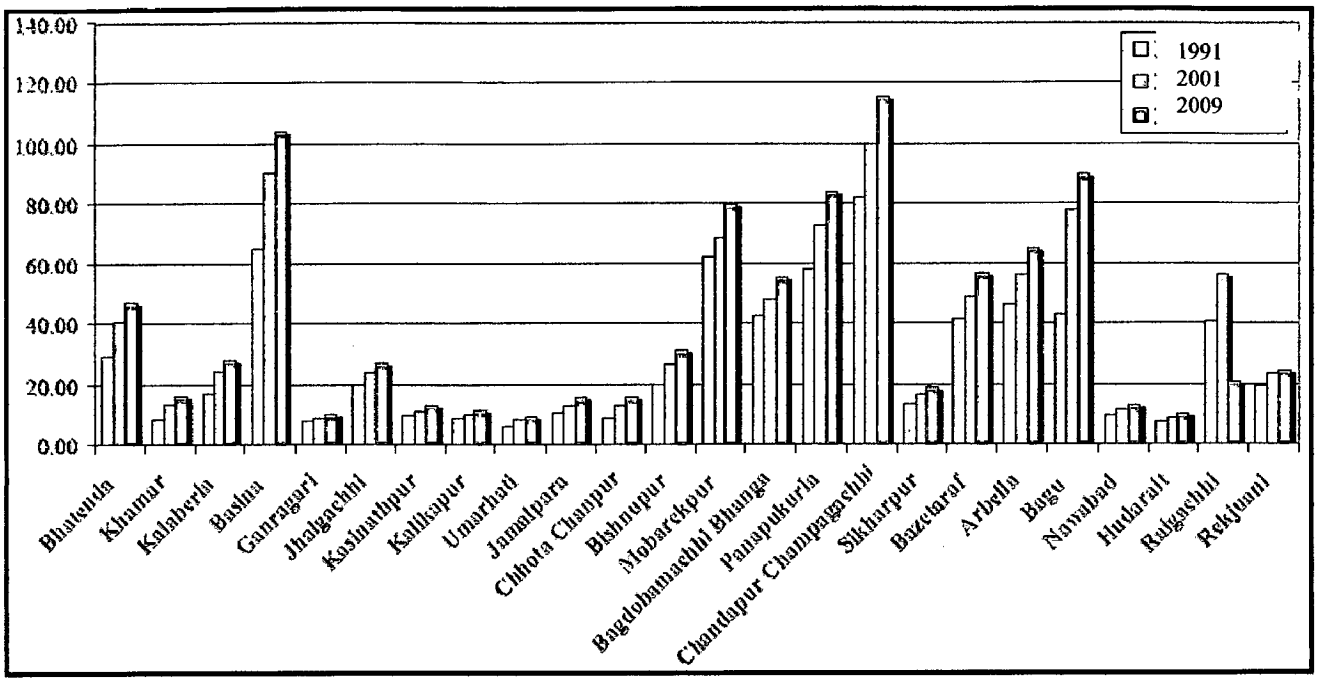


Fig. 6.7. Population density comparison of all villages (people/ hectare)

The annual growth rate between 1991 and 2001 is 2.62%, and between 2001 and 2009 is 1.32%. Here it shows a decline in growth rate, which may be the cause that development after 2000 has become restricted.

Population density of the area in the year 2009 is 26.4pph. Earlier in 2001 it was 24.75pph, thus a growth of 6.66% has occurred after implementation started at New Town. In 1991 population density was 19.61pph. The population density of mauzas adjacent to New Town, i.e, Bhatenda, Kalaberia, Basina, Ganragari, Kalikapur, Jamalpara, Chhota Chanpur, Hudarait and Rekjuani. has increased from 20.12pph in 2001 to 22.24pph in 2009.

Even having some restriction the area has shown an increase of 10%, which is higher than the growth of the whole block. Beside this some block has shown high growth rate like, Khamar and Bagu. Khamar is in northern tip, it has a close proximity to nearby urban center, and also it is the part of nucleus of Rajarhat. The villages having the highest density of population are Chandapur Champagachi, Basina, Bagu and Mobarekpur. The villages having the lowest population density are Umarhati, Gangragari and Hudarait.

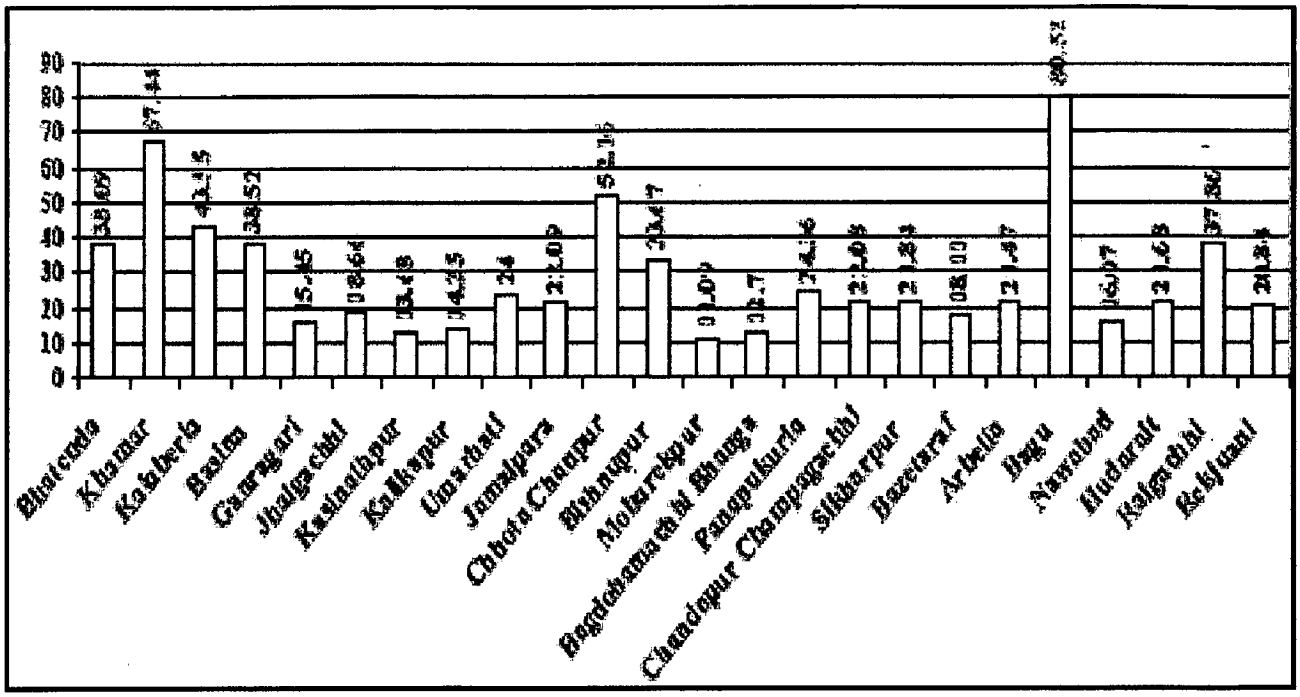


Fig. 6.8. Decadal Growth Rate All Villages (from 1991-2009)

The other area Bagu has also shown a growth of 80.52% between 1991 and 2001, is from eastern border of the block. This area is well connected through Bus Route No. 91. Ganragari, Jhalgachi, Kashinathpur, Kalikapur, Mobarekpur, Bagdobamachi Bhanga, Bazetaraf and Nawabad have shown lower growth in terms of population. (1991-2001).

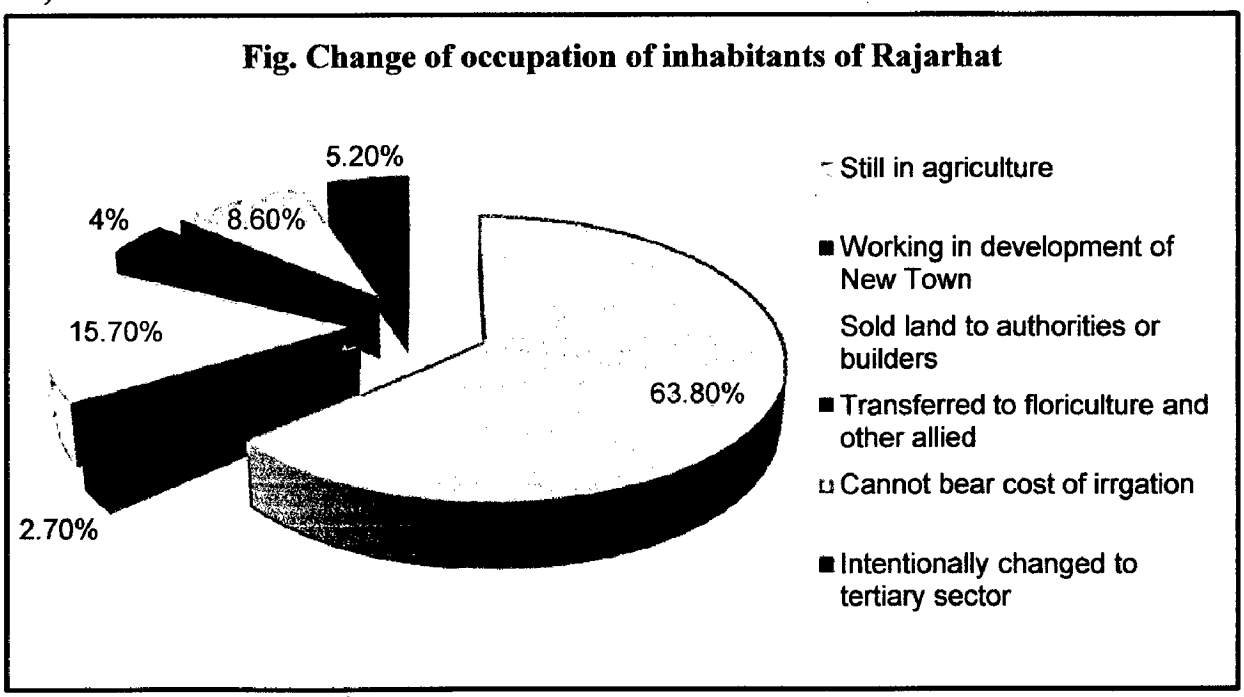
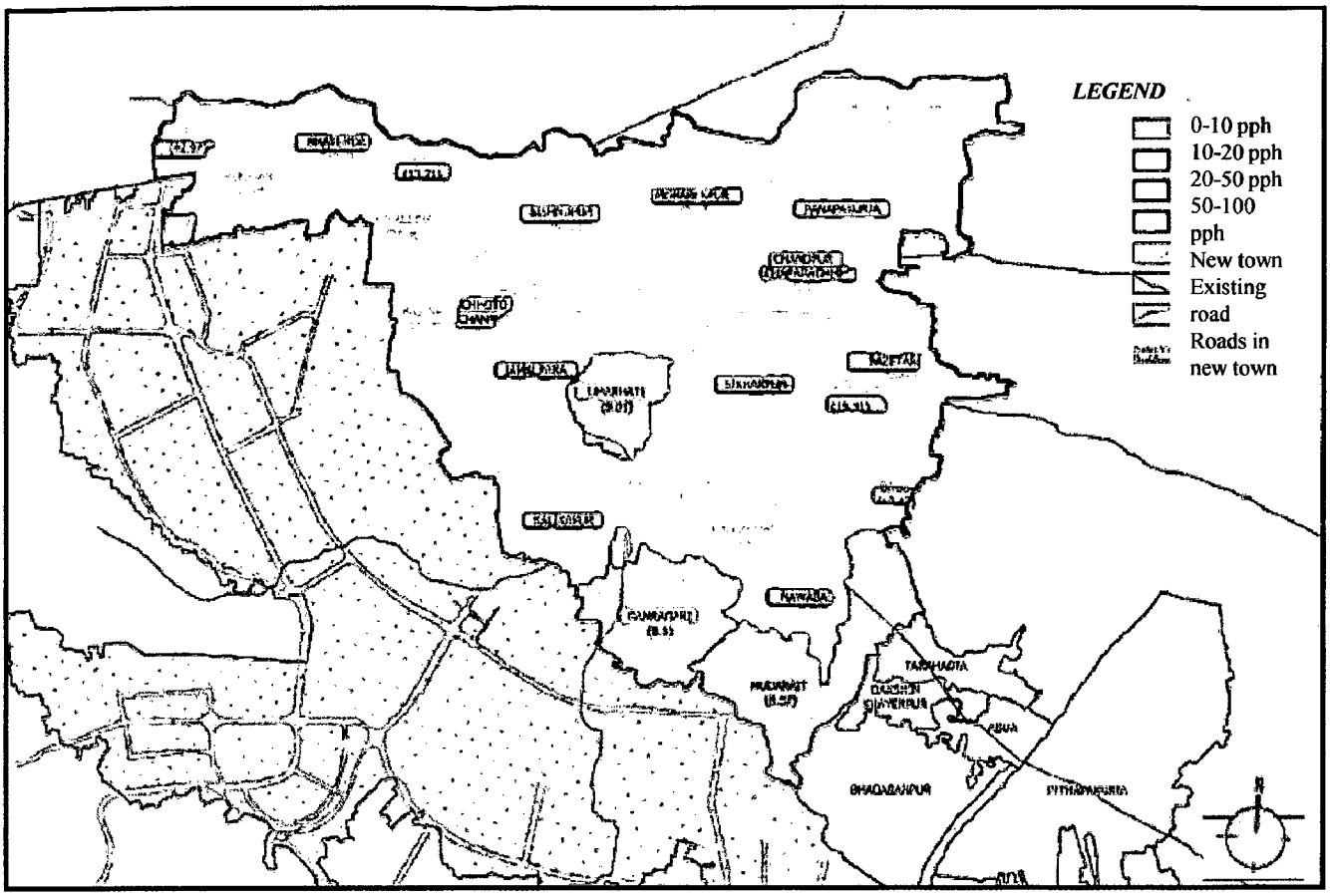
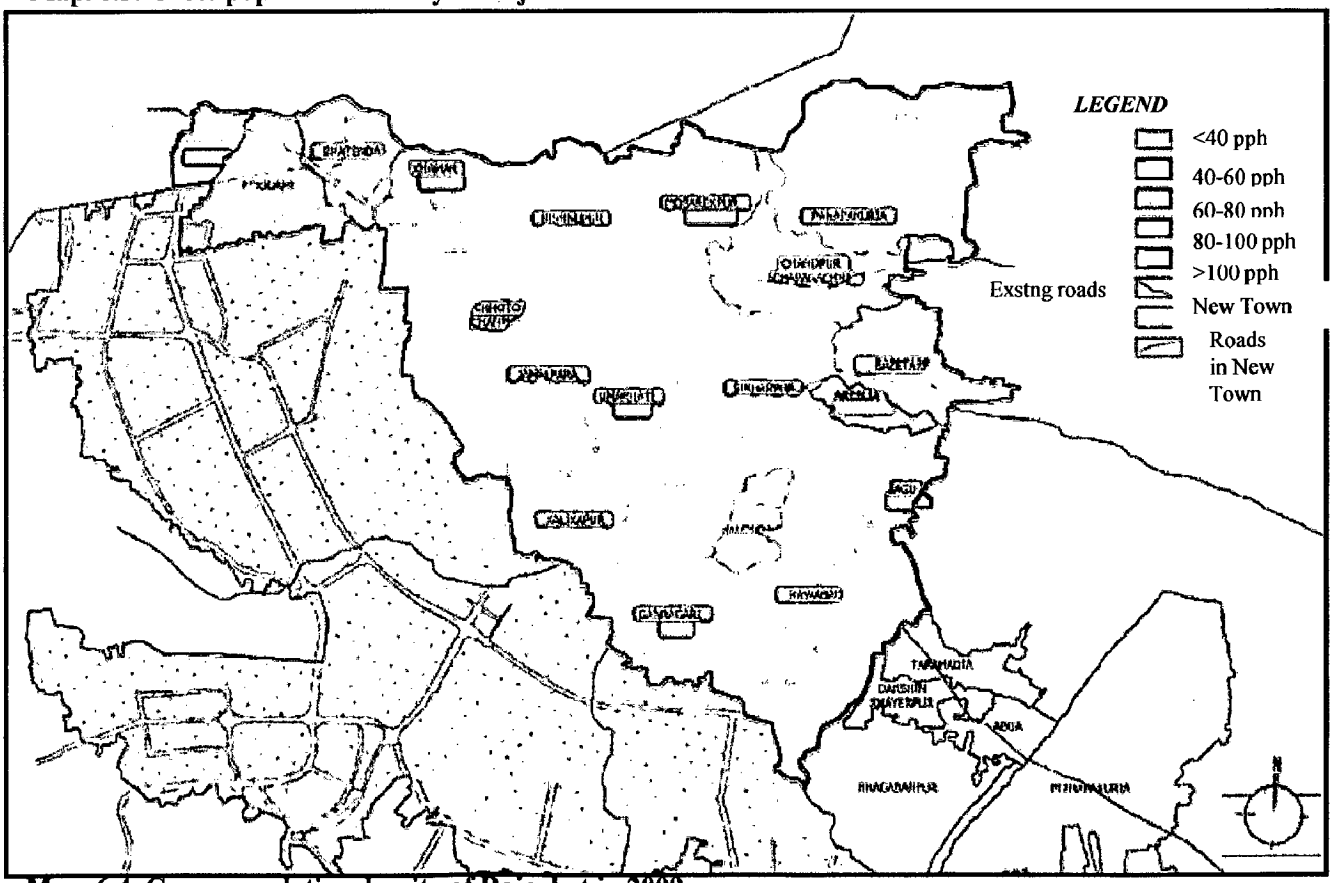


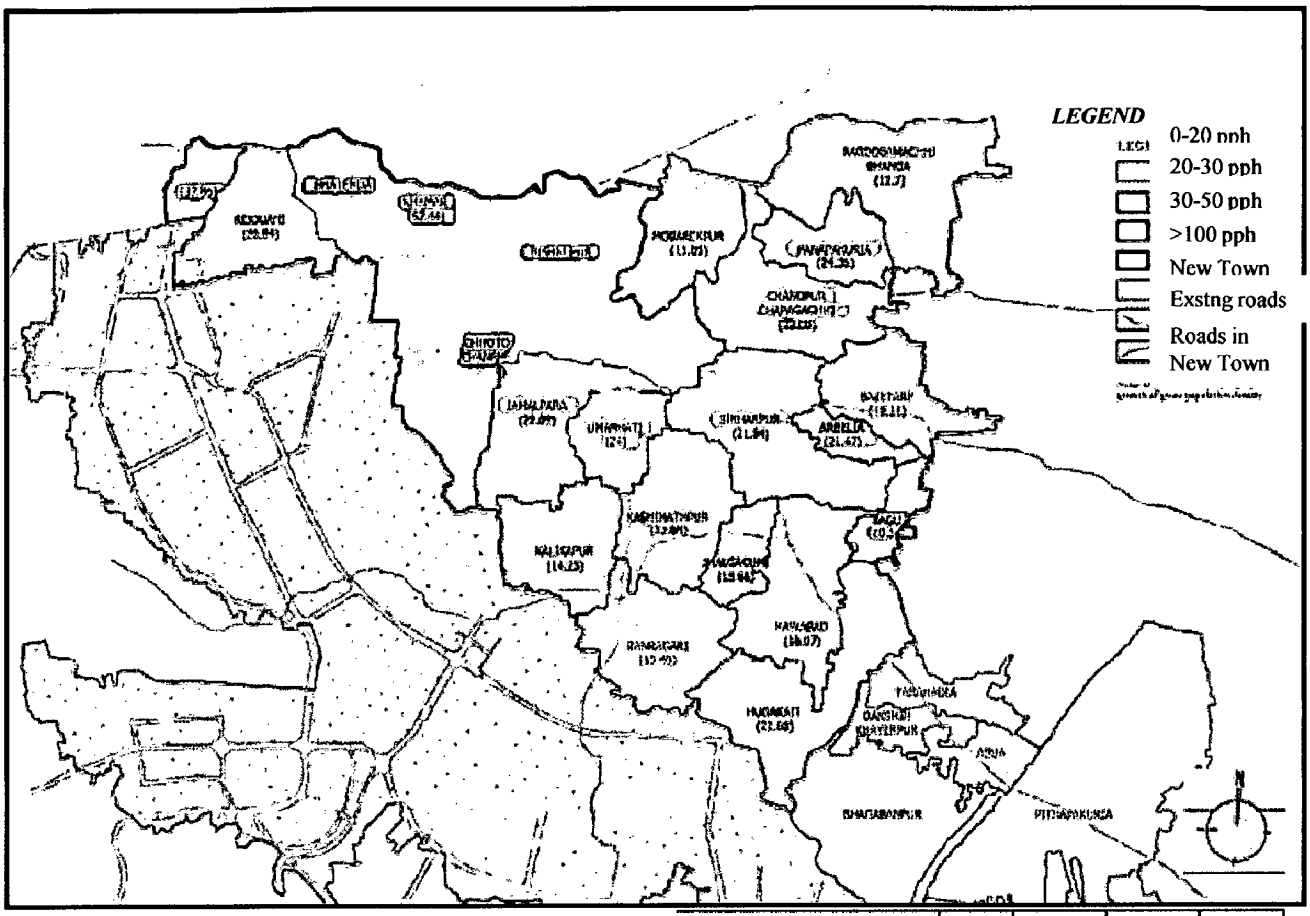
Fig. 6.9. Change in occupation of inhabitants of Rajarhat



Map. 6.3. Gross population density of Rajarhat in 2001



Map. 6.4. Gross population density of Rajarhat in 2009



Map. 6.5. Decadal growth of population in Rajarhat from 2001 to 2009

6.9. SOCIO ECONOMIC CHARACTERS

6.9.1. WORK FORCE PARTICIPATION RATE

According to 2001 census the percentage of total workers (including marginal workers) with respect to total working age population was 29.33 % the same for the rural areas of North 24 Pgs and Rajarhat P. S was 33.64% and 30.33 % respectively. So it can be observed that work force participation rate has gradually decreased from district level to the area.

Table. 6.2. Percentage of different class of people

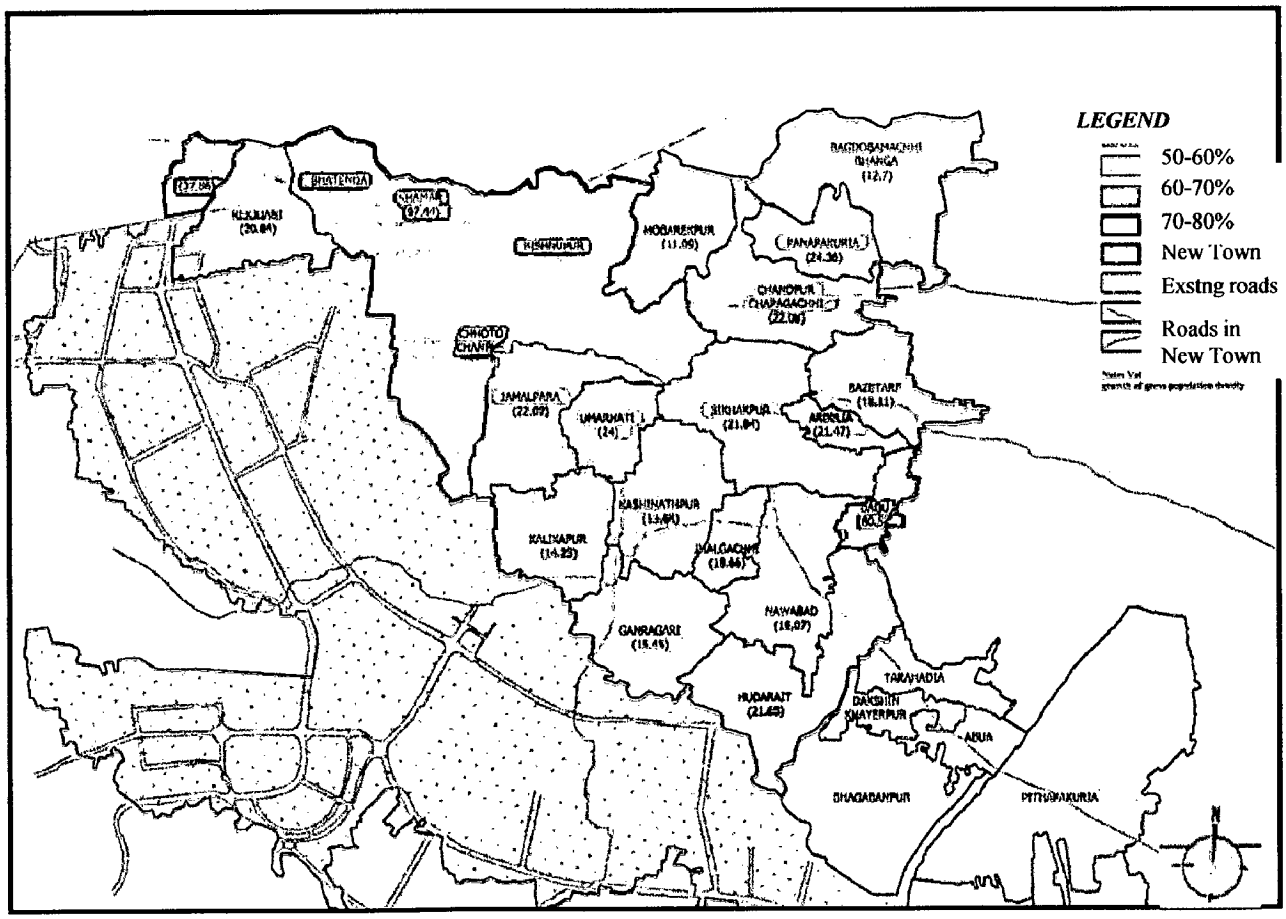
Mouza	HIG	MIG	LIG	EWS
Raigachhi	2	75	18	5
Rekjuani	5	45	50	0
Bhatenda	5	35	55	5
Khamar	2	85	10	3
Kaleberia	5	60	30	0
Basina	0	65	30	5
Gonragari	0	78	15	7
Jhalgachhi	0	80	10	10
Kashinathpur	0	75	15	10
Kalikapur	0	75	15	10
Umarhati	0	75	15	10
Jamalpara	0	60	12	28
Choto Chanpur	0	87	10	3
Bishnupur	2	65	30	3
Moborekpur	2	40	55	3
Bagdobamachhi Bhanga	2	40	55	3
Panapukuria	1	35	62	2
Chandapur Champagachhi	0	55	40	5
Sikherpur	0	65	30	5
Bazetaraf	0	65	30	5
Arbelia	0	75	15	10
Bagu	0	85	10	5
Nowabad	0	85	10	5
Hudaroit	0	85	10	5
Total	0.96	66.97	26.67	6.38

6.9.2. PERCENTAGE OF MAIN WORKER WITH RESPECT TO TOTAL WORKER

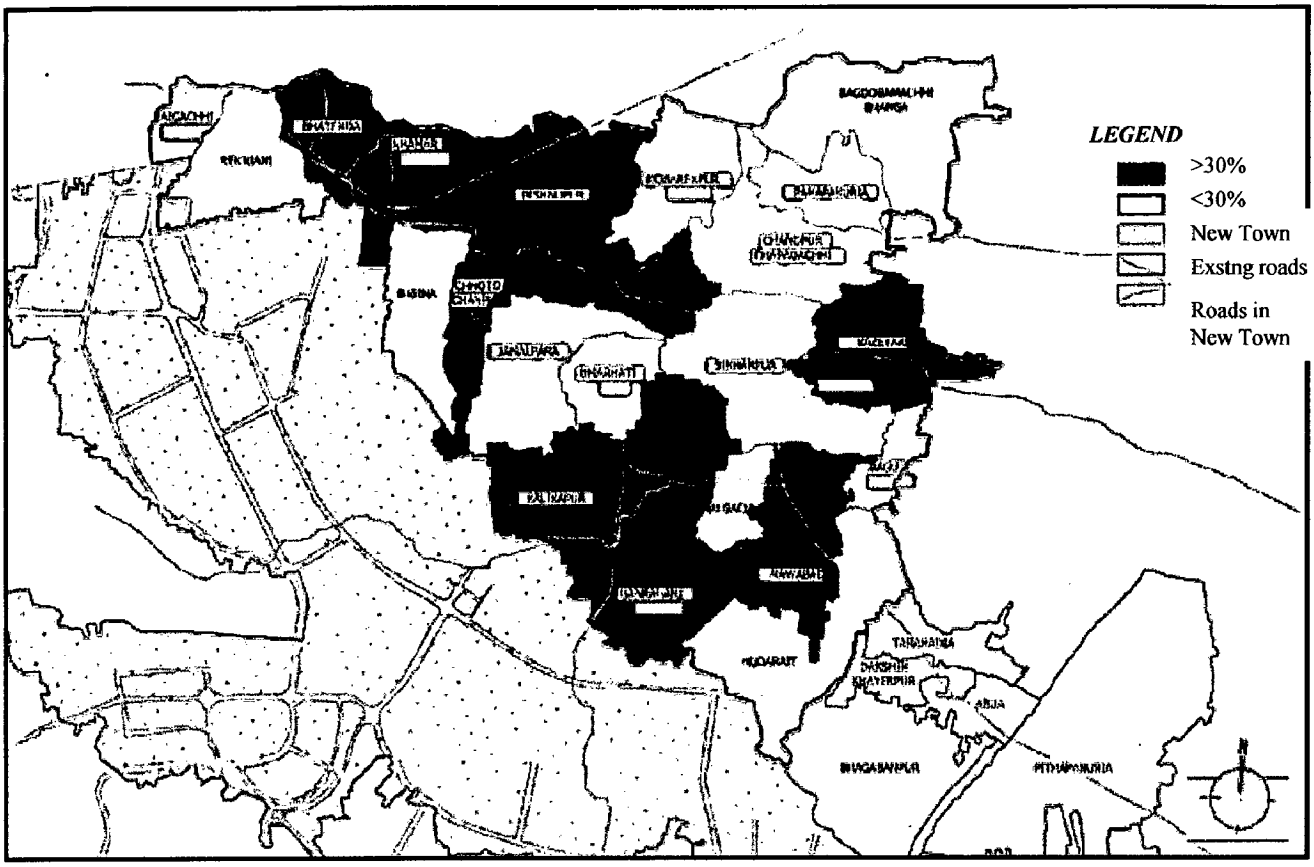
The percentage of total worker in formal sector with respect to total worker was 88.45% whereas that of rural areas of Rajarhat P.S and North 24 Pgs was 86.99% and 82.88% respectively.

6.9.3. ENGAGEMENT OF WORKER IN PRIMARY SECTOR ACTIVITY

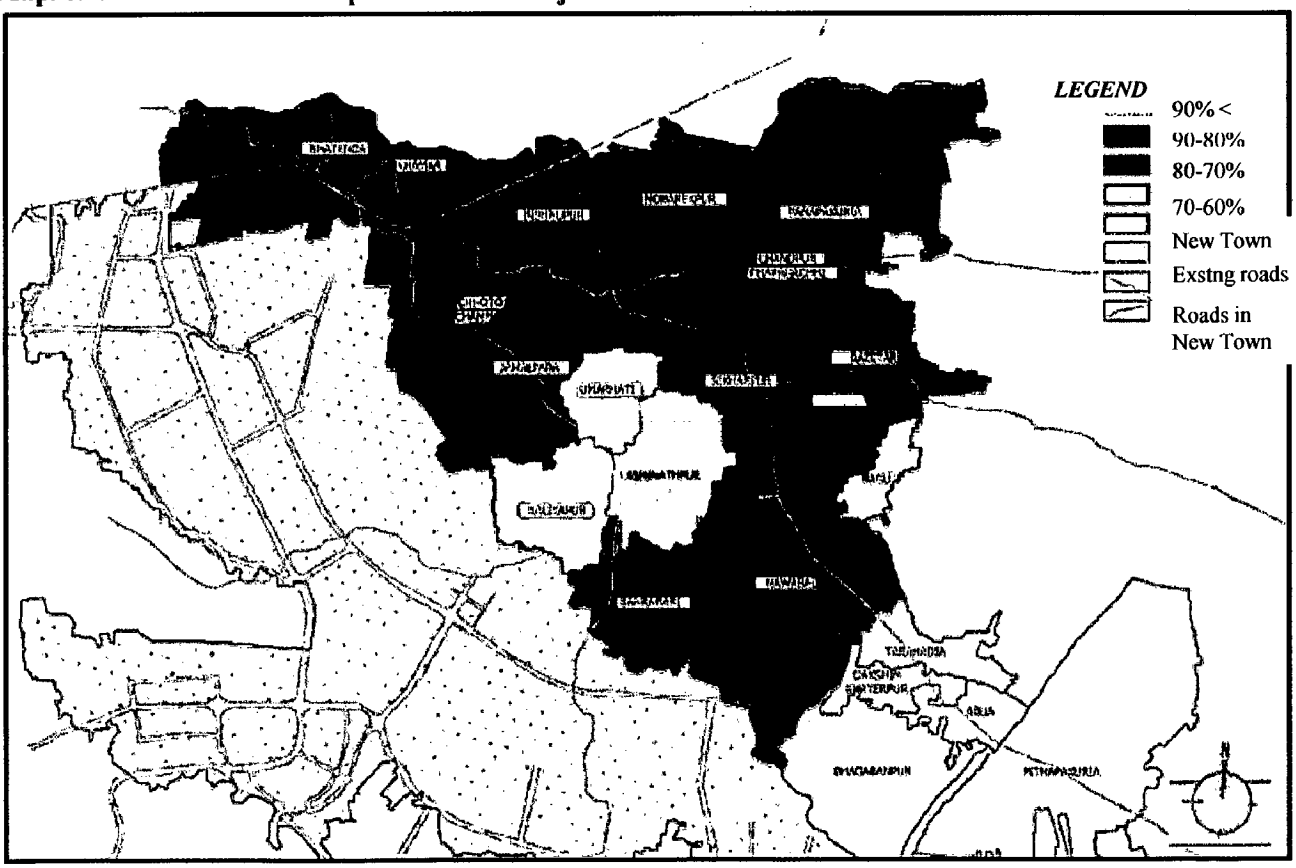
The percentage of main worker in primary sector with respect to total main worker was 26.32% whereas that of rural areas of Rajarhat P.S and North 24 Pgs are 25.79% and 49.48% respectively.



Map. 6.6. Percentage of literate to total population in Rajarhat



Map. 6.7. Work Force Participation Rate in Rajarhat



Map. 6.8. Percentage of main workers with respect to total workers in Rajarhat

THE STUDY AREA: RAJARHAT

6.10. LAND USE

The predominant land use of the study area is agricultural though some pockets of settlements are clearly seen. This development is mostly of a ribbon kind, and is taking place along the main transportation corridoor. Areas like Raigachi, Rekjuani, Bhatenda being more nearer to the urban area, peri urban characteristics are predominant and the areas are very quickly acquiring urban characters. Southern part, except Abua, agricultural land use is leading. Blocks adjoining New Town also show patches of settlement. Analysis is done comparing the landuse changes from 1981 to 2009. There is a gradual and constant increase in built up areas and decrease in vegetation and green areas. The change has been much drastic in the past 8 years from 2001 to 2009.

Table. 6.3. Land Use break-up of all Villages of Study Area: Rajarhat (2009)

Villages	Residential	Vegetation[6]	Industrial	Others[7]
Raigachhi	32.55	22.87	5.01	39.57
Rekjuani	72.06	14.89	2.48	10.57
Bhatenda	73.22	6.05	1.98	18.75
Khamar	33.35	15.32	43.26	8.07
Kalaberia	50.13	24.27	5.61	20.09
Basina	44.79	40.29	0.75	14.17
Ganragari	24.79	58.11	0.69	16.41
Jhalgachhi	38.56	52.04	1.36	8.04
Kashinathpur	28.3	54.87	0.38	16.45
Kalikapur	32.58	60.89	0.38	6.15
Umarhati	21.86	50.08	6.19	21.87
Jamalpara	36.31	57.74	0.02	5.93
Choto Chanpur	14.81	75.49	0.08	9.62
Bishnupur	35.84	47.23	1.47	15.46
Moborekpur	35.74	32.02	1.5	30.74
Bagdobamachhi Bhanga	14.67	38.55	0.37	46.41
Panapukuria	53.6	37.99	0.31	8.1
Chandapur Champagachhi	48.4	42.74	0.97	7.89
Sikharpur	22.91	72.17	0.69	4.23
Bazetoraf	35.82	58.93	0.29	4.96
Arbelia	43.19	46.83	0.48	9.5
Bagu	28.09	68	0.12	3.79
Nowabad	25.93	69.18	0.2	4.69
Hudarait	7.49	85.39	0.1	7.02
Total	32.67	53.93	1.11	12.39

Vegetation - agricultural, orchard, floriculture.

Others - commercial, circulation, water body, public, semi- public, fallow land, marshy lands , cultivable waste land.

6.10.1. Residential

Presently 32.57% of the land is residential. The existing settlement structure shows a linear sprawl of residential development along the main roads. Some less accessible areas show sparse settlement and the buildings are more or less clustered at uneven intervals. Mud and thatch houses can be rarely observed. Most of the houses are either brick structures or made of asbestos.

Settlements developed in the most accessible zone adjoining to Rajarhat New Town and Rajarhat Gopalpur Municipality, with better infrastructure and facilities. The growth of settlement is towards east and south mainly along the main roads in a sparsely manner with good accessibility and some facilities. Settlements developed in some pockets within vast agricultural lands are without minimum infrastructure and facility.

6.10.2. City Center

The area is rural in character, so no such city center exists here. With time, the impact of urbanization has developed the area near to Rajarhat Chowmatha (Round about of four streets)as focal point, as it is easily accessible from the other parts of the block.

6.10.3. Industrial

Industrial development is comparatively very less in this area; only 1.11% of the land is developed as industrial area. Industries found here are less in number as well as mainly small in character. These include Cement godown, Mineral Water factory, Cotton Mill, Paper Mill, Cake, Pastry and Confectionary. These industries are mostly found near the Rajarhat Chowmatha (in Bhatenda, Khamar, Kalaberia and Bishnupur mouza) along the main roads.

In addition to this, brickfield is present in Umarhati and Bogdobamachhi Bhanga mouza. As all the existing industries except the brickfields are non-hazardous in nature they do not create severe problem to the adjacent residential plots. The environment is not much effected by these industries.

Commercial

6.10.4. Commercial center

In the most accessible zone nearer Rajarhat Chowmatha, commercial functions have closely developed along the parallel portion of the two major roads. This can be termed as the commercial center of the planning area as the variety of shops present here is infrequent in other parts where commercial landuse is mostly absent.

6.10.5. Wholesale Market

One wholesale market of fish, vegetables, rice, and cereals is situated and near Lauhati. Moreover, transaction of agricultural products of the local and surrounding areas is done in this market. A number of daily markets (5 nos.) meet the need of the residents at neighbourhood level, but their number is not sufficient to cater the whole population. In addition to this, sparse development of commercial functions along the main accesses and surrounding the important road junctions (Bishnupur Battala, Sikharpur More) can be observed.

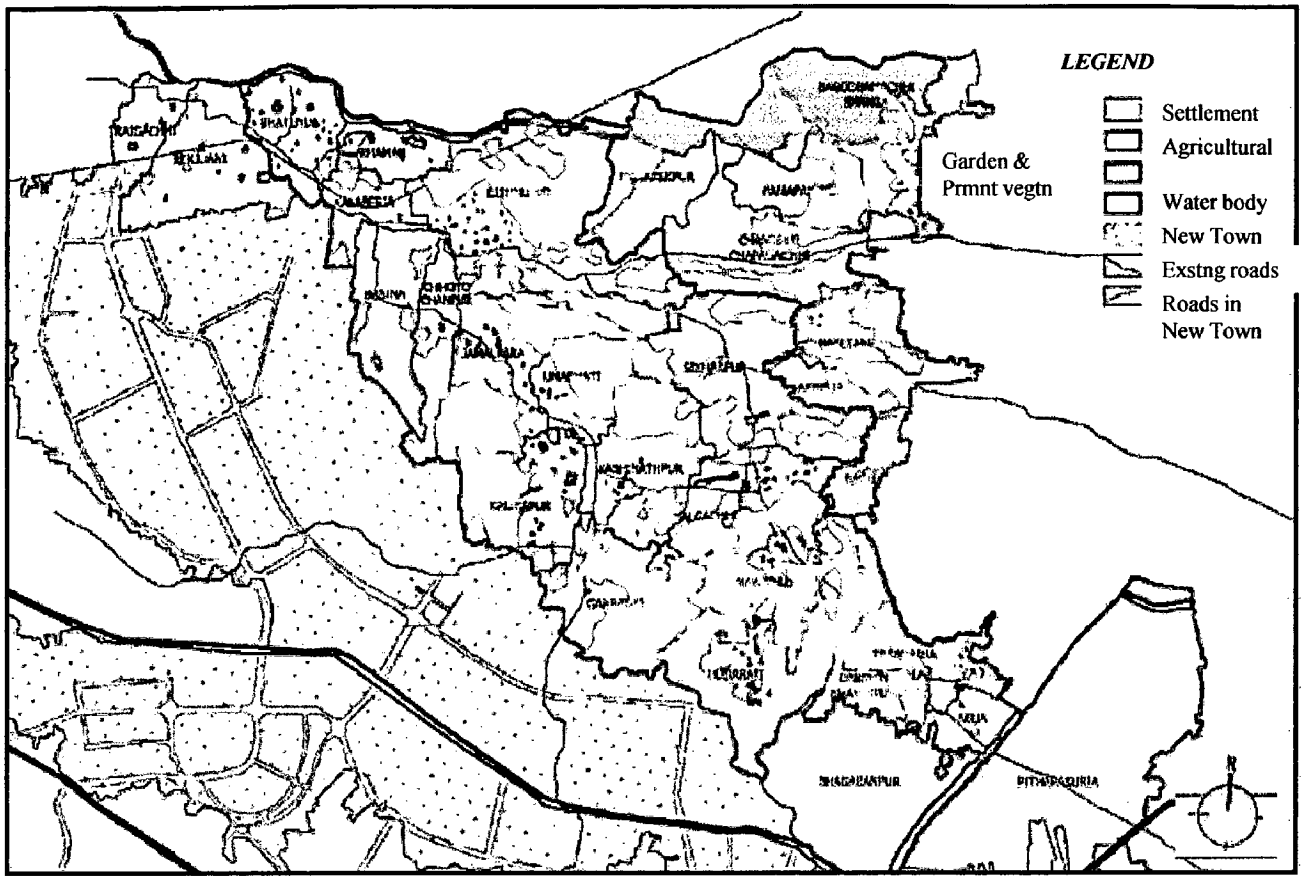
6.10.6. Daily market

The daily markets are present in Rekjauni, Bhatenda, Kalaberia, Bishnupur and Shikharpur. Haat or weekly markets are there in Rekjauni, Kashinathpur and Bishnupur. A major percentage of the population is deprived of a market and have to travel to another village to avail one. Small tea stalls and vegetable stalls can be found at regular intervals, but specialty stores and grain shops are no there.

6.10.7. Agricultural

A major portion of land of the study area is agricultural with a variety of crop production throughout the year. Paddy (Aus, Aman, Boro), green crops (pulses, vetches, mustard), flowers (Rose, Gandha, Rajanigandha) are main among them. In addition to this, jute, vegetables and herbal plants are also produced to some extent.

On most of the irrigated lands in villages like Bishnupur, Sikharpur, Bazetaraf, Chotochandpur, Basina Jute (during summer), Aman (during r



Map. 6.9. Present landuse of Rajarhat (2009)

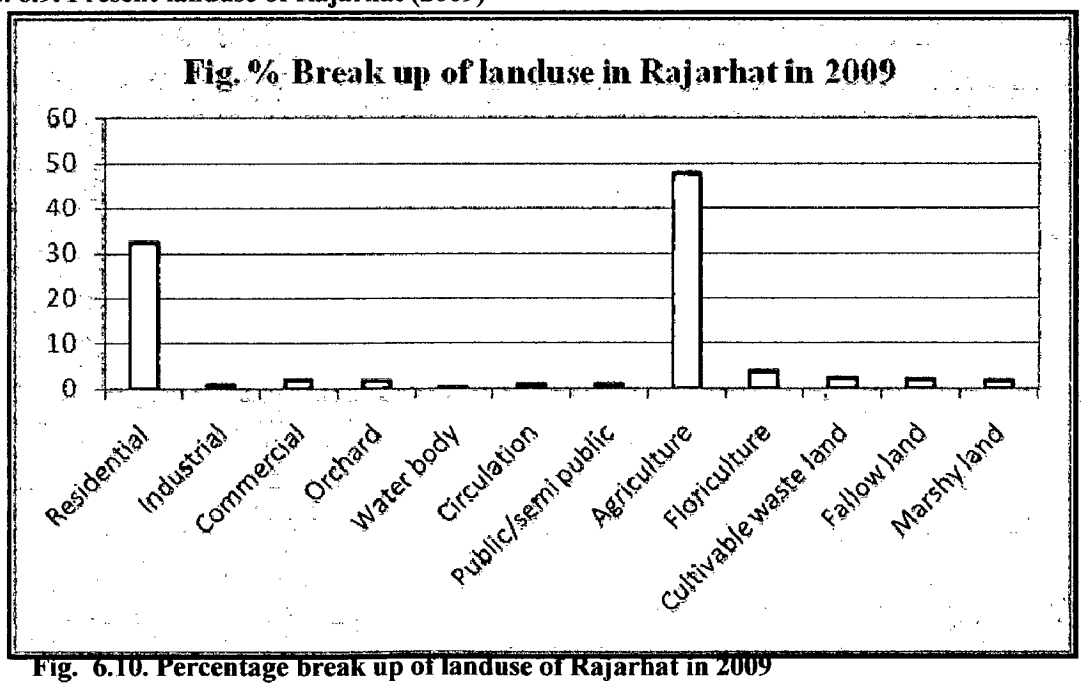


Fig. 6.10. Percentage break up of landuse of Rajarhat in 2009

crops (during winter season) are produced throughout the year.Flowers and vegetables with some amount of green crops and Boro paddy, herbs are mostly produced in villages like Garagari, Nawabad, Hudarait, Jamalpara, Umarhati, Kashinathpur, Chandpur Chapagachhi. In villages like Jagadishpur, Dharsamoktarpur, Mahamrnadpur, Kalikapur crop production is

decreasing day by day due to lack of proper irrigation system. Absence of surface water source is another reason for the decreasing crop production. The production cost is comparatively more than the selling cost and the farmers are getting very low profit. So the farmers are preferring to change their occupation and indulge in some non-agricultural activities like poultry, pig rearing, dairy farming floriculture and pisciculture.

In mouzas like Bhatenda, Khamar, Kalabena most of the agricultural lands have converted into unirrigable fallow lands. In addition to this, there are a number of nurseries especially in mouzas like Sikharpur, Naabad, Bagu, Kashinathpur. In fact, nursery and floriculture is on its increase and plant saplings are supplied from here to various places of Kolkata. Variety of fishes, prawn and crab are also produced in the existing ponds, beets and berries.

6.10.8. Water Body and Greenery

A mentionable percentage of the area significantly contain a number of orchards. Trees of various seasonal fruits like: - Mango, Lichi, Jackfruit, Guava, Black Berries etc. are common in these orchards. In addition this, Bamboo tree, Coconut tree, Betel Nut tree can also be found. These cash crops fetch a relatively good amount of profit to the farmers.

A significant number of ponds, jheels embedded with existing settlements can be found. In addition to this, a huge area of marshy land exists in the northern part of the area. Some portion of these marshy lands are used for pisciculture where the algae are used as food for the fishes. The fishes are reared upto a considerable size and then a portion of them are sold while some are kept for further breeding.

6.10.9. Administrative

Most of the administrative offices (Bishnupur Gram Panchayet) of the area are situated on the vested land between the two parallel roads nearer Rajarhat Chowmatha. Except this, B.D.O, A.D.O and another two local Panchayets (Bishnupur Gram Panchayet —II, Chandpur Panchayet) are situated here.

6.11. VACANT LAND AVAILABLE

No.	Name of village	Area	Vacant land	
1.	Raigachhi	45.27 Hectares	6.17 Hectares	(13.64%)
2.	Rekjuani	143.77 Hectares	7.27 Hectares	(5.06%)
3.	Bhatenda	96.91 Hectares	4.79 Hectares	(4.94%)
4.	Khamar	58.44 Hectares	2.72 Hectares	(4.66%)
5.	Kalaberia	56.52 Hectares	5 Hectares	(8.84%)
6.	Basina	118.43 Hectares	12.86 Hectares	(10.86%)
7.	Ganragari	165.77 Hectares	49.4 Hectares	(29.8%)
8.	Jhalgachhi	55.45 Hectares	13.3 Hectares	(24%)
9.	Kashinathpur	154.77 Hectares	44 Hectares	(28.48%)
10.	Kalikapur	133.30 Hectares	35.6 Hectares	(36.72%)
11.	Umarhati	80.74 Hectares	23.2 Hectares	(28.72%)
12.	Jamalpara	165.95 Hectares	21.1 Hectares	(12.72%)
13.	Choto Chanpur	84.42 Hectares	14.35 Hectares	(17%)
14.	Bishnupur	333.82 Hectares	41.79 Hectares	(12.52%)
15.	Mobarekpur	127.96 Hectares	32.10 Hectares	(25.08%)
16.	Bagdobamachhi Bhanga	250.38 Hectares	42.51	(16.98%)
17.	Panapukuria	89.60 Hectares	20.58 Hectares	(22.95%)
18.	Chandapur Champagachhi	170.60 Hectares	17.23 Hectares	(10.1%)
19.	Sikharpur	220.07 Hectares	33.54 Hectares	(15.24%)
20.	Bazetaraf	118.48 Hectares	30.24 Hectares	(25.52%)
21.	Arbelia	39.43 Hectares	8.88 Hectares	(22.52%)
22.	Bagu	46.13 Hectares	13.24 Hectares	(28.68%)
23.	Nawabad	172.53 Hectares	50.86 Hectares	(29.48%)
24.	Hudarait	222.26 Hectares	102.25 Hectares	(46%)
	Total	3150.95 Hectares	632.98 Hectares	(20.09%)

6.12. LAND USE CHANGE

Change of land use is a common phenomenon in all rural areas. It is basically an effect of population increase and influence of nearer urban centers. Some parts of these rural areas start to act like a nucleus and attract all the facilities and opportunity for its catchment area. So the areas having close proximity to this nucleus become much more inclined to being urbanized than to other. As a result increase in non-agricultural activity and non-agricultural land use.

The study area also shows almost the same situation. Area like Rajarhat Chowmatha, Lauhati were started to grow like nuclei for the region. But as Rajarhat Chowmatha is nearer to Rajarhat Gopalpur Municipality and also much more near to the main city, it turned to 'the nucleus' of the area. Beside these, the development pattern is like ribbon development. Along the transportation corridor, most of the settlement came up with some basic amenities like health centers, schools etc. The growth is towards southern and south-eastern part mainly. Between 1991 and 2001 the growth was maximum and mostly concentrated on the corridor going towards east and south.

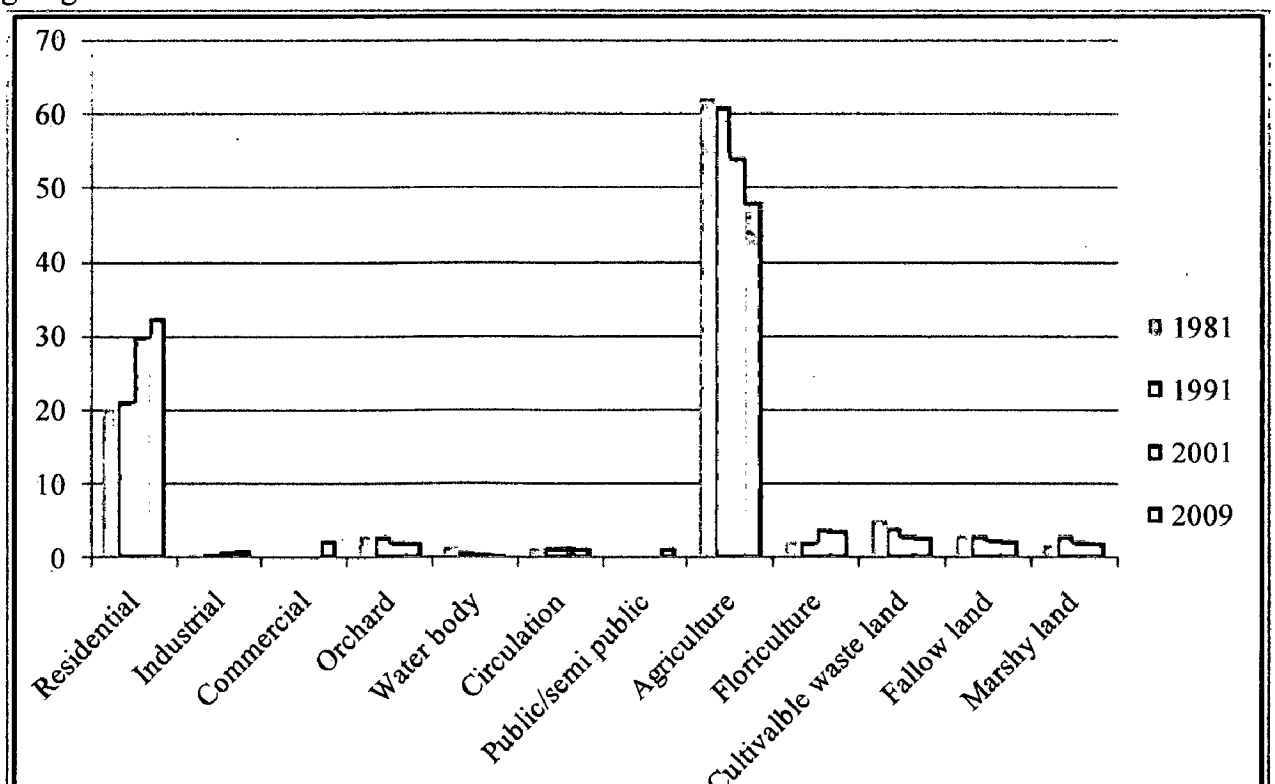


Fig. 6.11. Comparison of Land Use percentages in 1981, 1991, 2001 and 2009

Between 1991 and 2001 the growth was maximum and mostly concentrated on the corridor going towards east and south. A sharp increase in residential land use with a decline in vegetation is clearly visible. New settlements started to come up nearer to New Town.

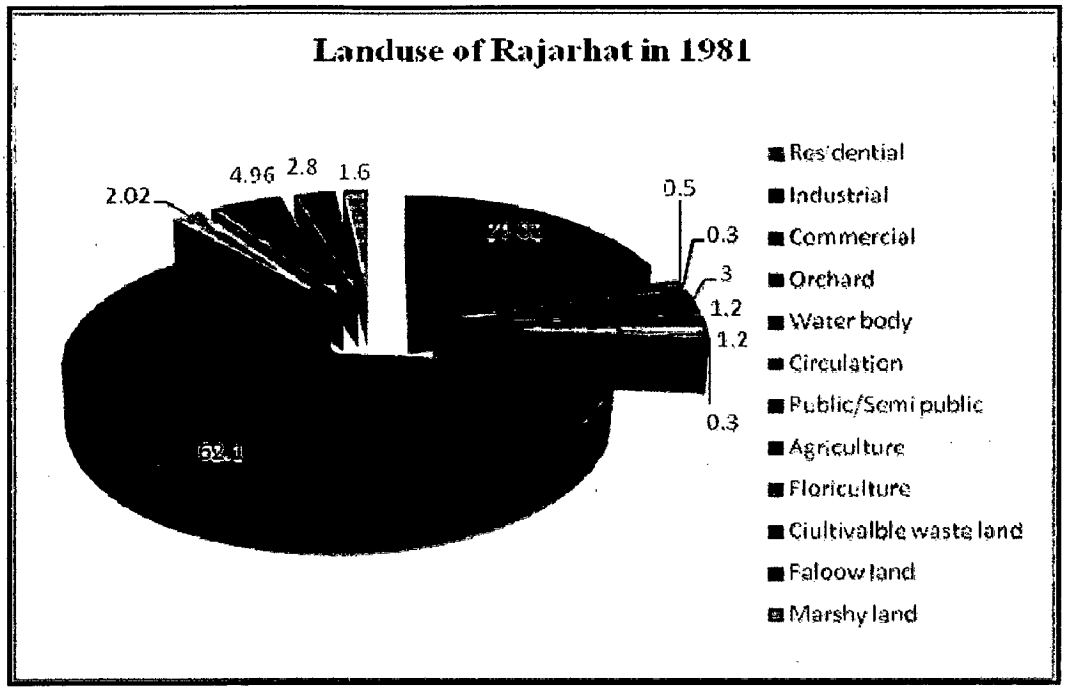
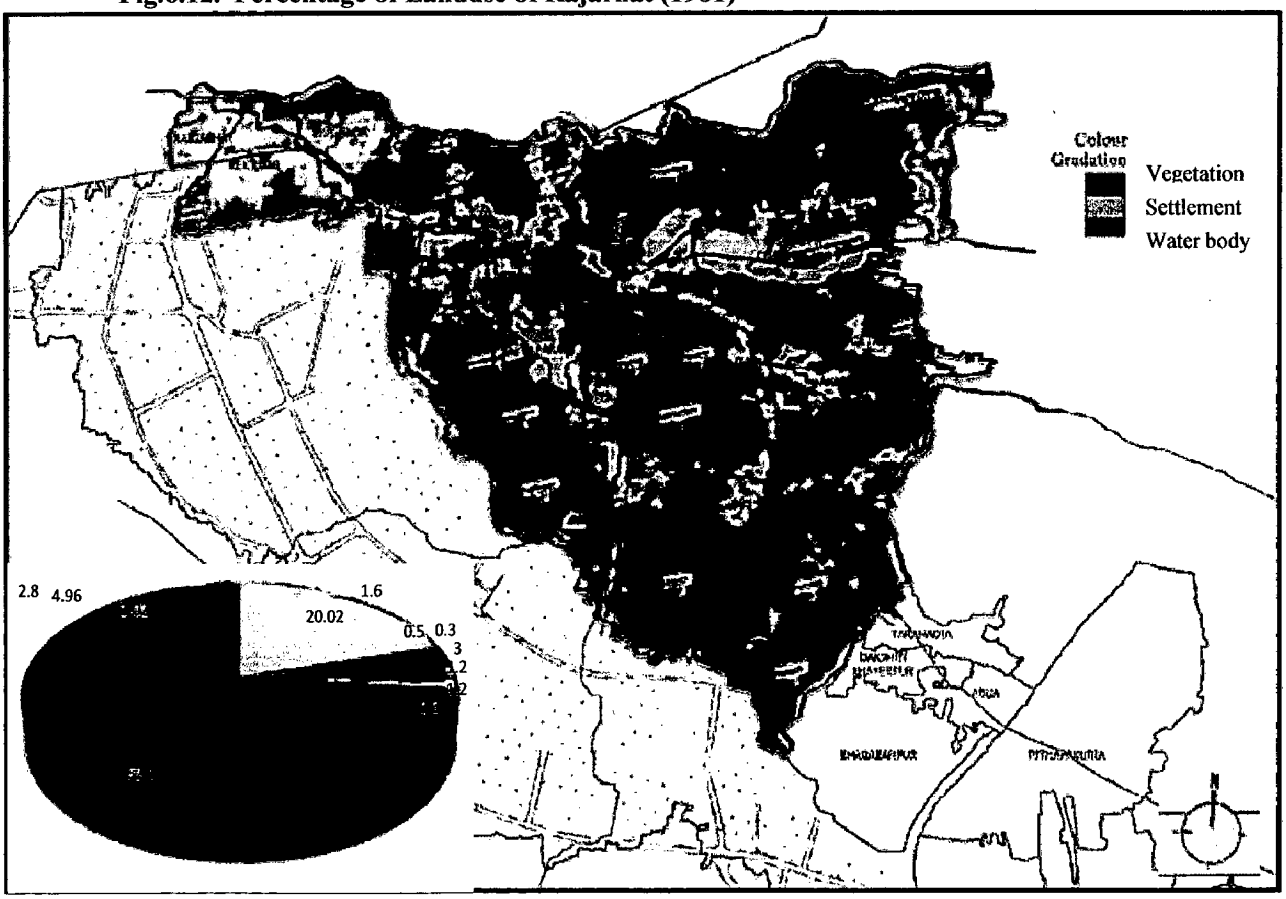


Fig.6.12. Percentage of Landuse of Rajarhat (1981)



Map. 6.10. Landuse of Rajarhat (1981)

After that, 2009's land use says development continues in those villages attached to New Town. So as the southern corridor becomes the main spine for new developments. Blocks where land use change is high are Bhatenda, Khamar, Basina, Kashinathpur, Bagu.

The declination in vegetation is about 16% in last 25 years with an increase in residential land use of 52%.

Industrial development pattern is not so high in this area but it also has a constant growth (30%).

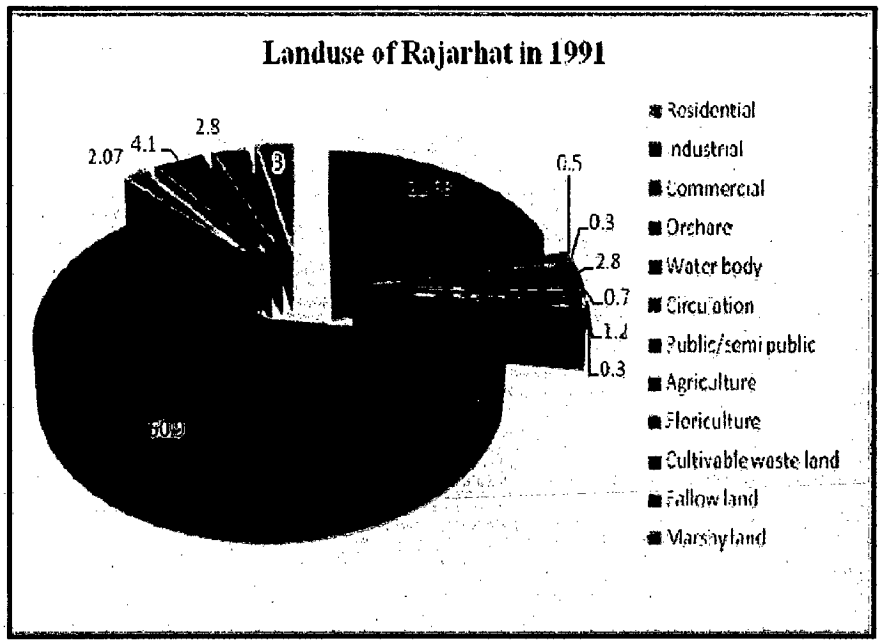
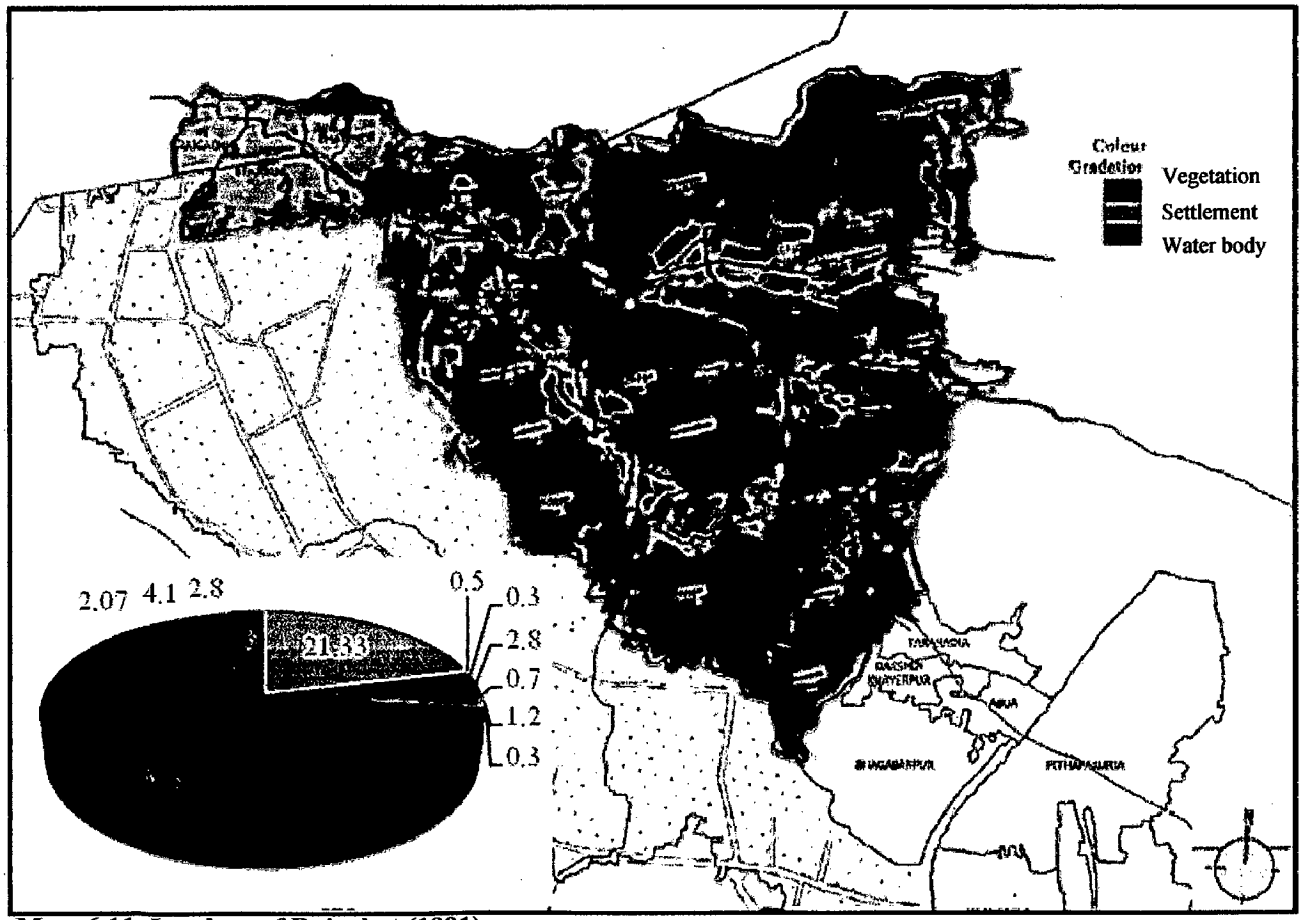
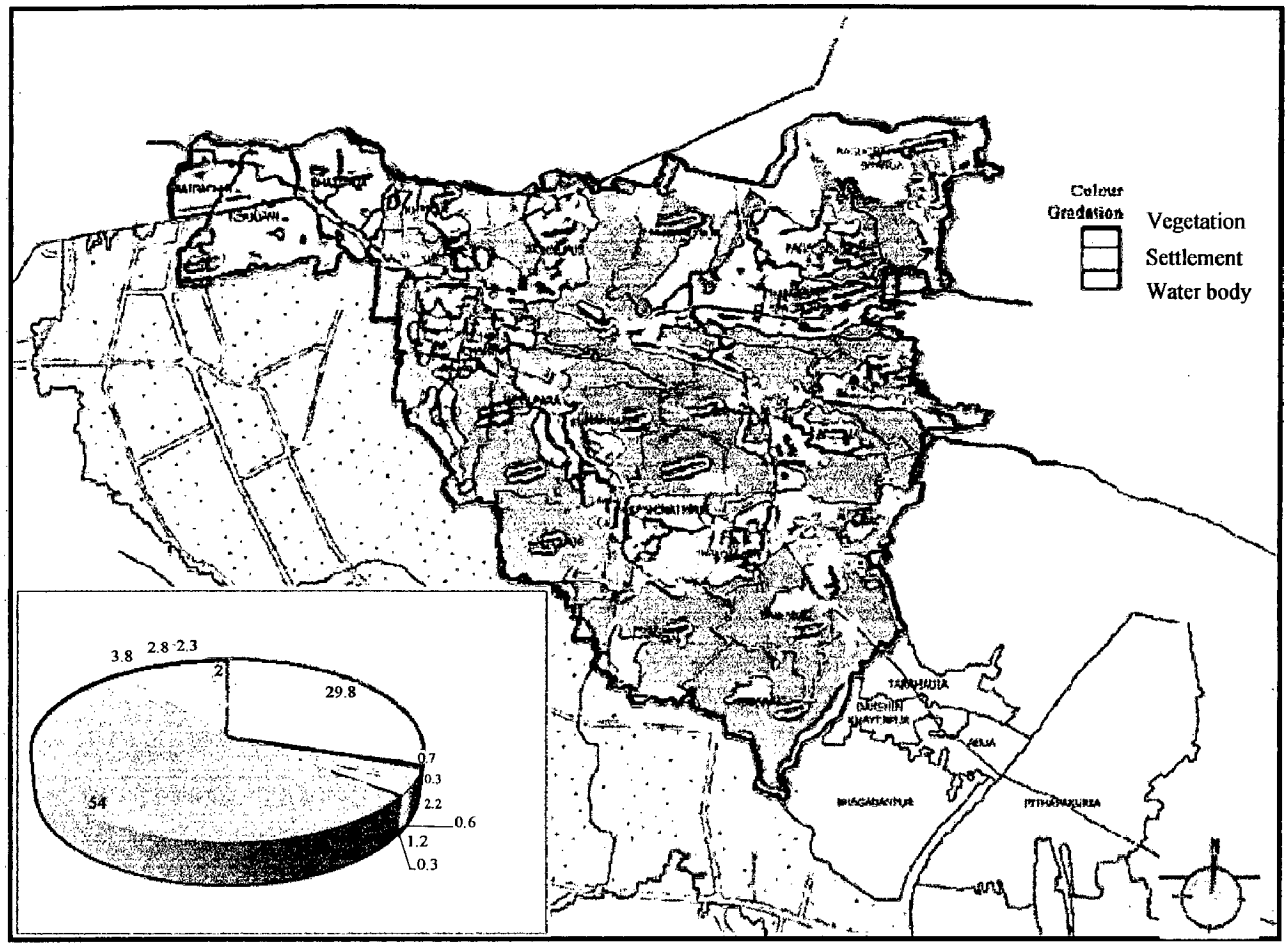


Fig.6.13. Percentage of Landuse of Rajarhat in 1991



Map. 6.11. Landuse of Rajarhat (1991)



Map. 6.12. Landuse of Rajarhat (2001)

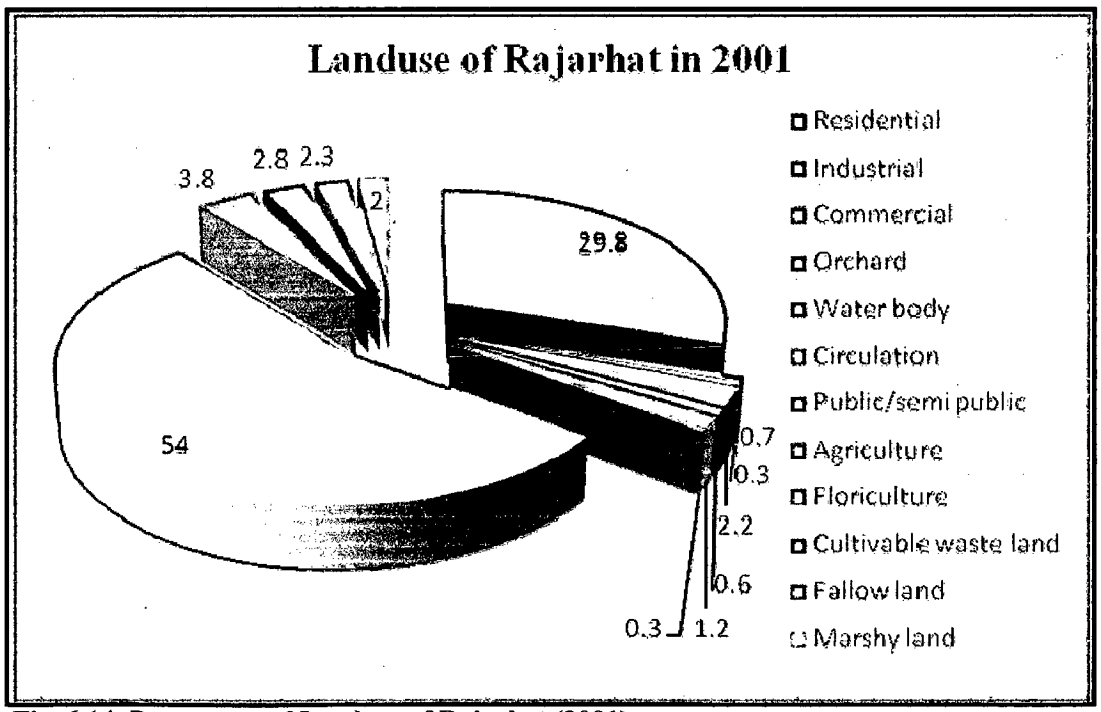


Fig. 6.14. Percentage of Landuse of Rajarhat (2001)

6.13. SOCIAL INFRASTRUCTURE

Social infrastructure facilities are mostly located along the main roads. But the main concentration is found around Rajarhat Choumatha. Inside the villages, there is hardly any social infrastructure visible and whatever is there does not function properly.

➢ **Health**

There are only two primary health centers to cater the villagers of these 24 villages. Among these, the condition of the health center situated in Arbelia is very poor. Both of them are located in two extreme end of the block. So its very much inconvenient for the villagers to travel such long distances to avail the primary health care. Number of staffs in these centers are not sufficient and the villagers have to wait for hours to get any minimum care.

➢ **Education**

In the study area 33 numbers of schools are present, some of which are primary, secondary and higher secondary schools, but their number is not sufficient to cater the whole population. For higher education there are no options for the students within that area. The highest rank of educational facility present within the Rajarhat P.S is a general College located in Kalipark under Rajarhat Gopalpur Municipality. There are 24 primary schools, 5 higher secondary schools and 1 high/ secondary school. The schools are not provided with playgrounds and so the children have to play on the road or the fields.

➢ **Religious**

For religious practice, there are 20 temples and 11 mosques have spread all over the block. Beside that few numbers of ashrams are also seen in this area.

➢ **Markets**

There are few daily markets to cater the present population. These are located near to all major settlement area. 3 haats are also there in villages like Rekjuani, Kashinathpur and Bishnupur.

➢ **Recreation**

There are three cinema halls (one is closed due to monitory problem), numbers of playgrounds, one auditorium, and two public libraries. Quite a number of recreational clubs has come out.

Between 1991 and 2001 the growth was maximum and mostly concentrated on the corridor going towards east and south. A sharp increase in residential land use with a decline in vegetation is clearly visible. New settlements started to come up nearer to New Town.

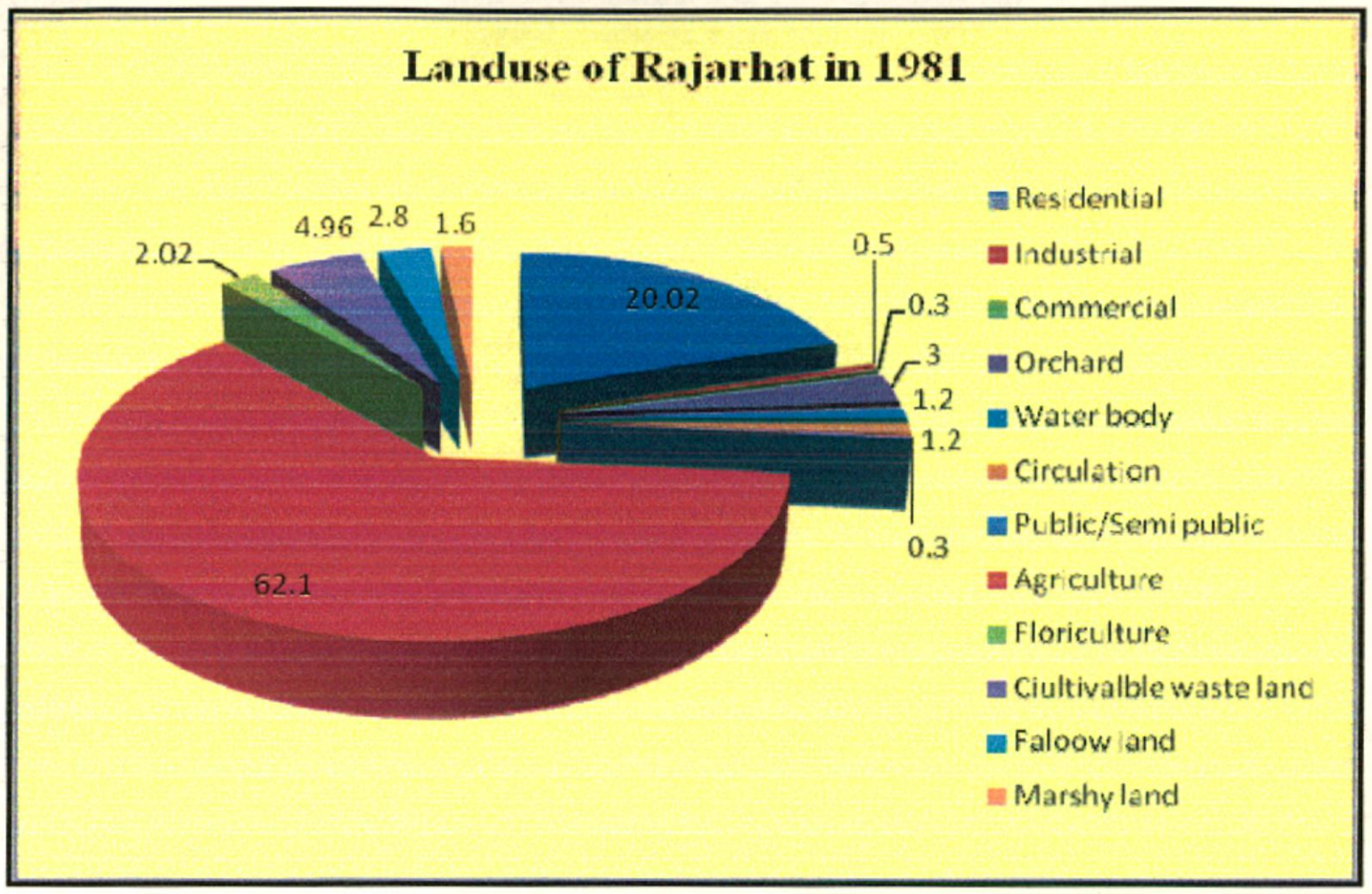
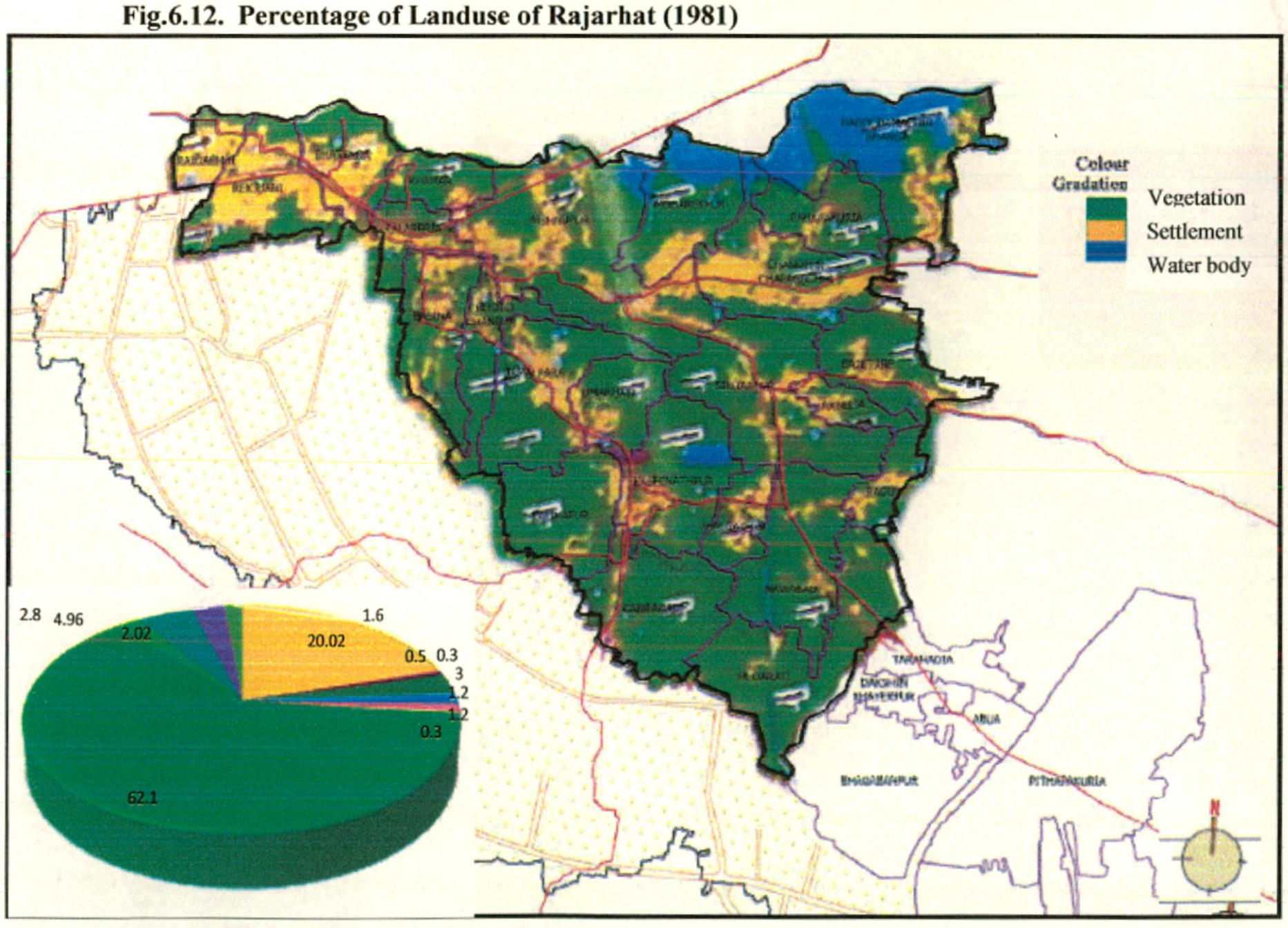


Fig.6.12. Percentage of Landuse of Rajarhat (1981)



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The declination in vegetation is about 16% in last 25 years with an increase in residential land use of 52%.

Industrial development pattern is not so high in this area but it also has a constant growth (30%).

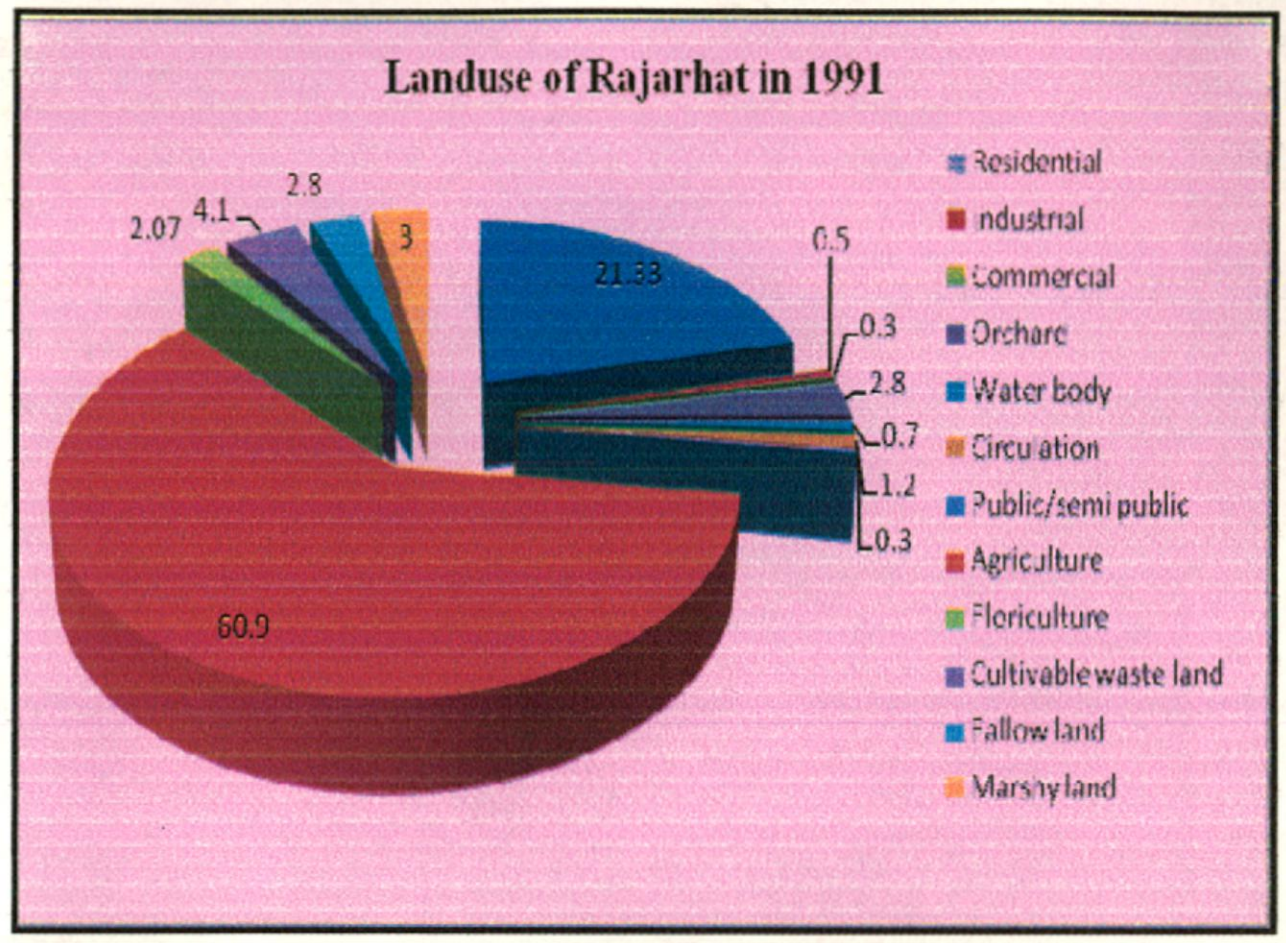
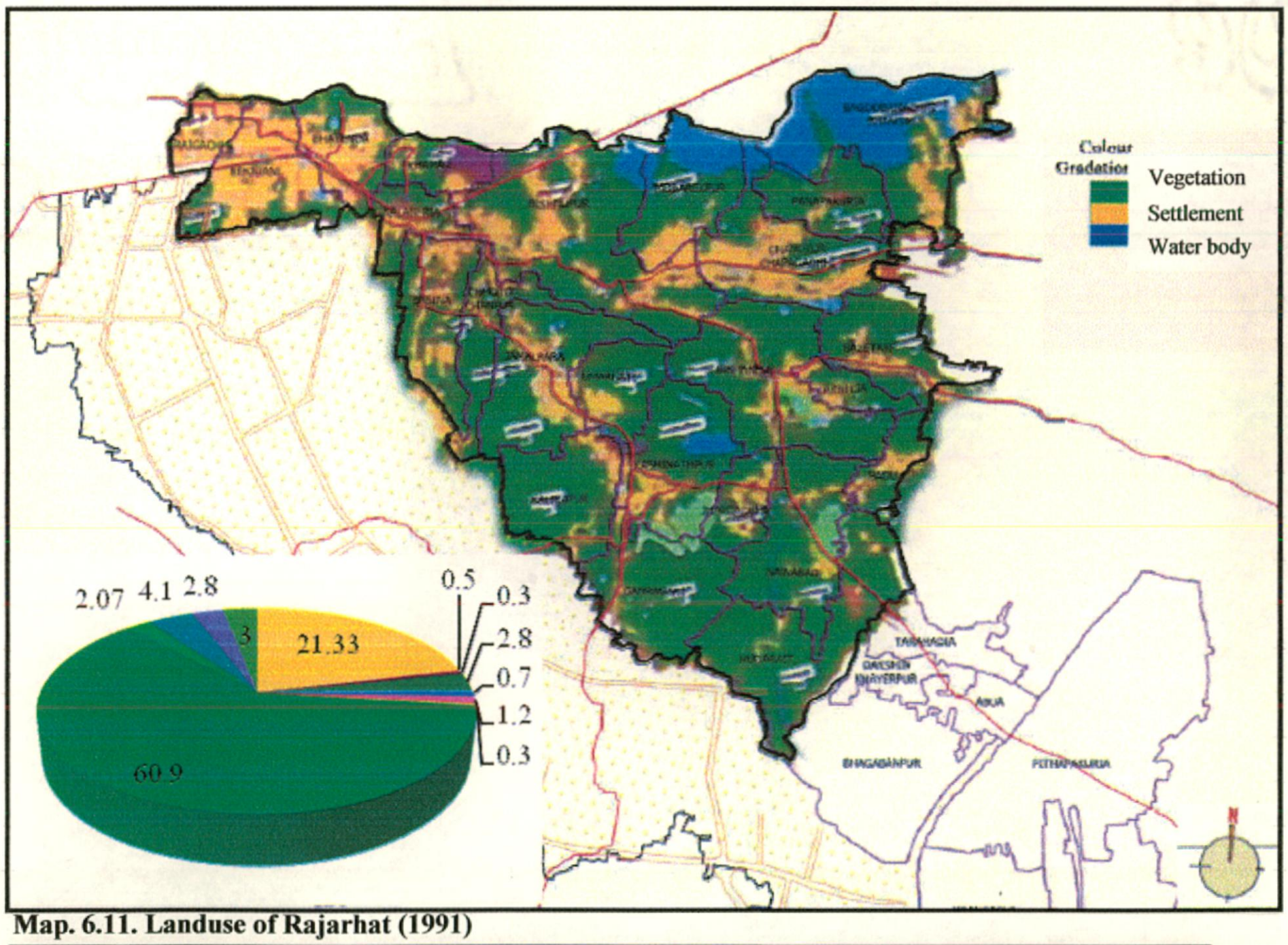
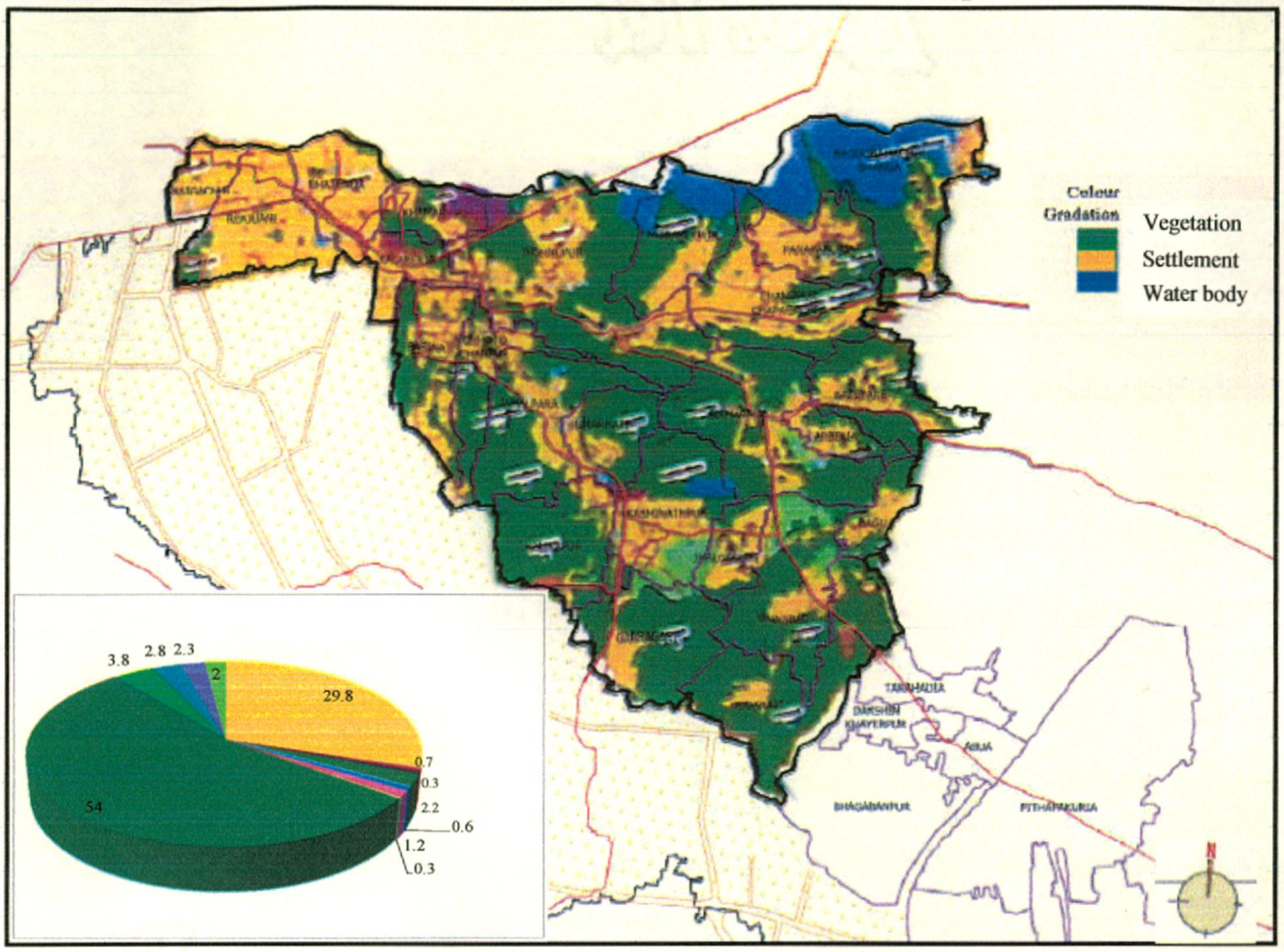


Fig.6.13. Percentage of Landuse of Rajarhat in 1991



Map. 6.11. Landuse of Rajarhat (1991)



Map. 6.12. Landuse of Rajarhat (2001)

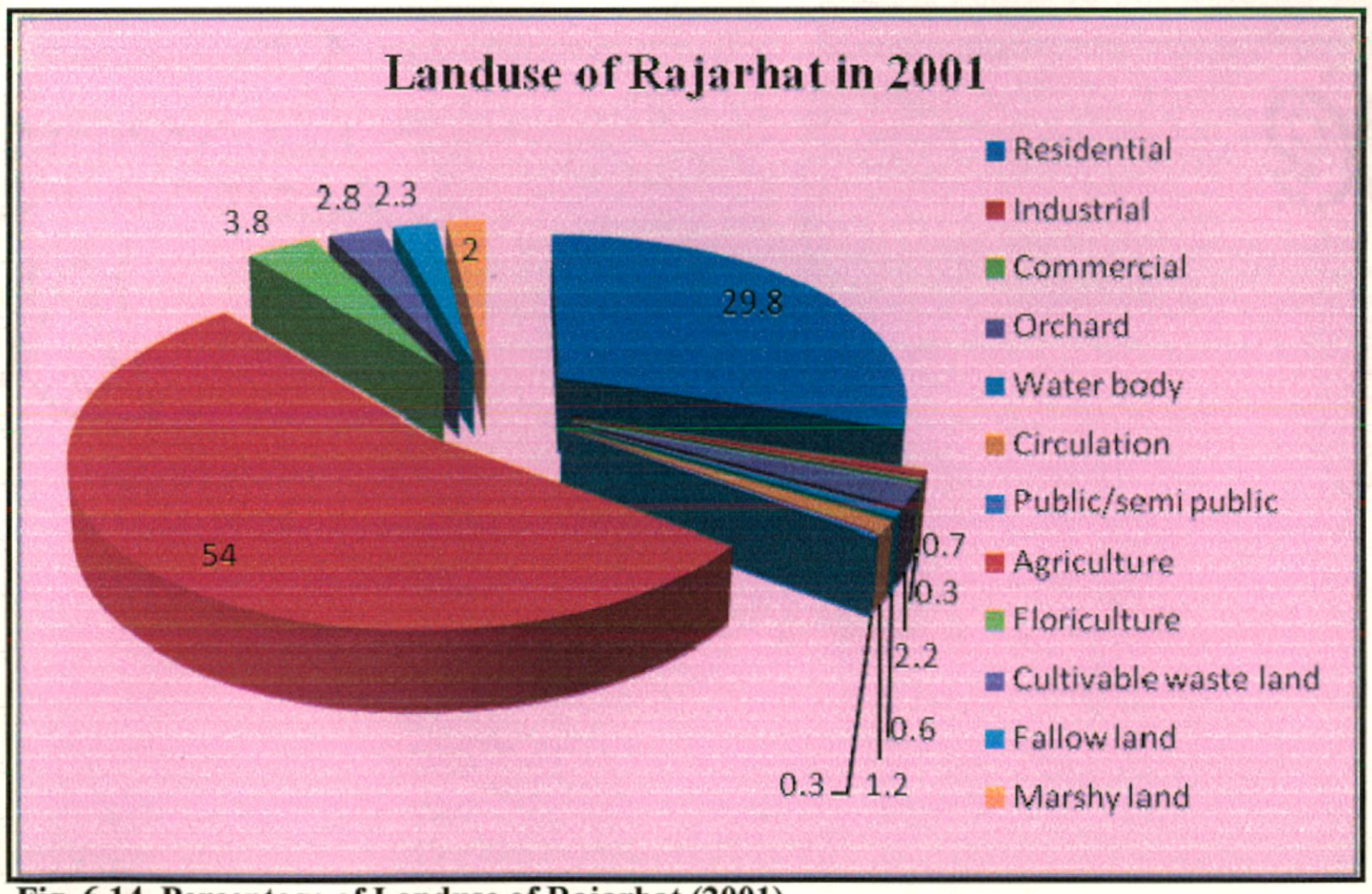


Fig. 6.14. Percentage of Landuse of Rajarhat (2001)

6.13. SOCIAL INFRASTRUCTURE

Social infrastructure facilities are mostly located along the main roads. But the main concentration is found around Rajarhat Choumatha. Inside the villages, there is hardly any social infrastructure visible and whatever is there does not function properly.

➢ **Health**

There are only two primary health centers to cater the villagers of these 24 villages. Among these, the condition of the health center situated in Arbelia is very poor. Both of them are located in two extreme end of the block. So its very much inconvenient for the villagers to travel such long distances to avail the primary health care. Number of staffs in these centers are not sufficient and the villagers have to wait for hours to get any minimum care.

➢ **Education**

In the study area 33 numbers of schools are present, some of which are primary, secondary and higher secondary schools, but their number is not sufficient to cater the whole population. For higher education there are no options for the students within that area. The highest rank of educational facility present within the Rajarhat P.S is a general College located in Kalipark under Rajarhat Gopalpur Municipality. There are 24 primary schools, 5 higher secondary schools and 1 high/ secondary school. The schools are not provided with playgrounds and so the children have to play on the road or the fields.

➢ **Religious**

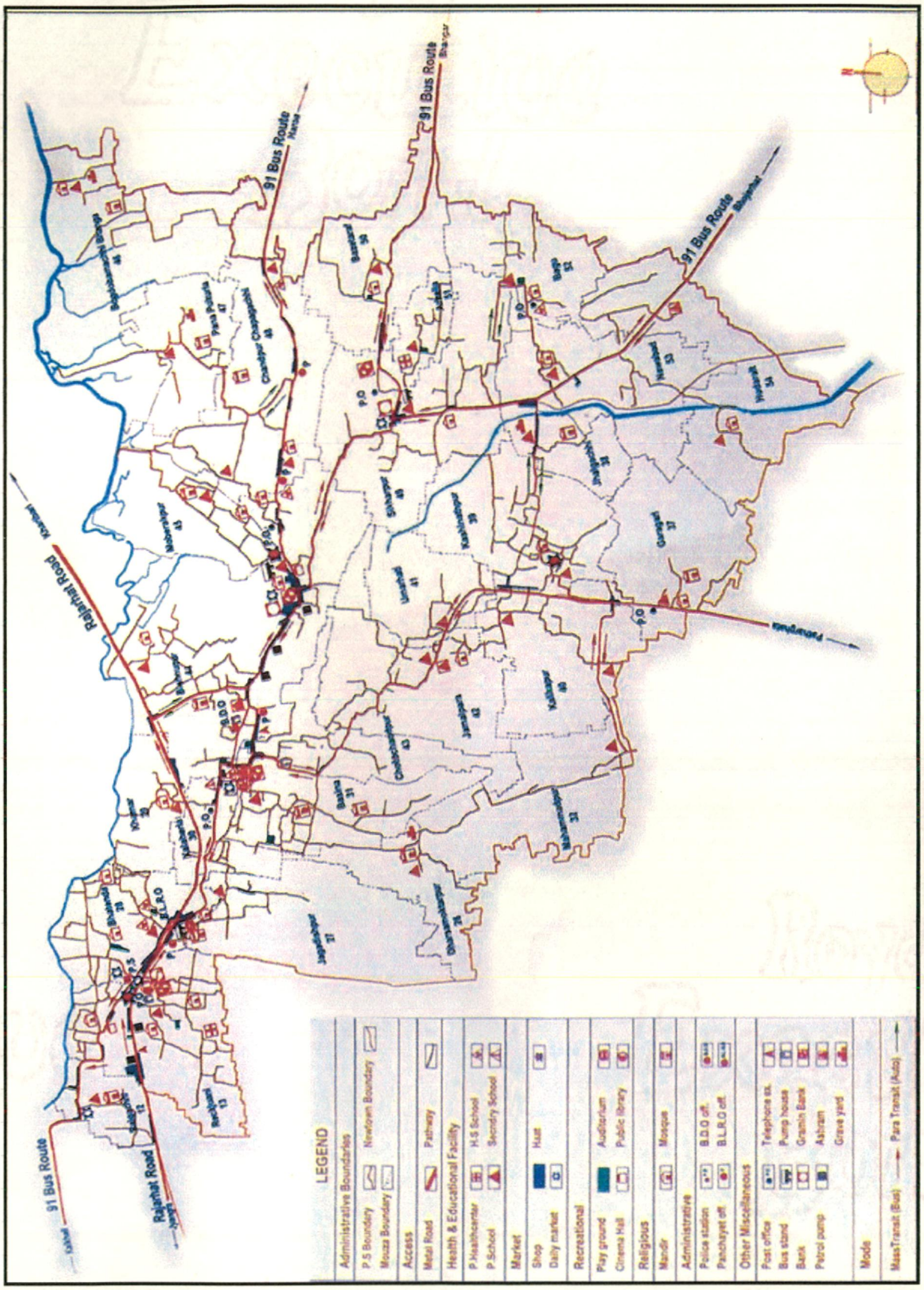
For religious practice, there are 20 temples and 11 mosques have spread all over the block. Beside that few numbers of ashrams are also seen in this area.

➢ **Markets**

There are few daily markets to cater the present population. These are located near to all major settlement area. 3 haats are also there in villages like Rekjuani, Kashinathpur and Bishnupur.

➢ **Recreation**

There are three cinema halls (one is closed due to monitory problem), numbers of playgrounds, one auditorium, and two public libraries. Quite a number of recreational clubs has come out.



Map.6.13. Infrastructure available in Rajarhat

➢ Other / Miscellaneous

Leaving all the above, many other facilities are also available here like Gramin Banks, Govt. and Private Banks, Post Offices, Telephone Exchange etc. Showrooms of various specialty products are also seen in some of the villages.

Mouza	Health	Education	Recreation	Religious	Market	Bank	Misc.
Raigachhi	-	P-1	-	Mo-1	-	-	-
Rekjuani	PHC-1	P-1	Ply-2	Ma-3	Daily-1, H-1	B-1	Tele Ex-1, PP-2, PH-1, PO, PL-1, C-1
Bhatenda	-	P-1, HS-2	Ply-2	Ma-3	Daily-1	-	PS,BS-1, Pn, A-1, BLRO
Khamar	-	P-1	-	Ma-1	-	-	-
Kalaberia	-	P-1, M-1, HS-1	Ply-1	-	Daily-1	-	PO, PL-1
Basina	-	P-1	Ply-1	Mo-2	-	Gramin-1	-
Ganragari	-	-	-	Ma-1, Mo-1	-	-	PO
Jhalgachhi	-	P-1	-	Mo-1	-	-	G-1
Kashinathpur	-	P-1	-	Ma-1	H-1	-	-
Kalikapur	-	P-2	-	-	-	-	-
Umarhati	-	P-1	-	-	-	-	-
Jamalpara	-	P-1	-	Ma-1	-	-	As-1
Choto Chanpur	-	-	Ply-1	-	-	-	PH-1
Bishnupur	-	P-2, HS-1	-	Ma-2, Mo-1	Daily-1, H-1	B-1	PP-3, As-1, BS-1, Tele Ex-1, PH-1, BDO, Pn, PO, C-1
Mobarekpur	-	P-1	-	Ma-1, Mo-1	-	-	-
Bagdobamachhi Bhanga	-	P-1	-	Ma-1, Mo-1	-	-	G-1
Panapukuria	-	P-1	-	Mo-1	-	-	G-1
Chandapur Champagachhi	-	P-1	-	Ma-1, Mo-1	-	-	Pn, PO
Sikharpur	-	P-1	-	Ma-1	Daily-1	B-1, Gramin-1	Pn. BS-1, PO.
Bazetaraf	-	P-1	Ply-1	Ma-1	-	-	-
Arbelia	PHC-1	P-1	Ply-1	-	-	-	-
Bagu	-	P-1, HS-1	Ply-1	Ma-1	-	-	PO
Nawabad	-	P-1	Ply-1	Ma-1	-	-	-
Hudarait	-	P-1	-	Ma-1	-	-	As-1
Total	PHC-2	P-24, HS-5, M-1	Ply-11	Ma-20, Mo-11	Daily-5, H-3	B-3, Gramin-2	PP-5, As-3, BS-3, Tele Ex-2, PH-2, BDO, Pn-3, PO-8, PS-1, A-1, PI-2, BLRO-2, C-2, G-4

Table.6.4. Available infrastructure in Rajarhat

Short Form	Full Form	Short Form	Full Form	Short Form	Full Form	Short Form	Full Form
As	Ashram	Gramin	Gramin Bank	Mo	Masque	PP	Petrol Pump
B	Nationalised Bank	H	Haat	P	Primary School	Ply	Play Ground
C	Cinema Hall	HS	Higher Secondary School	PH	Pump House	PHC	Primary Health Center
Daily	Daily Market	M	Secondary School	PO	Post Office	Tele Ex	Telephone Exchange
G	Graveyard	Ma	Temple	Pn	Panchayet	BS	Bus Stand

6.14. PHYSICAL INFRASTRUCTURE

➢ Water supply

Supply of drinking water is a big problem in the study area as there is no source of surface water. People have to depend fully on the ground water. Provision of drinking water by the civic authorities are minimal. Water connections are also not provided by the municipal authorities as it is not in their jurisdiction. The Panchayat bodies are unable to tackle the increasing population and thereby the increasing water demand.

Water supply scenario in the whole area is in a very bad shape and requires immediate attention. As a result, people who are buying their individual plots are digging their own bore wells to get the ground water. The extraction of the ground water is in an alarming rate and there is an increasing risk of arsenic contamination in the ground water. There is no filtration done in a large scale. People are using filtration measures at individual levels.

➢ Sewerage and Drainage

Kolkata itself is lacking in sewerage measures till date, so one can easily imagine the condition of the fringes. The Rajarhat block is no exception as it falls short of a system to take out and dispose off the sewage from the residences.

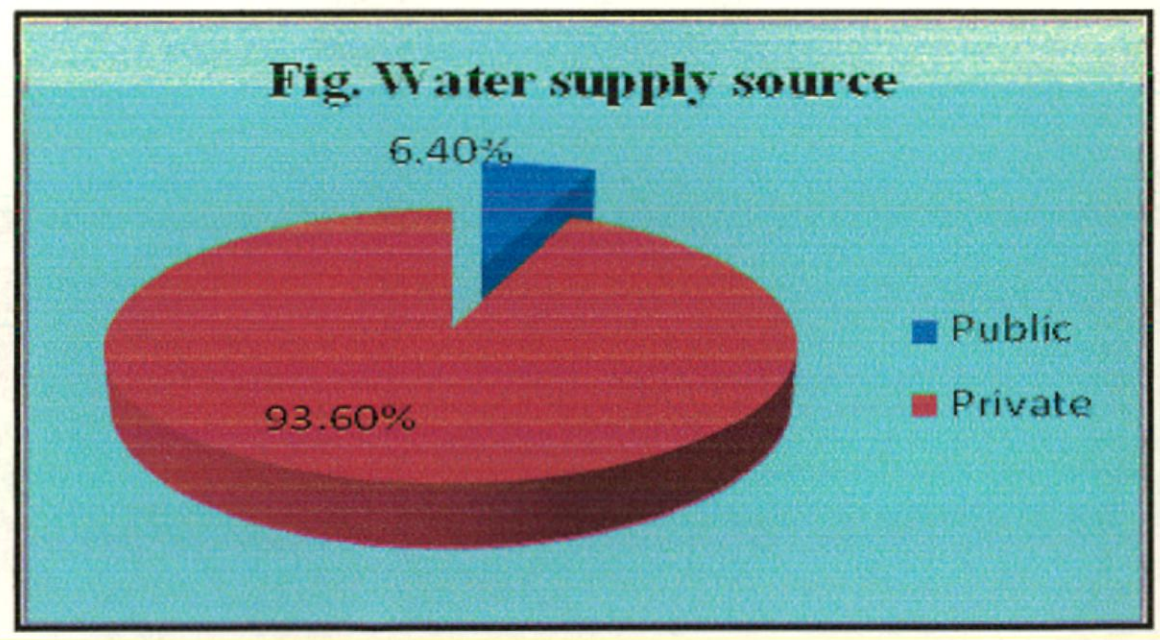


Fig. 6.15. Percentage of water supply source

People are building their own individual septic tanks and soak pits and there is a high risk of the ground water contamination as these works are generally done without any expert supervision. Cleaning of these pits once made, is rarely done and in most cases a new pit is dug when the old one starts overflowing. The area is predominantly low-lying agricultural land. The slope is towards south with some low laying pockets of M. S. L as low as 0 M.

The main drainage canals are Noai Canal which runs along the northern boundary of the planning area, Bagjola Canal which is located at the southern side beyond the boundary of the planning area, and a local canal connected with Bagjola canal.

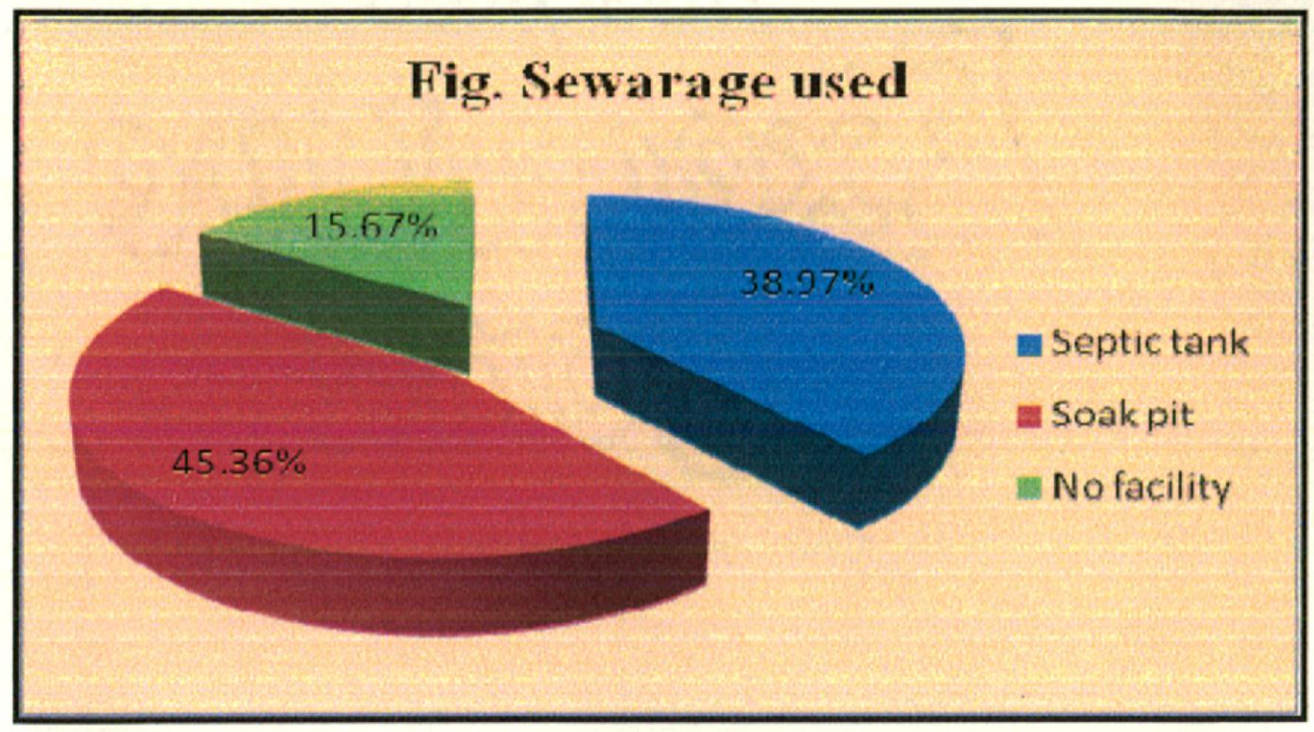


Fig. 6.16. Different types of sewerage used

Bagjola Canal and Noai Canal ultimately get opened to Bidyadhari River.

➢ **Electricity**

Electric poles are erected in all the villages but the amount of electricity available per day is about 4-5 hours. Most of the villagers are managing in whatever is available to them. Some are using generator sets for irrigation in fields.

➢ **Solid waste management**

There is no measure taken from the authorities to collect or dispose the garbage. The construction wastes mixed with vegetable wastes, paper, animal wastes and others are dumped wherever a vacant place is there. Burning of garbage is also rampant without segregating the different types of wastes. Polythene, thermocol and other hazardous wastes are also burnt in open areas in the vicinity of the crop fields. The residents are happy to dispose the household daily wastes on the road itself.

Some neighbourhoods have arranged for their own waste collection and have appointed sweepers to collect garbage on alternate days. Still then, the work of the sweepers end with collection and disposal at some vacant land and burning them once in a month.

6.14.1. CONNECTIVITY

➢ **Rajarhat road**

This road starting from Kaji Nazrul Islam Sarani (V. I. P Road) has gone straight towards north east. Near Atghara (under Rajarhat Gopalpur Municipality) it has crossed the newly constructed road of Rajarhat Newtown going towards Airport. Near Dashdron (under Rajarhat Gopalpur Municipality) it has turned towards east and entered in the study area. After this it has met with the other major road of the area at Rajarhat Chowmatha and further gone towards the north-east.

The Rajarhat road has ultimately crossed the boundary of the planning area and ends in Barasat- Basirhat Road. Kaji Nazrul Islam Sarani (V. I. P Road) and Barasat- Basirhat Road are again connected with some major roads like Jessore Road, NH-34, NH- 35 and other local roads. So this area is also indirectly connected with southern part of North 24 Pgs, North Bengal, Bangladesh and eastern part of KMA through this Rajarhat Road.

The Rajarhat road acts as the major lifeline of the area. Most of the goods are supplied in and out of the area through this road. This also acts as the easiest and most convenient medium of transport for those working in Kolkata and New Town.

➢ **Other Roads**

Another road has emerged from Kaji Nazrul Islam Sarani (V. I. P Road) at Kaikhali More. As the road does not have any specific name it is addressed by the private bus route (91 Bus Route). This road is narrower compared to Rajarhat road and is having a number of curves. After passing through Airport P. S it enters in to the study area and meets Rajarhat Road at Rajarhat Chowmatha. From this junction this road goes towards south-east.

And from Bisnupur Battala, there emerges another road leading towards Patharghata. In Lauhati Junction, this road is divided into two parts - one going towards Howrah (crossing the Bidyadhan River) and the other towards South 24 Pgs.

The bifurcated portion of the road going towards South 24 Pgs is again divided into two parts at Sikharpur More — one going towards Bhangar (crossing the Bidyadhari River) and the other towards Bhojerhat (crossing the Bagjola Canal). So it can be seen that this road directly connects the planning area with a vast agricultural land in southern part of North 24 Pgs and northern part of South 24 Pgs. The overall condition of the roads inside the villages are quite bad. In most villages proper roads are not present, and muddy lanes are used as pedestrian and bicycle pathways.

Mode		Route		Origin	Destination	Frequency
		No.	Road			
Mass Transit (Bus)		211	Rajarhat Road	Ahiritala	Kharibari	2
		211A	Rajarhat Road	Ahiritala	Langalpota	2
		211	Rajarhat Road, the road going towards Patharghata	Ahiritala	Patharghata	2
		211B	The connecting main arterial road of New Town with the road going towards Patharghata	Ahiritala	Patharghata	1
		91	91 Bus Route	Shyambazar	Bhangar	2
		91A	91 Bus Route	Shyambazar	Bhojerhat	2
		91B	91 Bus Route	Shyambazar	Haroa	2
		91C	91 Bus Route	Shyambazar	Lauhati	4
		L91B	91 Bus Route	Shyambazar	Rajarhat Chowmatha	1
		MS91 B	91 Bus Route, Rajarhat Road	Esplanade	Sikharpur	1
		T11	91 Bus Route, Rajarhat Road	Esplanade	Lauhati	1
Para Transit	Taxi (Shuttle)	Rajarhat Road		Baguihati	Rajarhat Chowmatha	-
		Rajarhat Road, 91 Bus Route		Baguihati	Lauhati	-
	Tracker	Rajarhat Road, 91 Bus Route, road going towards Patharghata		Rajarhat P.S.	Patharghata	-
	Auto	Rajarhat Road		Jora Mandir	Rajarhat Chowmatha	-
		91 Bus Route		Rajarhat Chowmatha	Lauhati	-
		Road going towards Ptharghata		Bishnupur Battala	Patharghata	-
		91 Bus Route		Lauhati	Sikharpur	-

Table. 6.5. Different Modes of Transport and their Origin and Destination

6.14.2. Mode of Transport

Through those two roads the study area can be approached by bus, taxi (shuttle), auto or tracker. Buses are mostly available in "91 Bus Route", comparing to the Rajarhat Road. Availability reduces during night time and the buses become crowded during peak hours. The para transit systems present in this region are providing a good connectivity with the surroundings.

➢ **Accessibility by Rail**

Previously the area had narrow gauge railway line along the existing Rajarhat Road. But at present the area is deprived of this type of mass transport system. The nearest railway station is Ultadanga, which is about 11 km far from the extreme western side of Rajarhat.

➢ **Accessibility by Air**

Dumdum International Airport is located near the planning area and is about 9 km far from the extreme western side of the area.

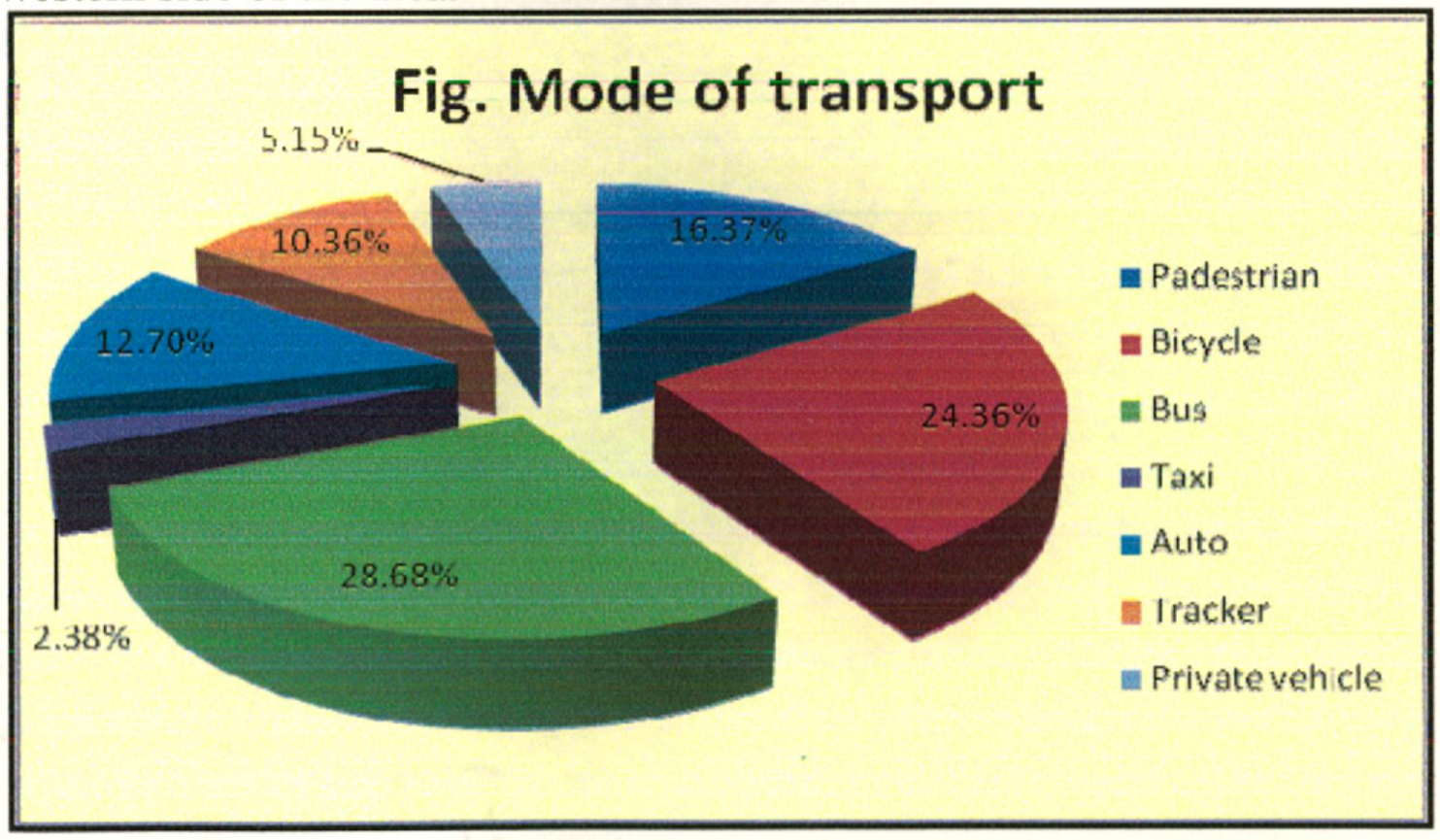


Fig. 6.17.Different modes of transport used by travelers

6.14.3. LAND FORM

Geology

The planning area is blanketed by an alluvial cover deposited by the River Hoogly and its tributaries. These alluvial sediments are of quaternary age. A significant feature of the litho-logy is present in basal clay bed and top clay bed.

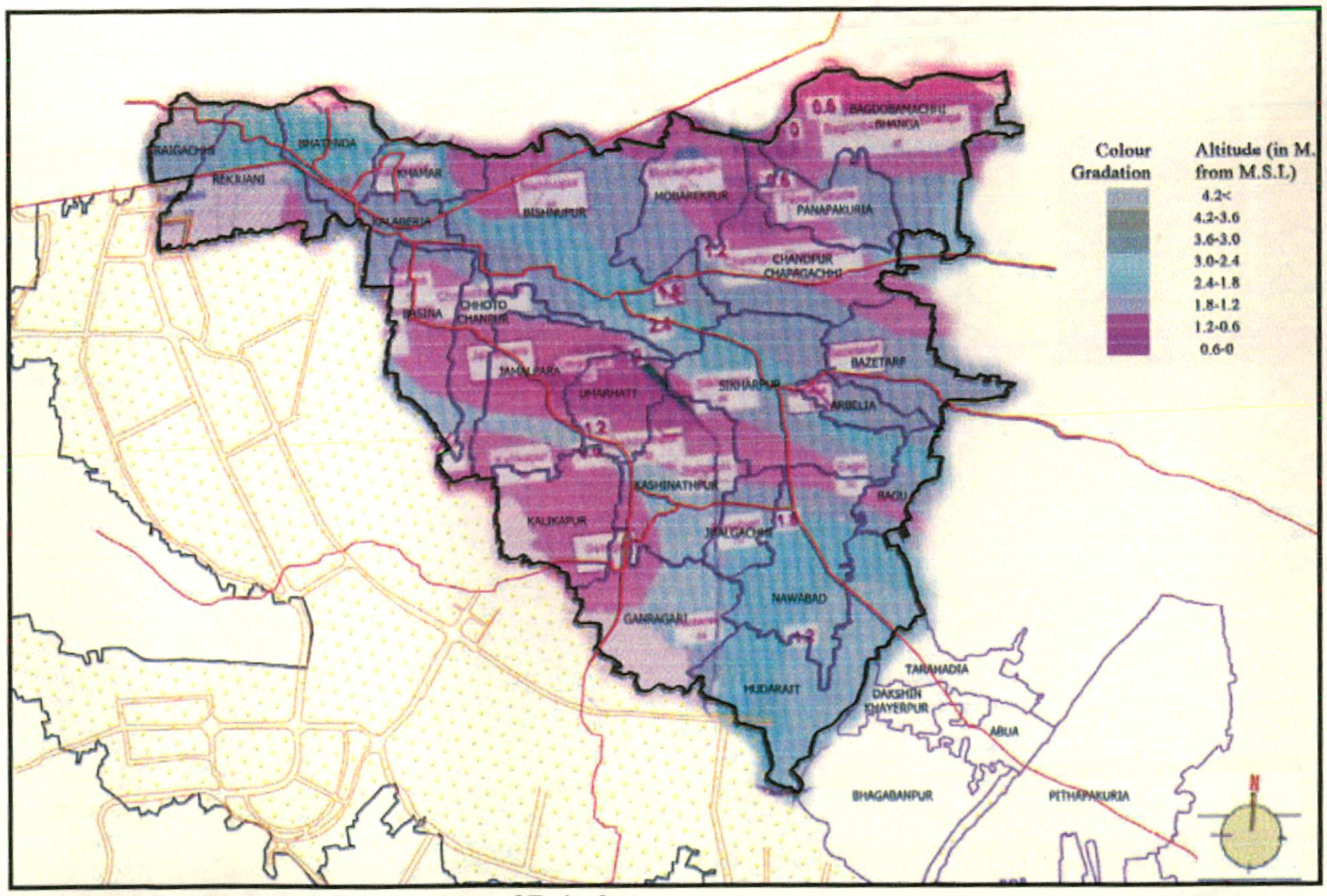
➢ Contour

Predominantly the area is low-lying agricultural land with a maximum height of 3.6 M from Mean Sea Level (MSL) to a minimum of 0 M from the same. The slope of the area is mainly from north to south with some low-lying pockets in area between the main access roads.

➢ Drainage

The drainage condition of the planning area is very poor,. This is mainly because the area is predominantly low laying agricultural land (minimum altitude 0 M. from MSL) with a very gentle slop. The main drainage channels are Bagjola Canal, located at the southern side and Noai canal which runs along the northern boundary of the planning area. The drainage of northern portion of the area is done mainly through the Noai Canal, which ultimately pass the waste water to Bidyadhari River.

The waste water of the southern part of the planning area is discharged through the Bagjola canal, which also falls into Bidyadhari River.



Map. 6.14. Drainage and Contour map of Rajarhat

In addition to this, one local canal, which has generated from Umarhati mouza, also helps in discharging the wastewater and storm water of central part of the area through Bagjola Canal. In addition to this, a number of ponds, Beels and Bheries are situated in the study area which helps in some extent to drain out the huge amount to storm water from residential plots during rainy season.

Inspite of these, the remaining storm water gets clogged in the study area during rainy season due to the lack of natural slope and the low lying nature of the area. The areas like Umarhati, Chandpur Chapagachhi, Jamalpada, Basina etc face the most critical situation during the rains.

6.15. LAND VALUES

The land values are ever changing rapidly with time. But, as the development is of ribbon kind, land prices were high along the transportation corridor in comparison to the rates of land in the interior sides of the villages. This situation the till now prevails, and mainly the lands having close proximity to road, have high valuation. In 1981 the value was within Rs. 1.5 Lakhs. to 2 Lakhs per acre along the transportation routes, and in the other parts it was of Rs. 80,000 to 1 Lakhs., i.e, almost half and even low.

In the next ten years (till 1991), the value raised up to Rs.3 Lakhs. and more, but this was still along the main spine. And the price seems to be gradually decreasing as its proximity reduces from road. In this process the lands in some villages especially in north like Raigachi, Rekjuani, Bhatenda, Khamar, Kalaberia, Bishnupur are costlier than the rest of the villages, as the main existing roads reside in these villages.

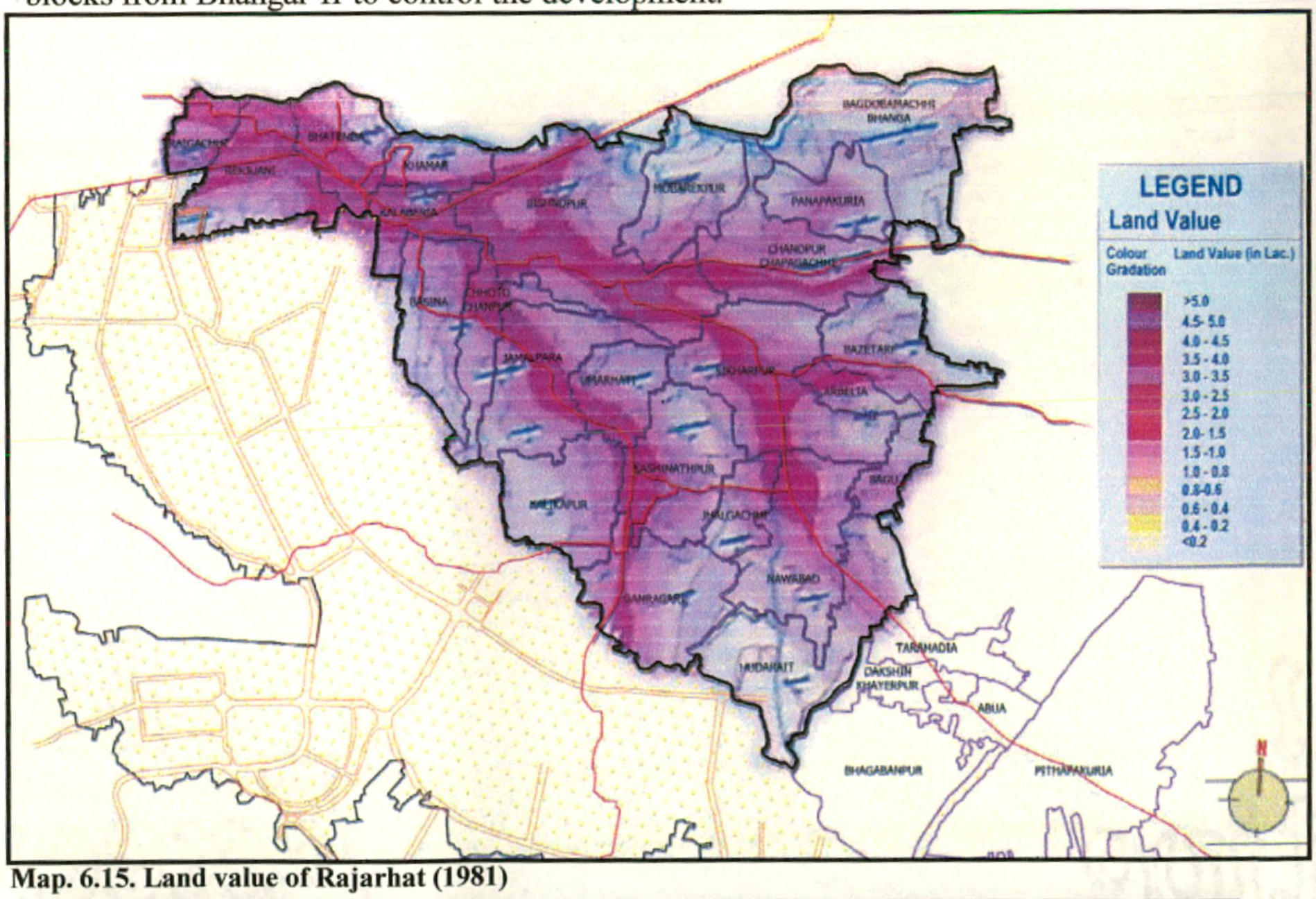
Some other villages like Sikahrpur and Jamalpara in east and south also show high value of land. But in extreme south and east (Hudrait, Bagdobamachi Bhanga) the land value remains as low as Rs. 20 to 40 thousand only.

In 2001 the scenario looks much more homogeneous in nature. Plots along spine roads become of about Rs 4.5 to 5 lakhs. Value also increases in southern part but not in eastern part. Situation after the proposal of New Town (i.e. in 2009) is quite different than the previous pattern of development.

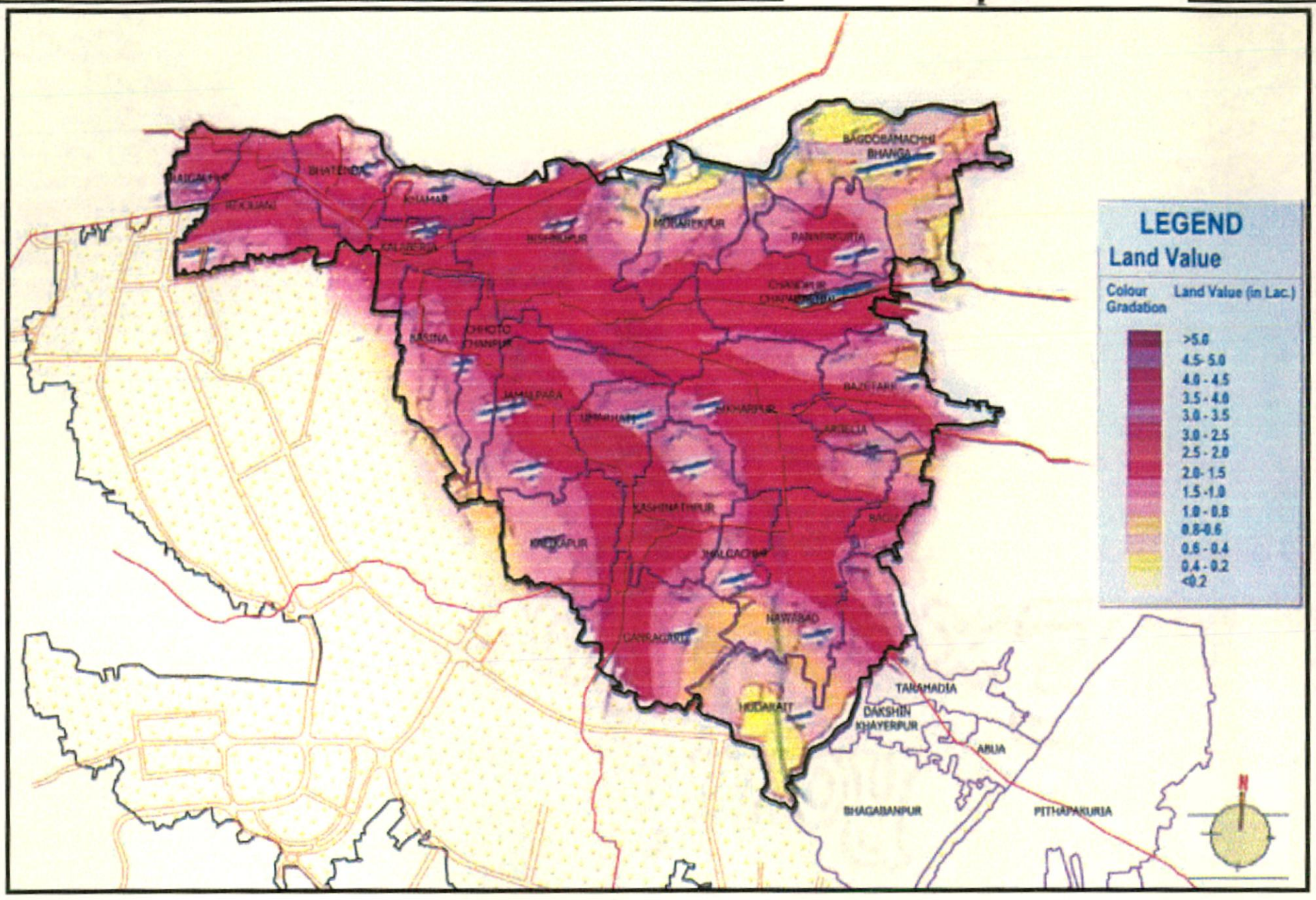
Between 1991 and 2001 the price increased in southern part, especially some villages like Nawabad, Jhalgachhi, Kashinathpur, Kalikapur experienced a high growth in land value. In 2009 prices of land in Kalikapur have crossed Rs 5 lakhs. whereas the other villages remain almost the same as previous. Along this, the whole western part has experienced a growth in terms of land value.

6.15.1. INSTITUTIONS

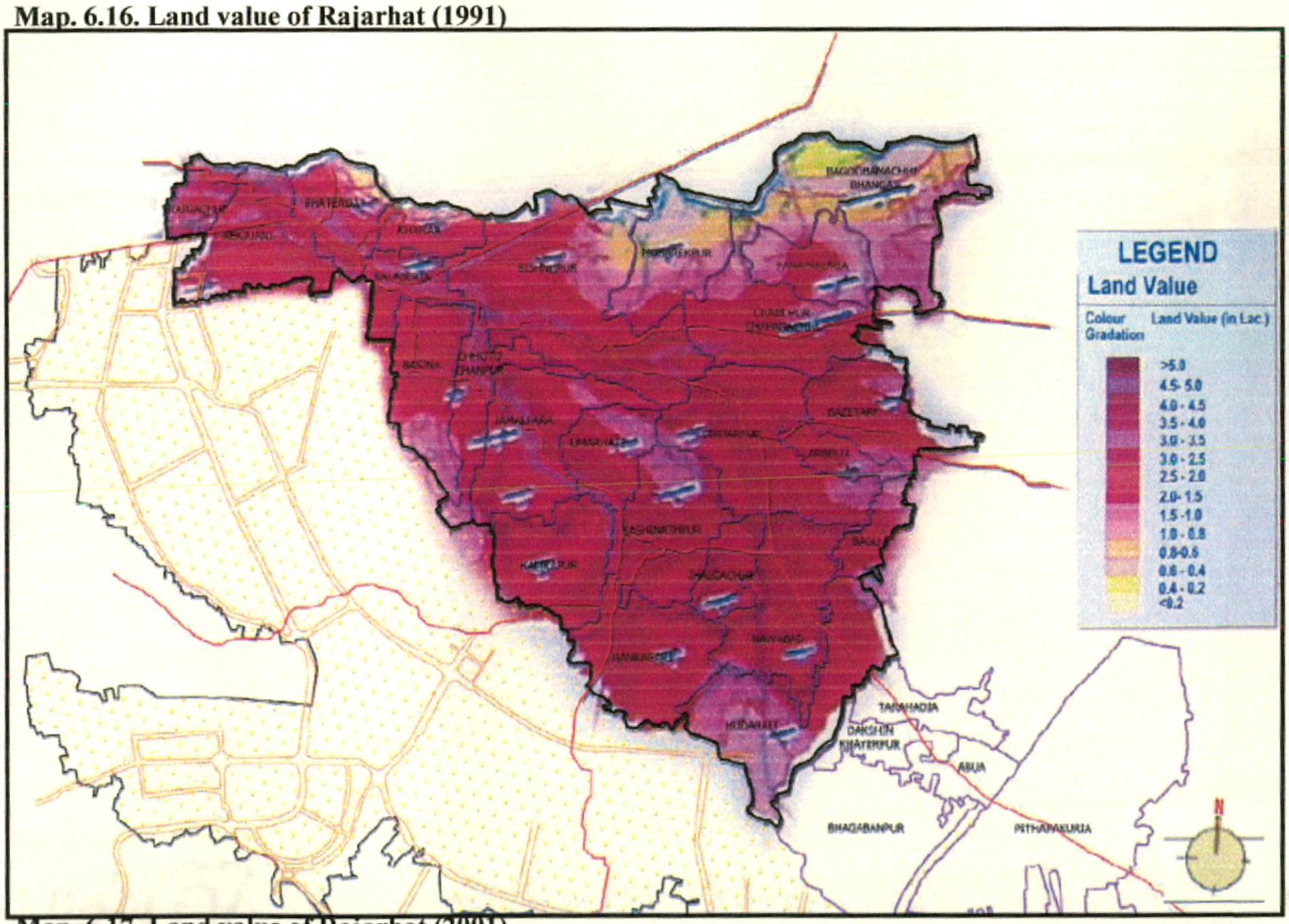
As described before, the 24 villages are under jurisdiction of 4 village panchayats, viz. Rajarhat-Bishnupur-I, Rajarhat-Bishnupur-II, Chandpur and Patharghata. Beside that a new area development authority has formed taking 15 villages from the block Rajarhat and 8 blocks from Bhangar-II to control the development.



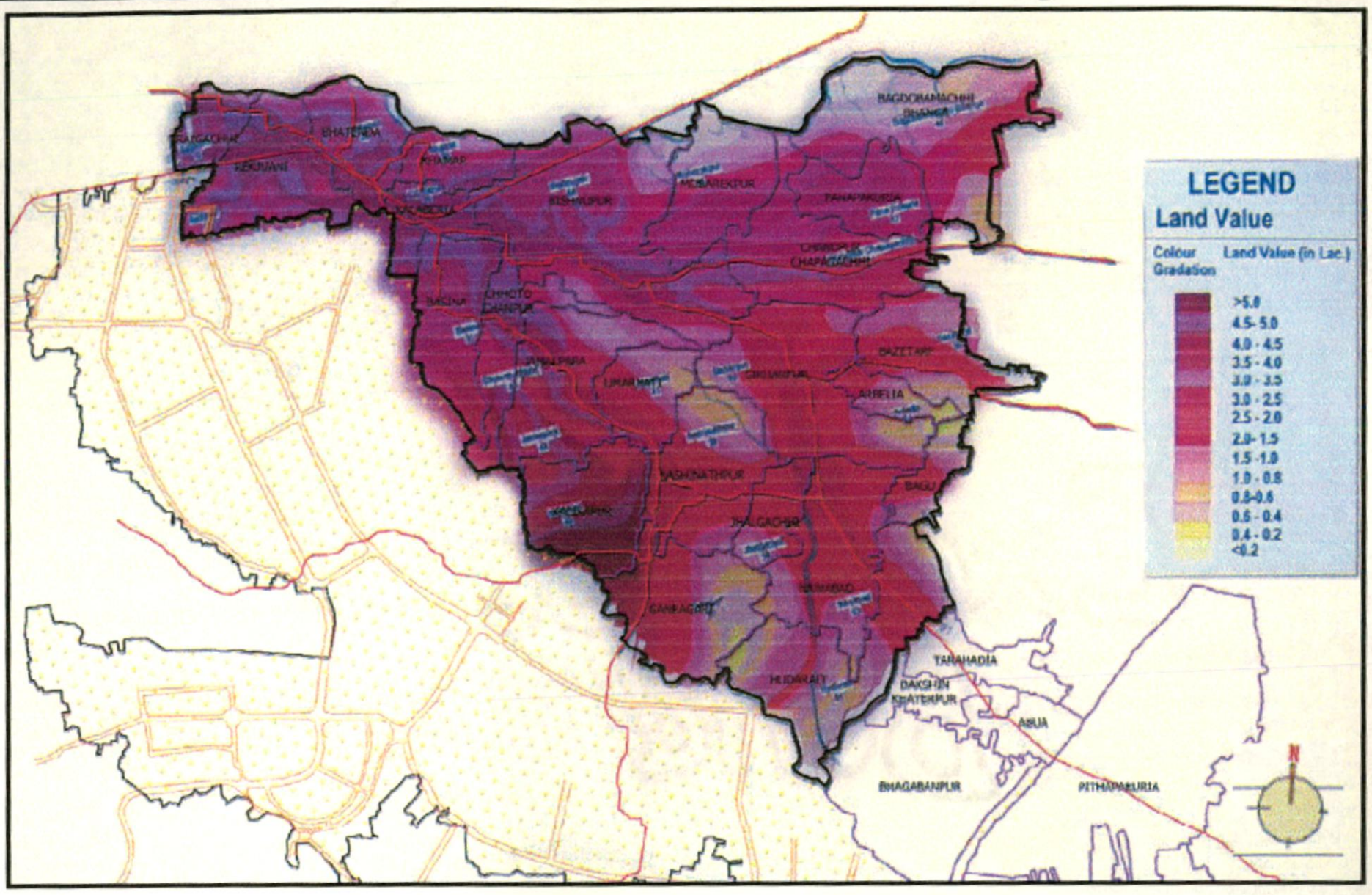
Map. 6.15. Land value of Rajarhat (1981)



Map. 6.16. Land value of Rajarhat (1991)



Map. 6.17. Land value of Rajarhat (2001)



Map. 6.18. Land value of Rajarhat (2009)

4200 Ha of land is delineated under this authority and they are on the way of preparing a land-use map for future. The area is almost equal to the New Town (3779 Ha.) and proposed density (240 pph) is taken a bit lower than New Town (264 pph). The total projected population is taken same as New Town i.e. 10 lakh.

6.16. OVERALL STATUS

The area reveals that there is an increasing trend of urbanisation. Substantial land still shows rural characters but they are mostly being assessed as potential developable land by the developers or individual property owners. The type of residential developments taking place bears witness to the contemporary styles of the city's architecture and taste. The developers are catering to the needs of various strata of the society. One can see both individual bunglows and 6-7 storey apartment complexes coming up. Though the infrastructure facilities are quite less, people are migrating in an increasing number as they are finding cheap land and non-polluting environment compared to the main city. Ownership of houses are more than rented ones, much oppose to the situation in Kolkata.

ANALYSIS

7.1. CITY LEVEL ANALYSIS

Problems in study area

Problems of infrastructure and changing characters are common in any growing area. Similarly, there are several major problems the villagers in the fringes of New Town are facing due to drastic change towards urbanism. They mainly include

7.1.1. Haphazard Growth

Some of the areas are growing; they already have attained peri-urban characteristics, like the villages of Raigachhi, Rekjuani, Bhatenda, Khamar, located in north. Along these some other villages are also developing well like Sikharpur, Bagu, Abua due to the presence of strong connectivity within the region. Mauzas like Kalikapur, Kashinathpur being nearer to the action area 1 & 2 of New Town, has shown rise in land value in last five years, potentially this area will have a chance of very fast development.

Fig. 7.1. Mushroom development along transportation corridor

These areas are under Gram Panchayats, so there are no rules and regulations to control the growth of settlement keeping parity with existing infrastructure. These bodies do neither have the financial backing nor the technical manpower to develop the area in a planned manner.

As a result, unnecessary urban sprawl, mainly along the main accesses roads and some thickly populated areas with literally no infrastructure and facilities can be found.

7.1.2. Improper Infrastructure

Uncontrolled linear sprawl of settlement results in increase of laying and maintenance cost of infrastructure (roads, water supply and electricity). As a result, some settlements that are far from main roads and remain unserved from the other basic amenities. In addition to this, haphazard growth without any planning for pucca drainage system along the access roads leads to drainage congestion especially during rainy season.

In some villages show complete urban character but are lacking proper infrastructure facilities. The rural character of these villages are completely vanished and high rise developments have also come up. But the road and solid waste collection and disposal is far from adequate.

Fig. 7.2. Inadequate and mismanaged infrastructure

On one hand, the residents develop their own water supply and on the other hand they dump their garbage just outside the compound walls. People construct their houses because of the comparative low price of land, but neither the builder nor the authorities construct the roads as it is a costly affair.

7.1.3. Problem of Natural Drainage

The area is predominantly low-lying agricultural land. The slope is towards south with some low laying pockets of M. S. L as low as 0 M. The main drainage canals are Noai Canal which runs along the northern boundary of the planning area, Bagjola Canal which is located at the southern side beyond the boundary of the planning area, and a local canal connected with Bagjola canal. Bagjola Canal and Noai Canal ultimately get opened to Bidyadhari River.

Fig. 7.3. Open drain

As the capacity of these two main drainage canals is not sufficient to carry the discharge of growing population from its catchments areas the problem of water logging is becoming frequent in comparatively low laying lands. Above this haphazard growth of settlements without provision of proper drainage system has increased the problem in manifold.

Fig. 7.4. Overflow of drains

Fig.7.5. Open drain formed by the side of road

Fig. 7.6. Open sewer in front of a house

The open drain act as a breeding ground for diseases and infections. In rainy season, the situation in even worse. Most of the time the drains are not able to accommodate the wastes and overflow, flooding the roads. No actions are being taken by the authorities as the panchayats do not have funds and the municipal corporation and other planning authorities are least concerned.

Fig. 7.7.Open drains act as breeding ground of diseases

7.1.4. Lack of Steady Source of Surface Water

As there are no steady source of surface water, ground water is used as the main source. Private and public tube wells and wells are the most used sources of ground water. With the increase in population the pressure on these tube wells have increased many folds. Extraction of ground water in greater rate than its recharge creates pressure on the aquifer present in that area which may lead to increase of Arsenic (As) content in ground water.

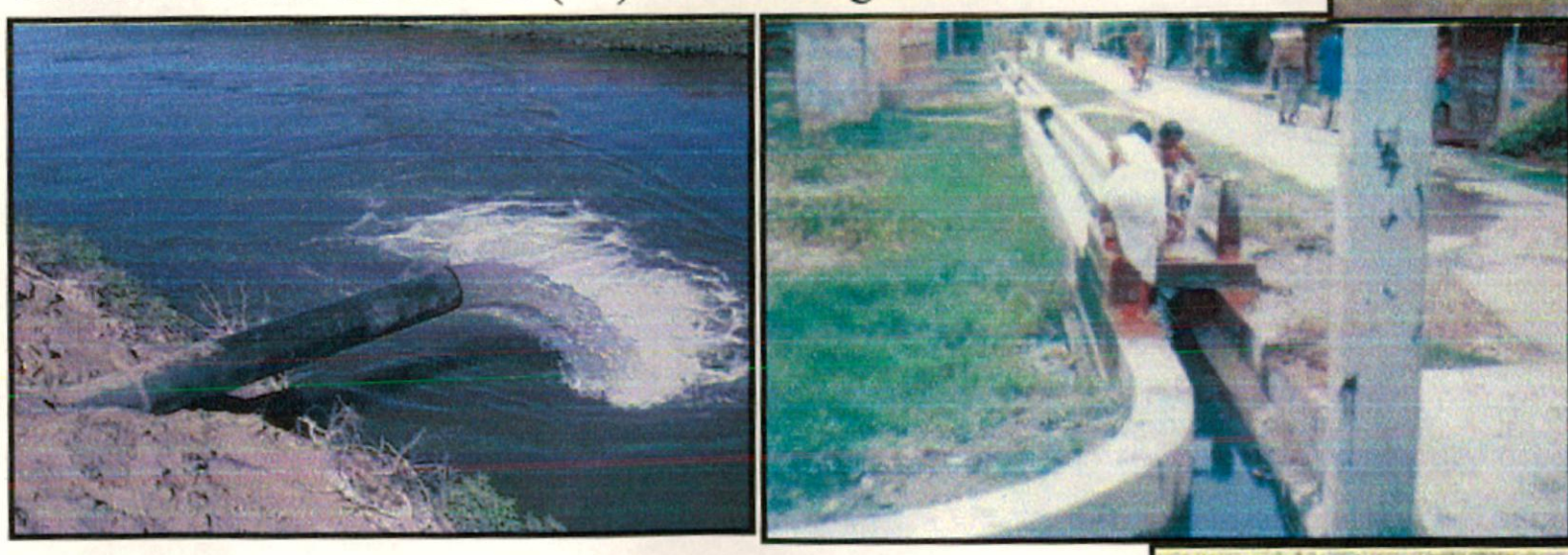


Fig. 7.8. Decline in drinking water availability

Presence of As above permissible level is one of the growing problems of the area, so the increasing use of ground water may prove to be dangerous for future sustenance.

7.1.5. Reduced production of Crop

Due to lack of steady source of surface water the amount of paddy (especially Boro, which requires good irrigation system) is reducing day by day. Most of the agricultural lands in western and southern part of the area, are at present, irrigated through shallow tube wells. This has increased the production cost with reduced amount of crop production. Again, use of ground water for irrigation purpose will help to increase the As content.

Fig. 7.9. Harvest

Fig. 7.10. Cracking of agricultural land due to water scarcity

Fig. 7.11. Grown trees are being cut randomly

Fig. 7.12. Agricultural land turning into marshy lands

With the reduction in production, the farmers are facing heavy losses and are prefering to shift their occupation. Bigger trees are being cut and sold as timber and lands are cleared and sold to the builders for construction purposes.

7.1.6. Change in occupation and character

As the agricultural land in fast depleting, the households in the villages are facing the problem because of rapidly changing character of the surrounding areas. Farming and associated non-farming activities are fast replaced by retail, construction and other tertiary occupations.

Fig. 7.13. Change in occupation and character

7.1.7. Large scale lands acquired for residential developments

Builders and private parties are acquiring large scale lands for construction activities, mostly residential colonies at cheaper prices than New Town. A large portion of these people do not construct and tend to sell the land at higher price after some years. Due to lack of proper guidelines, the ecologically sensitive areas are made available to the builders for development.

Fig. 7.14. Huge stretches of lands along transport routes

7.1.8. Condition of social infrastructure

The number of schools are sufficient but their condition is far from desirable. Mixed landuse is present everywhere and residential, commercial and institutional are assembled together. No playground for the schools and the children play on either the road or in the fields.

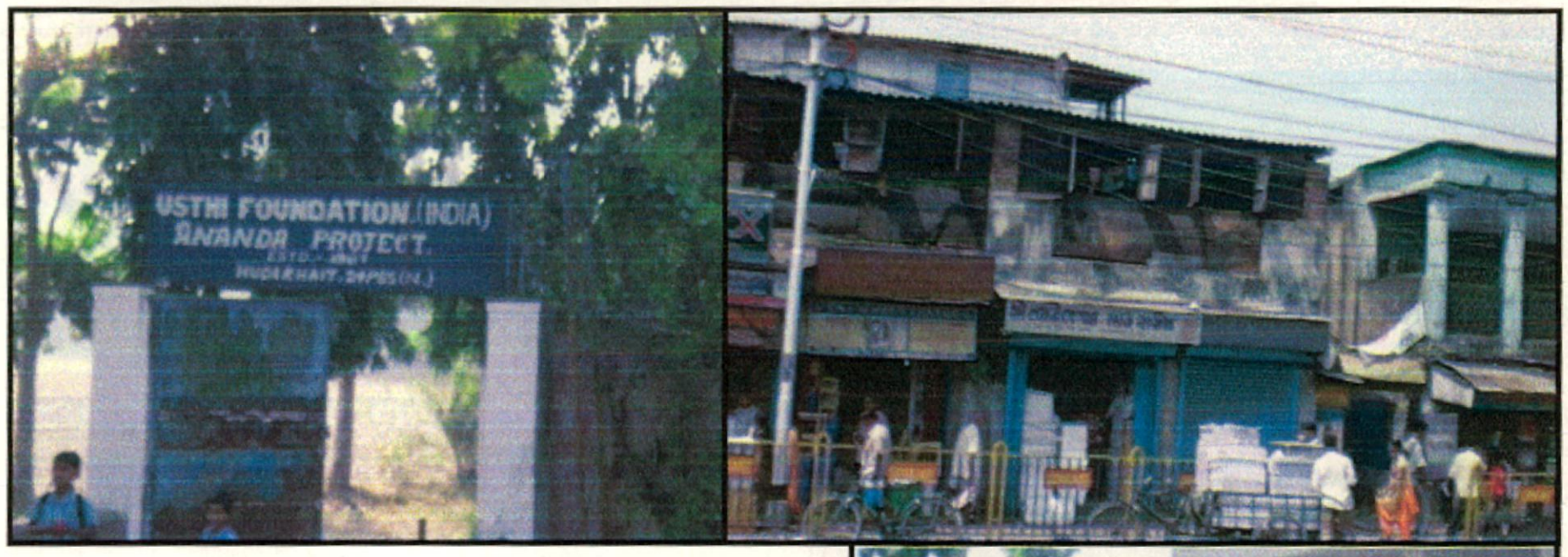


Fig. 7.15. Mixed landuse

Other social infrastructures like banks, hospitals and post offices are very less in number and the villagers have to travel large distances to avail these services. No proper planning in accordance to the population standards is done for the social infrastructure.

Only two primary health care units are there for these 24 villages which is far from adequate. Daily markets are available in only 5 villages and so most of the villagers have to go to other villages to avail market facilities. Due to change in occupation, the government schools present are not preferred by the dwellers, hence school area is serving as a dumping ground without any maintenance.

7.1.9. Under utilization of land and vacant plots

The elite class of people who are now constructing their residences are mostly lined up along the transportation corridors so that its easy to travel to their work places in New Town and Kolkata.

Fig.7.16. Plots laying vacant for a long time

This is rapidly changing the character of the villages, disturbing the agricultural land and farming and associated activities. Construction of big bunglows in a large chunk of land results in high cost infrastructure.

Fig. 7.17. Plots laying vacant without construction

Construction is seen happening in irregular patterns and leap frog manner as most of the buyers have bought the land in chap rates and either aim to sell it for higher price in the future or to construct later. This creates problem as infrastructure facilities are difficult to be provided for any single plot separately and the owners are neither available nor interested for any sort of development activities.

Fig. 7.18. Half boundary wall to demarcate plot

The land are thus laying vacant for a long time with no productive results and are becoming dump yards for the uncollected garbage. The owners construct compound wall around their plot or a single room to demarcate their plot. Thus vast stretches of land are lying vacant with some construction in between. The land are neither used for agriculture nor for residences.

Fig. 7.19. Small room constructed to demarcate ownership

Land is exploited as an investment and has already changed hand 2 to 3 times.

7.1.10. Slums and squatter settlements

Due to vast stretches of land being left vacant for a long period of time, slums creep in and people like labourers coming from other villages construct temporary houses and settle there. These people even construct small eating places along the road and start their business there.

Fig. 7.20. Slums and squatters developing in vacant lands

7.2. DEDUCTIONS FROM CITY LEVEL ANALYSIS

➢ The settlement area has increased from 20.02% to 32.57% of the overall area, while vegetation has decreased from 62.1% to 48.13% from 1981 to 2009. This change is mostly happening on the north and north-western side which is adjacent to the New Town. Population density of these areas is also the highest and is on the rise. It has increased from 40pph to 70pph in this region. The percentage of migrants settling in theses areas are also higher as these areas are nearest to Kolkata and New Town.

➢ The major roads also pass through this area and it is easy to commute to the places of work. The land values have increased from Rs. 50,000 to Rs 3lakhs per acre. The lands along the

transport corridors have shown the highest increase in price and have reached Rs. 6lakhs and above per acre.

➢ Change of occupation and shift from agriculture to its allied activities, floriculture and other secondary activities is increasing. This is mainly due to the increase in production cost of crops as irrigation has become difficult without a constant source of surface water. With the increase in population density, need for drinking water has increased such that it is taking away all the ground water, making irrigation very costly. Eventually, farmers are preferring to sell their lands for high prices to the builders and engage in some other non-agrarian work.

➢ Social infrastructure is poor in most of the villages. Health, education and markets are less in number and specialty services are not available. Physical infrastructure are approximately evenly poor in all the villages.

Drainage facility of the area is very poor and water logging takes place during the rains as no storm water drain is there. On the other hand, water supply is fully dependent on the groundwater which is fast depleting and showing a high risk of arsenic contamination. Rain water harvesting is a good solution to all these problems.

➢ Some villages like Raigachhi, Rekjauni, Kalaberia and Bishnupur have good accessibility and main roads are passing through this area leading to its improvement. The belt adjacent to the New Town is showing the highest level of development in both living condition and outlook of the villagers.

➢ The villages in the eastern and southern side are the least developed ones having almost nil infrastructure. Industry and commercial activities are nearly negligible. People engaged in secondary and tertiary sectors daily commute out of the area. The vacant land available in these villages that are currently used as dumping yards for garbage, can be potentially used to encourage some small industries and commercial activities which will eventually create employment and economy in the villages leading to potential development of the whole area.

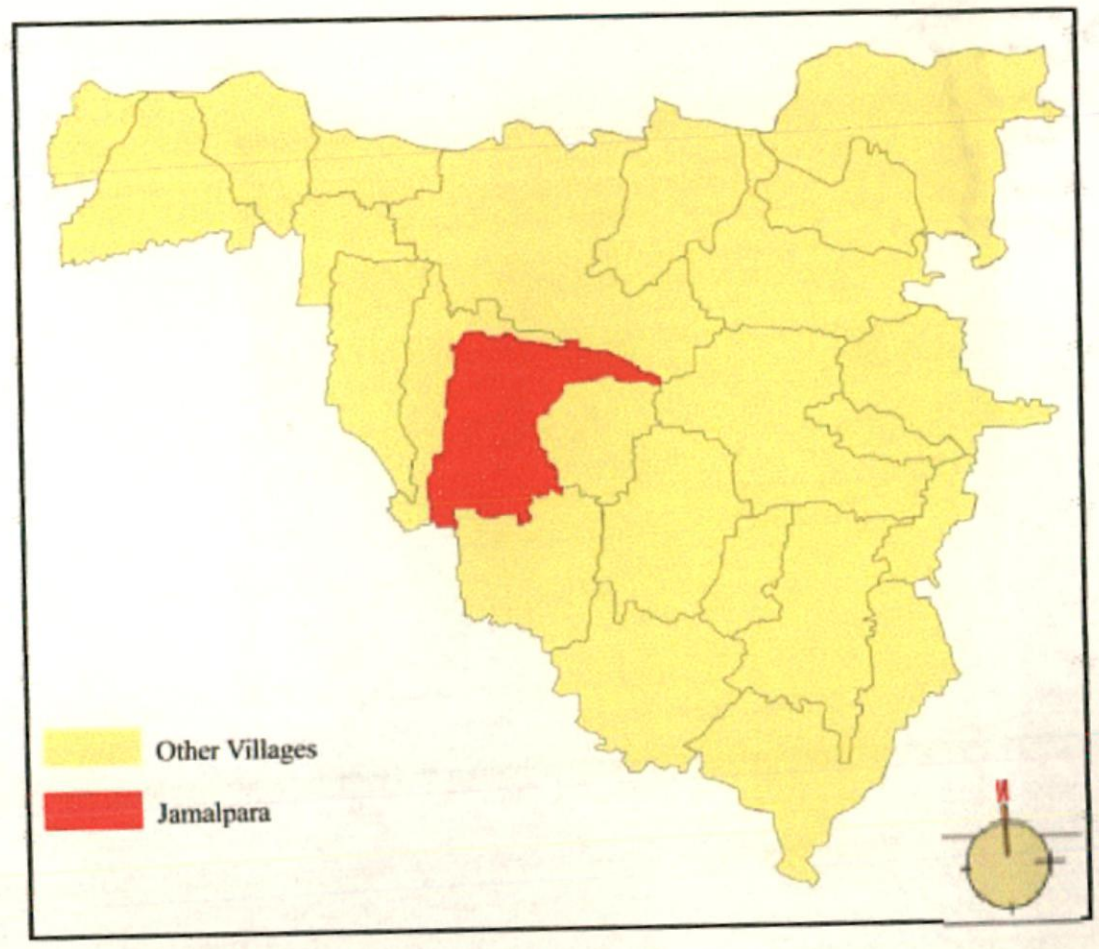
7.3. FIELD STUDY AND OBSERVATIONS

The majority of the developments in the study area which are changing the characteristics are the different types of residential ones and other are the commercial, industrial, recreational developments required for these residences. 4 villages are taken up for analysis in this regard.

7.3.1. JAMALPARA

This village is nearest to the city and is thus among the first ones showing the signs of urbanization.

The availability of green spaces is still high but the increasing sense of urban character is prevalent. One primary school and one ashram are located in Jamalpara. The problems of physical infrastructure are everywhere in Jamalpara, but the natural drainage is of average category here.



Map. 7.1. Location of Jamalpara in Rajarhat

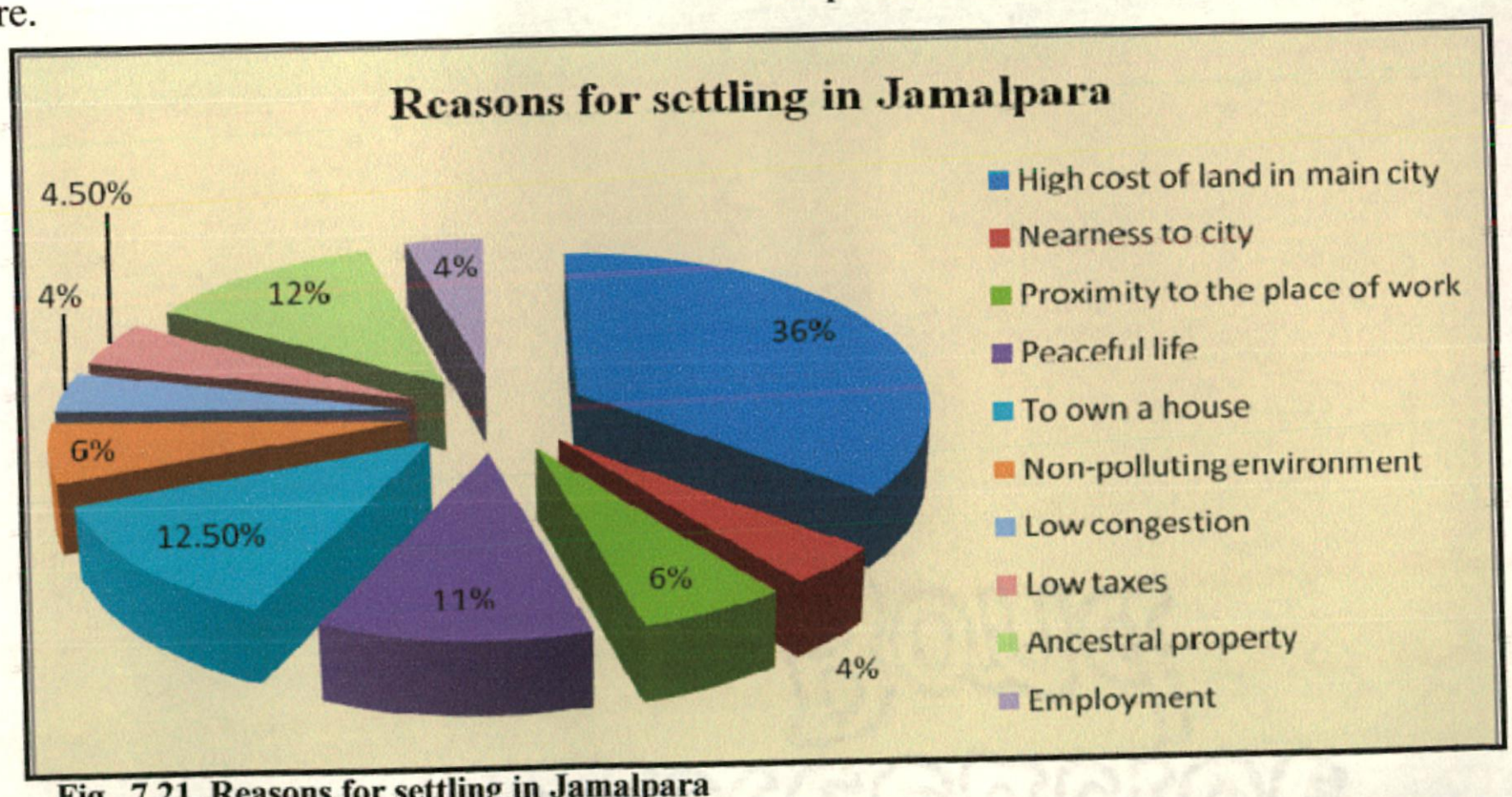


Fig. 7.21. Reasons for settling in Jamalpara

Presence of greenery is also on the higher side. People are more or less aware of their duties and problems.

The main features of Jamalpara are:

Total area: 165.99 hectares

Total population: 3,014

Density of population: 18 pph

Total existing residential land: 60.27 hectares.

Gross residential density: 50 pph

P anchayat: Rajarhat-Bishnupur-II

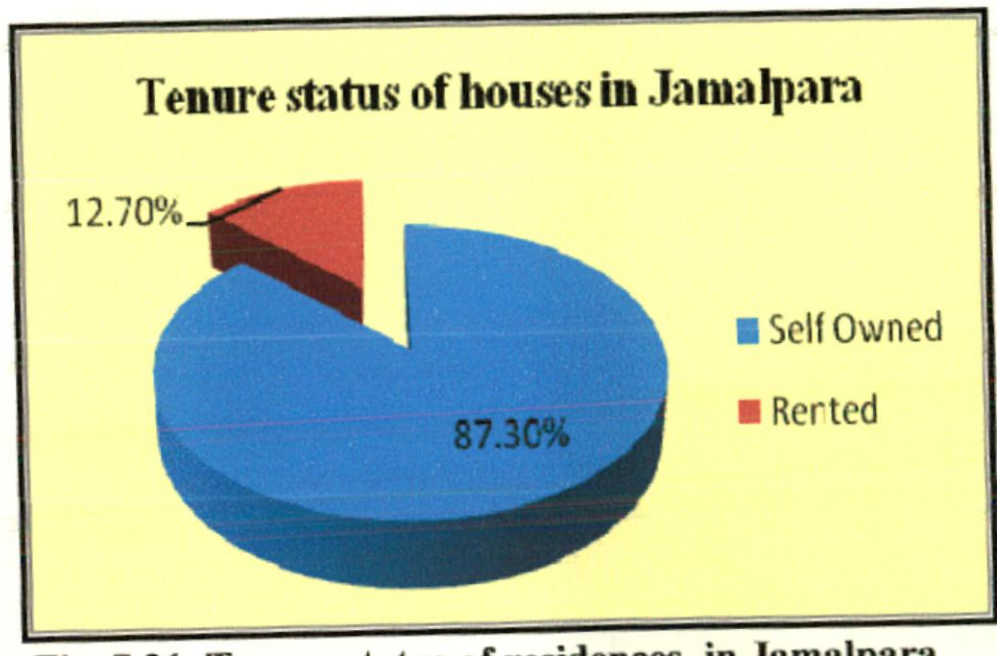


Fig. 7.21. Tenure status of residences in Jamalpara

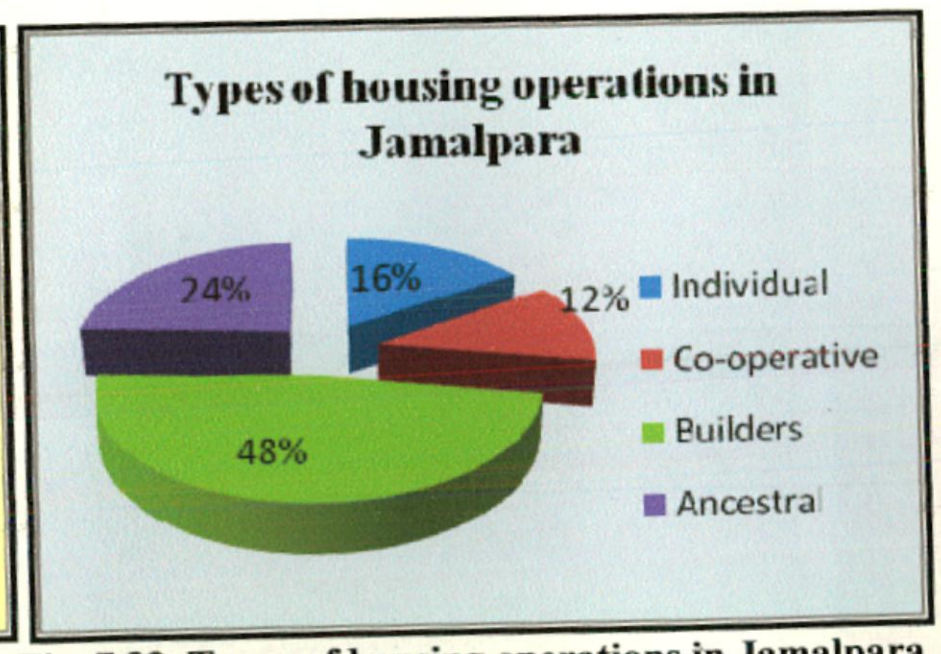


Fig. 7.22. Types of housing operations in Jamalpara

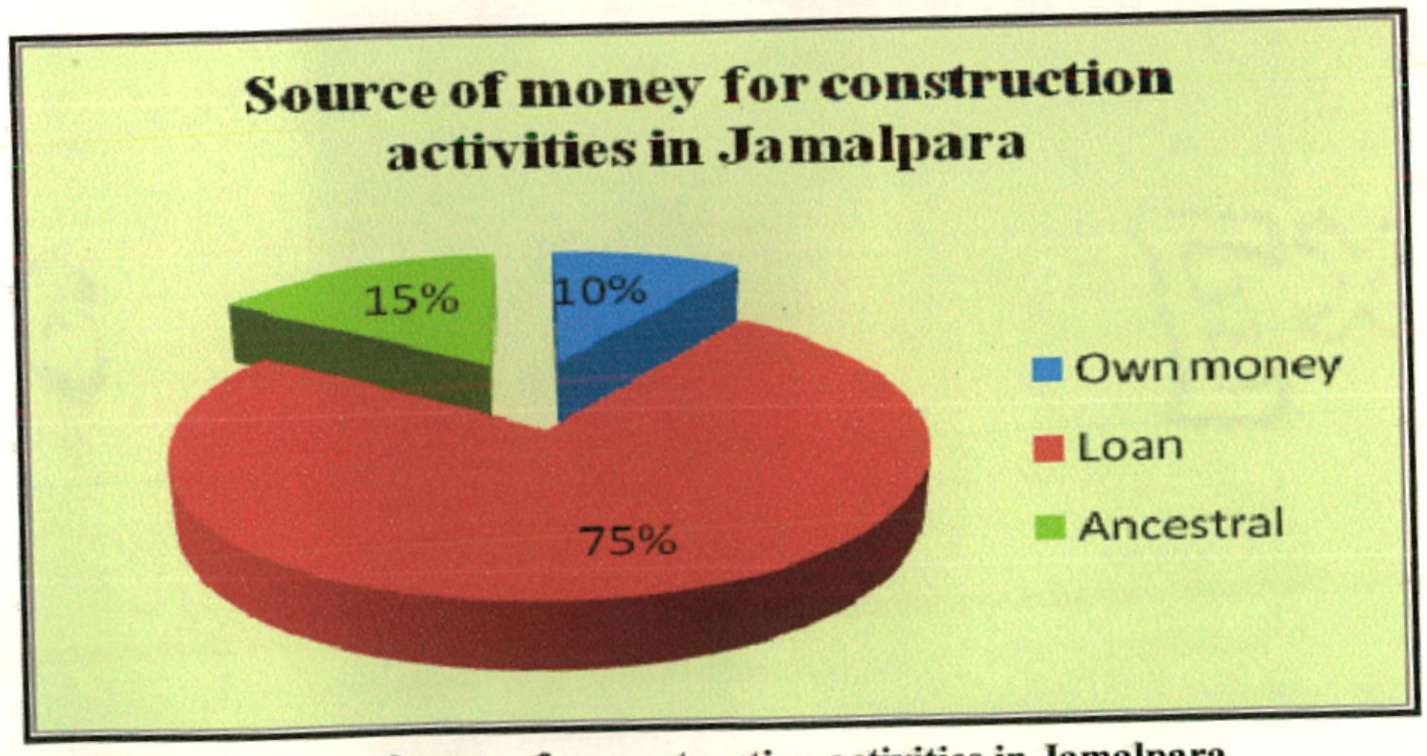


Fig. 7.23. Source of money for construction activities in Jamalpara

INFERENCES

➢ Jamalpara shows a increasing trend of urbanization. People residing in this village are mostly living in their own houses as the land prices are lower than the main city. 87% of the houses are self-owned compared to a mere 12% of rentals as people are finding it a good investment to buy land and construct their own house.

➢ Builders are largely developing the land and consist of as much as 48% of the total construction done. Individual construction, co-operative and ancestral houses consist of 16%, 12% and 24% respectively.

➢ Loan system is quite prevalent and 75% of individuals are constructing their houses by taking loan, as cheap land in comparison to the main city is available. On the other hand property tax and service taxes are low and land is also available in the fringes.

➢ Drainage: No storm water drains are there. One can find open drains everywhere, for which, no maintenance is done by the authorities.

➢ Sewerage system: It is totally dependent on individual septic tanks and soak pits, whether it is a bunglow or any larger scheme. No connection with the city sewage is available.

➢ Electricity: Electricity is provide by West Bengal Electricity Board. Before the consumption was less, but with the increase in population and change in occupation along with migration of non-agrarian people, need for electricity has increased manyfolds.

HUDRAIT

Hudrait shows very less effects of urbanization and is very much under-developed as far as the physical and social infrastructures are concerned.

One primary school and one ashram are located here. Accessibility is below average in Hudrait.

Main features of Hudrait are:

Total area: 222.33 hectares

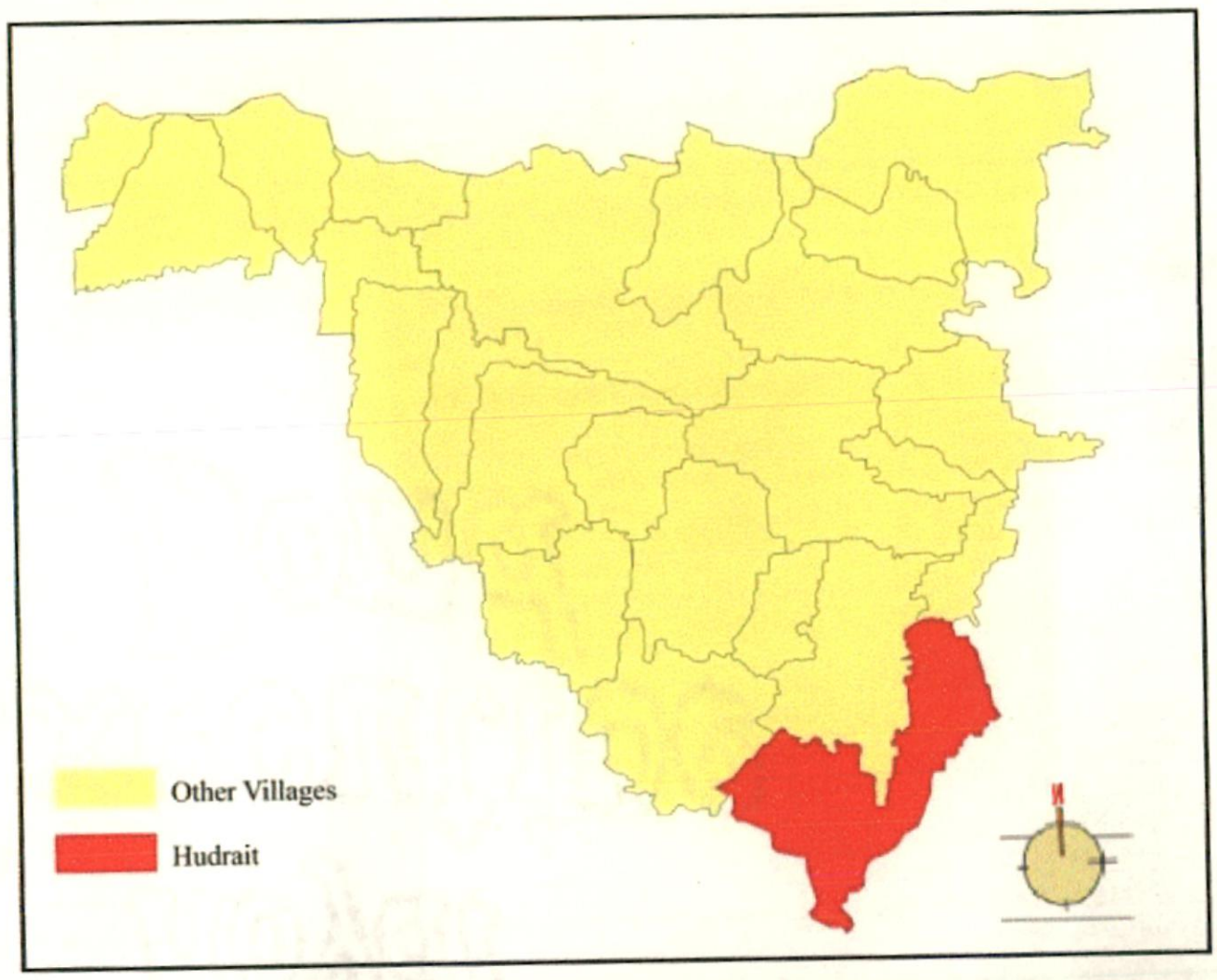
Total population: 1,832

Density of population: 8.2 pph

Total existing residential land: 16.65 hectares

Gross residential density: 110 pph

Panchayat: Chandpur



Map. 7.2. Location of Hudrait in Rajarhat

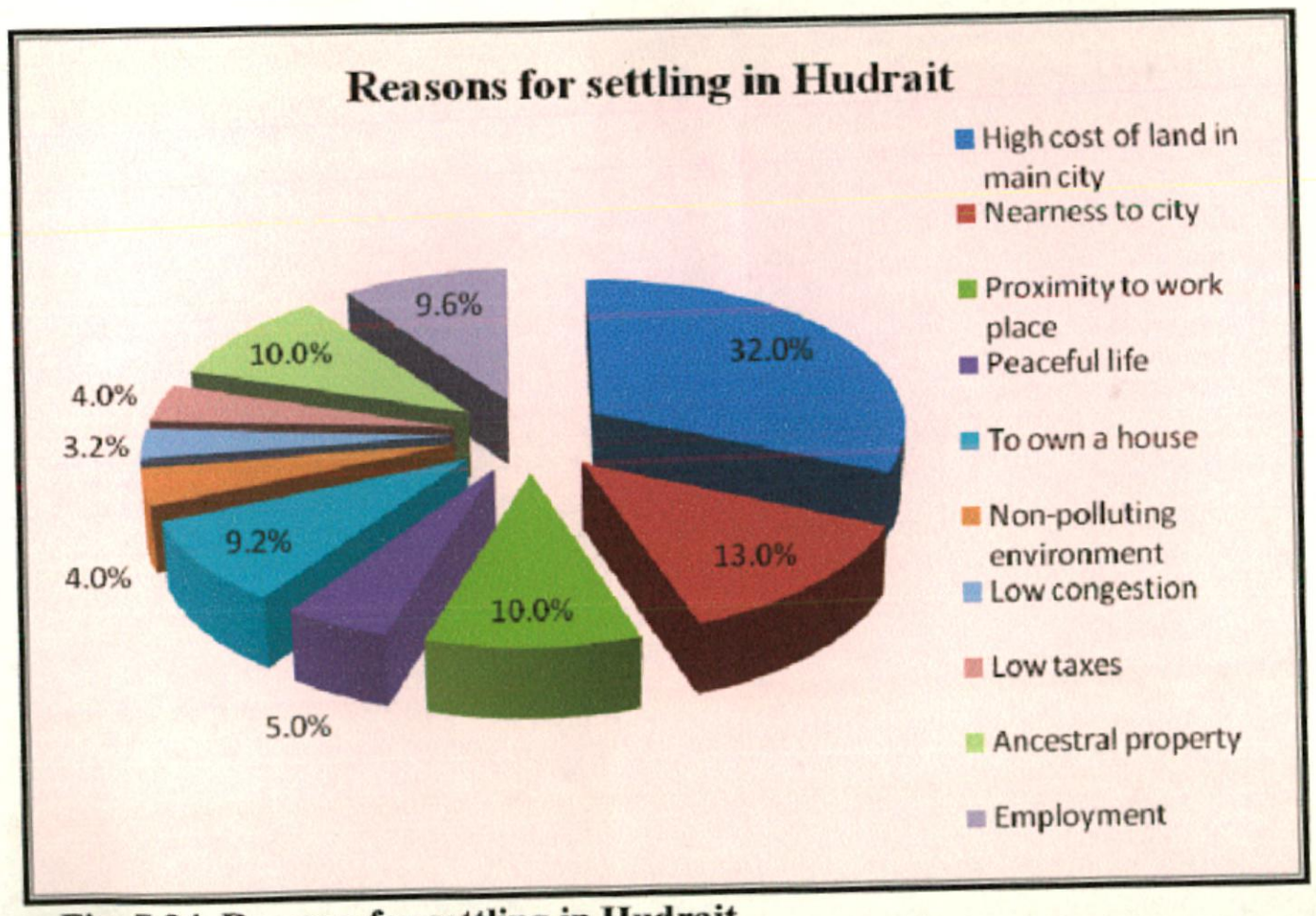


Fig. 7.24. Reasons for settling in Hudrait

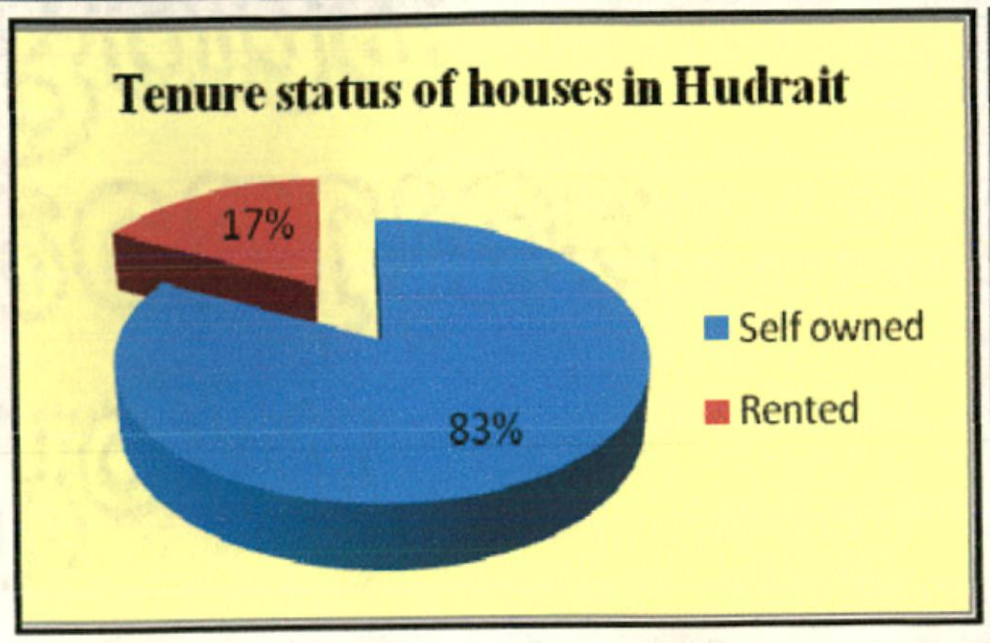


Fig. 7.25. Tenure status of residences in Hudrait

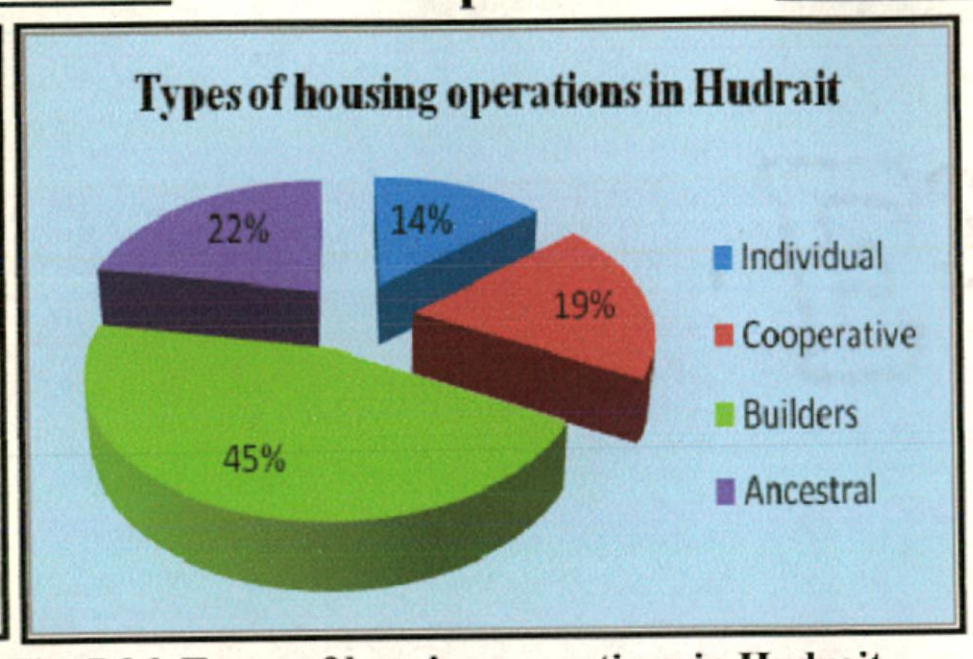


Fig. 7.26. Types of housing operations in Hudrait

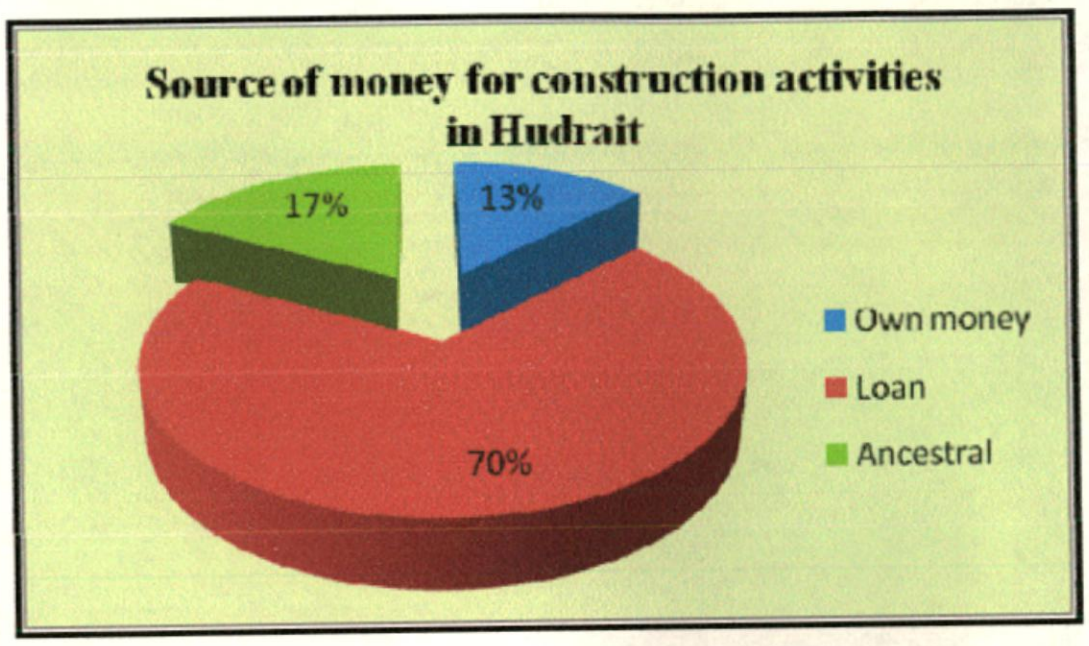


Fig. 7.27. Source of money for construction activities in Hudrait

INFERENCES

➢ Hudrait shows an average trend of urbanization. People residing in this village are mostly living in their own houses as the land prices are lower than the main city. 83% of the houses are self-owned compared to a mere 12% of rentals as people are finding it a good investment to buy land and construct their own house.

➢ Builders are largely developing the land and consist of as much as 45% of the total construction. Individual construction, co-operative and ancestral houses are 14%, 19% and 22% respectively. Loan system is prevalent here also and 70% of individuals are constructing their houses by taking loan, as cheap land in comparison to the main city is available.

➢ Drainage: As most of the land is low-lying here, water logging is a big problem here. Extra cost of land filling for any construction or development increases overall cost of the project.

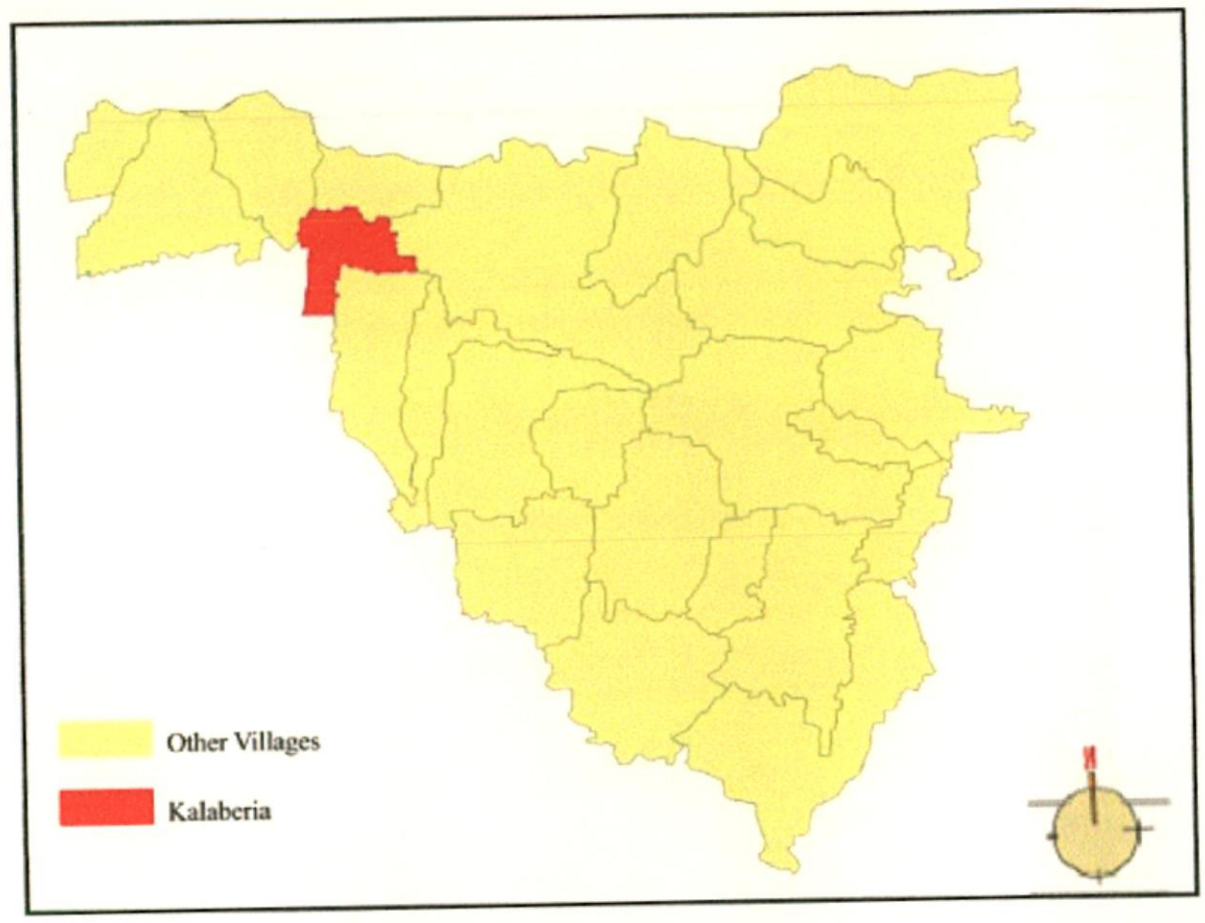
➢ Sewerage system: It is totally dependent on individual septic tanks and soak pits, whether it is a bunglow or any larger scheme. No connection with the city sewage is available.

➢ Electricity: Electricity is provide by West Bengal Electricity Board. Before the consumption was less, but with the increase in population and change in occupation along with migration of non-agrarian people, need for electricity has increased manyfolds.

KALABERIA

Kalaberia has good connectivity within the block and also outside it. It is having one Primary, one Secondary and one Higher Secondary school.

Two ATMs can be found in the daily market. A big playground is also there. One of the 2 public libraries is there in Kalaberia.



Map. 7.3. Location of Kalaberia in Rajarhat

Main features of Kalaberia are:

Total area: 56.54 hectares

Total population: 1,417

Density of population: 25.07 pph

Total existing residential land: 28.34 hectares.

Gross residential density: 50 pph

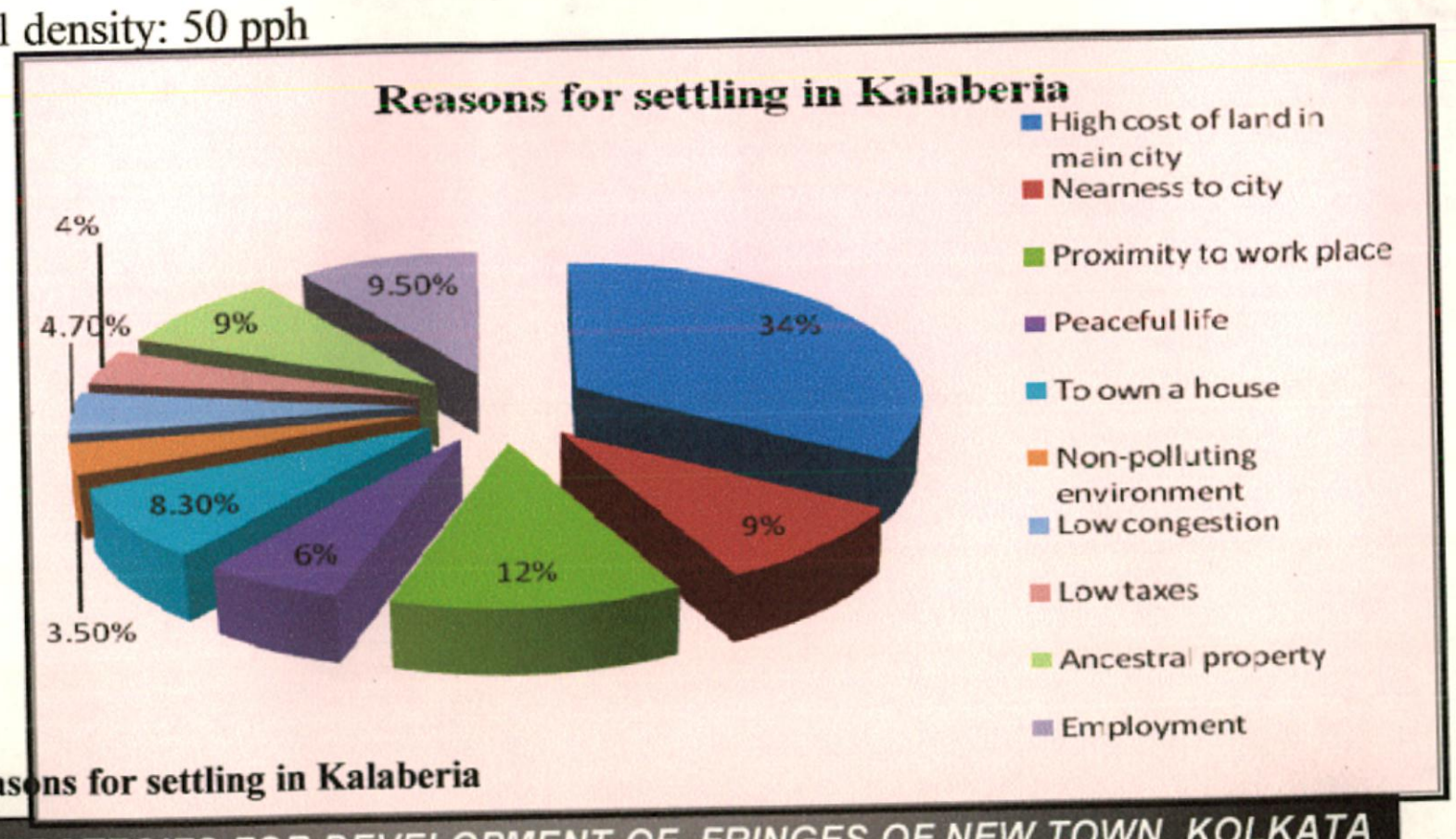


Fig. 7.28. Reasons for settling in Kalaberia

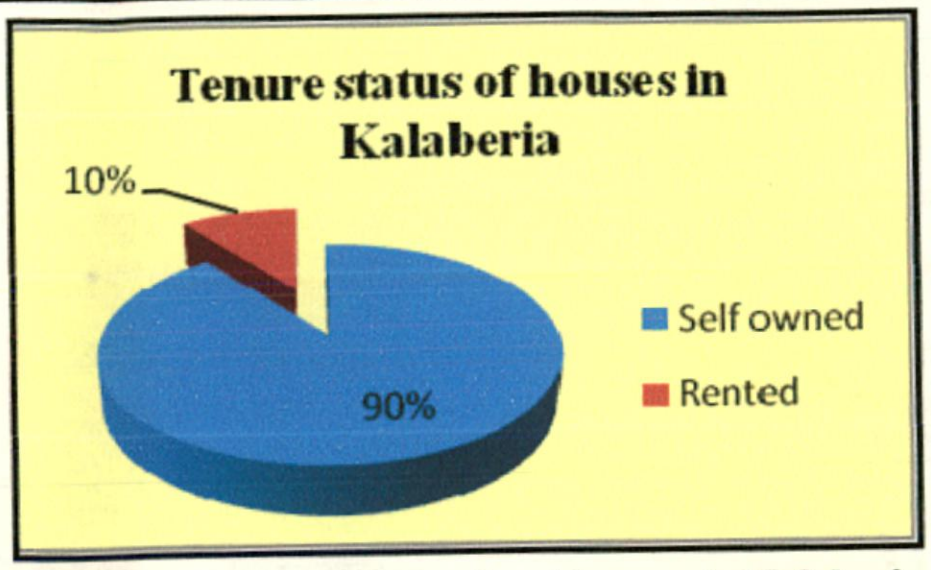


Fig. 7.29. Tenure status of residences in Kalaberia

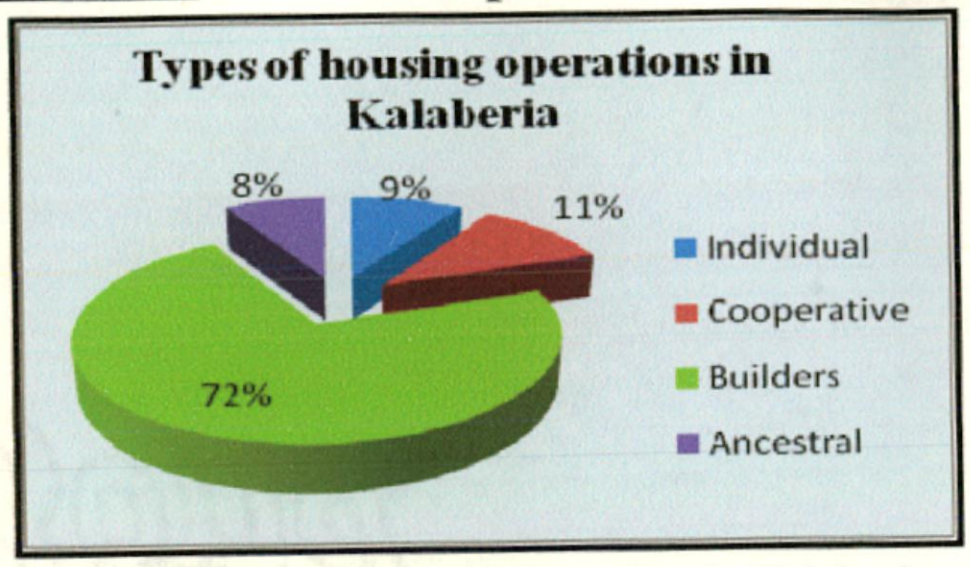


Fig. 7.30.Types of housing operations in Kalaberia

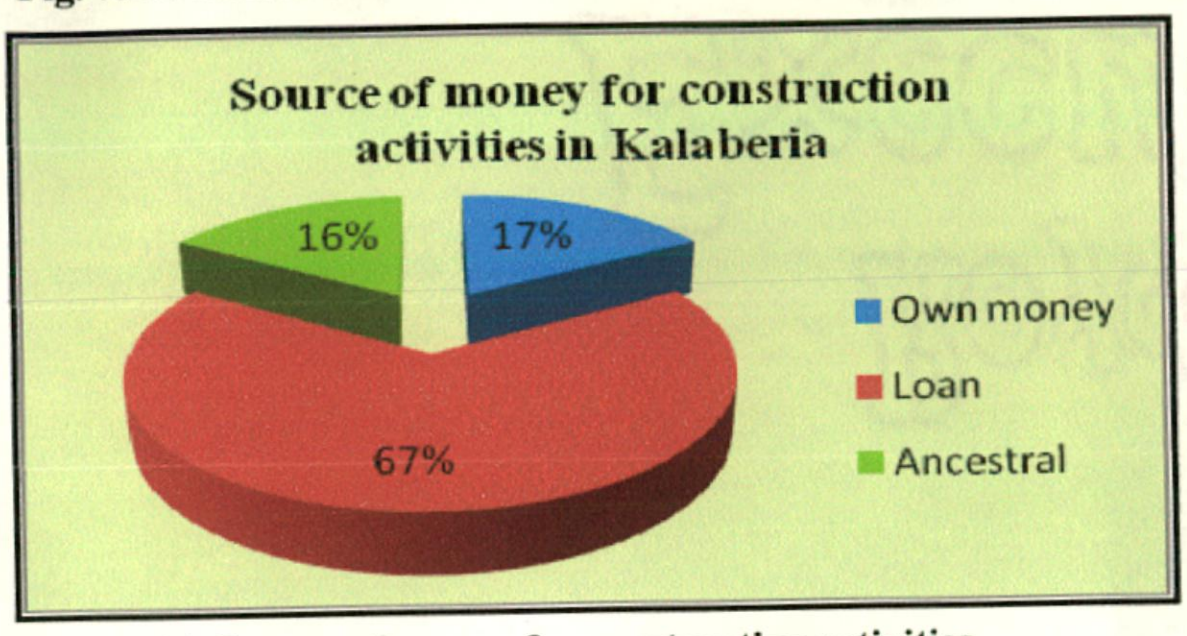


Fig.7.31. Source of money for construction activities in Kalaberia

INFERENCES

➢ Kalaberia shows a very high level of urbanization. 80% of the people are living in their own houses as the land prices are lower than the main city. A mere 20% of people are living in rentals accomodations.

➢ As it is showing high signs of transformation towards urban characters, much care has to be take. Otherwise it will lead to haphazard development which will pose a great problem at later time.

➢ Large scale constructions are found in Kalaberia and builders are developing 62% of the land and the total construction. Individual construction, co-operative and ancestral houses are 19%, 11% and 8% respectively. Loan system is prevalent here also and 73% of individuals are constructing their houses by taking loan, as cheap land in comparison to the main city is available.

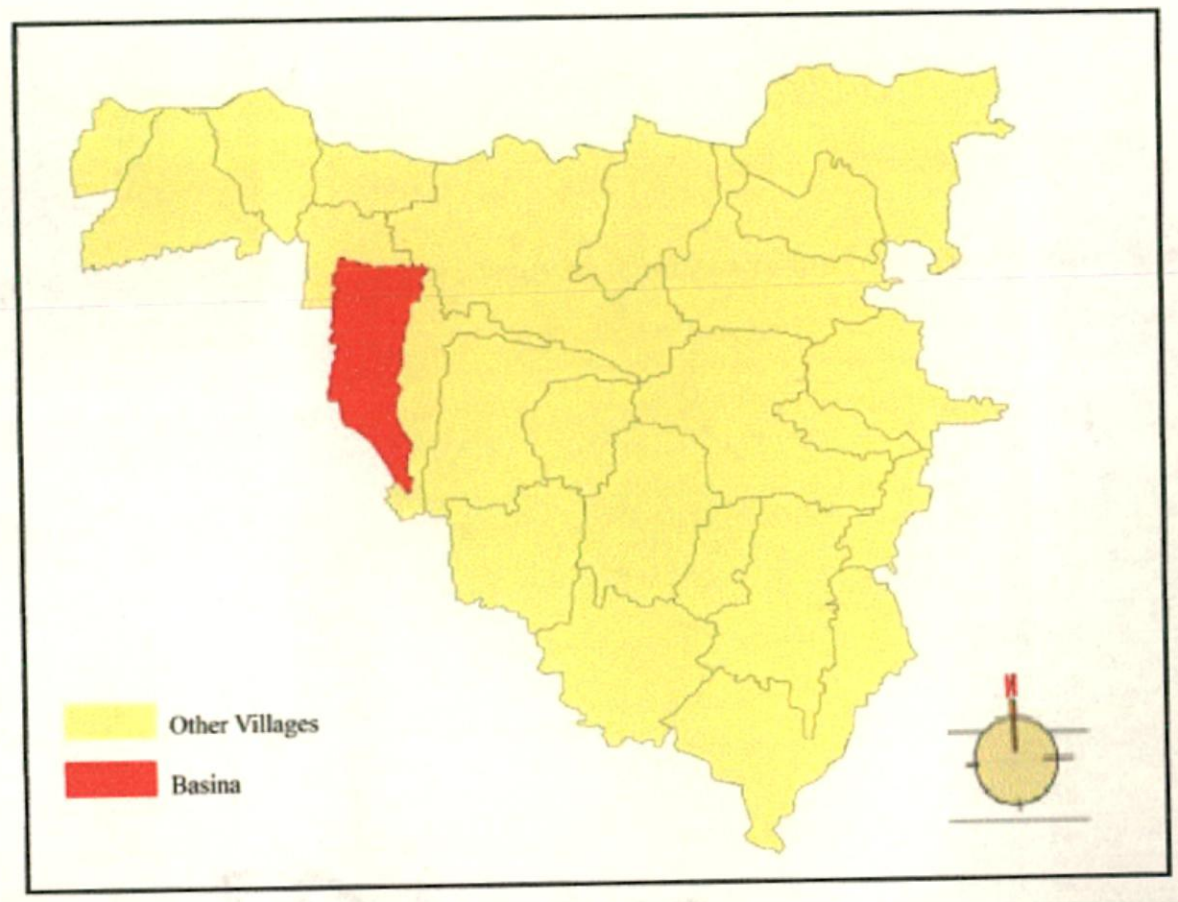
➢ Drainage: No storm water drains are there. One can find open drains everywhere, for which, no maintenance is done by the authorities.

➢ Sewerage facilities and Electricity are same as the previously discussed villages.

BASINA

Basina shows an average level of urbanisation but the physical and social infrastructures are far from being adequate. The land form is good here, altitude of land is above average level. It is near the Action Area I of the New Town. Percentage of vacant land available here is high.

A Gramin bank is there in Basina. Also a primary school is located here.



Map. 7.4. Location of Basina in Rajarhat

Main features of Basina are:

Total area: 118.46 hectares

Total population: 4,775

Density of population: 40.30 pph

Total existing residential land: 53.05 hectares

Gross residential density: 90 pph

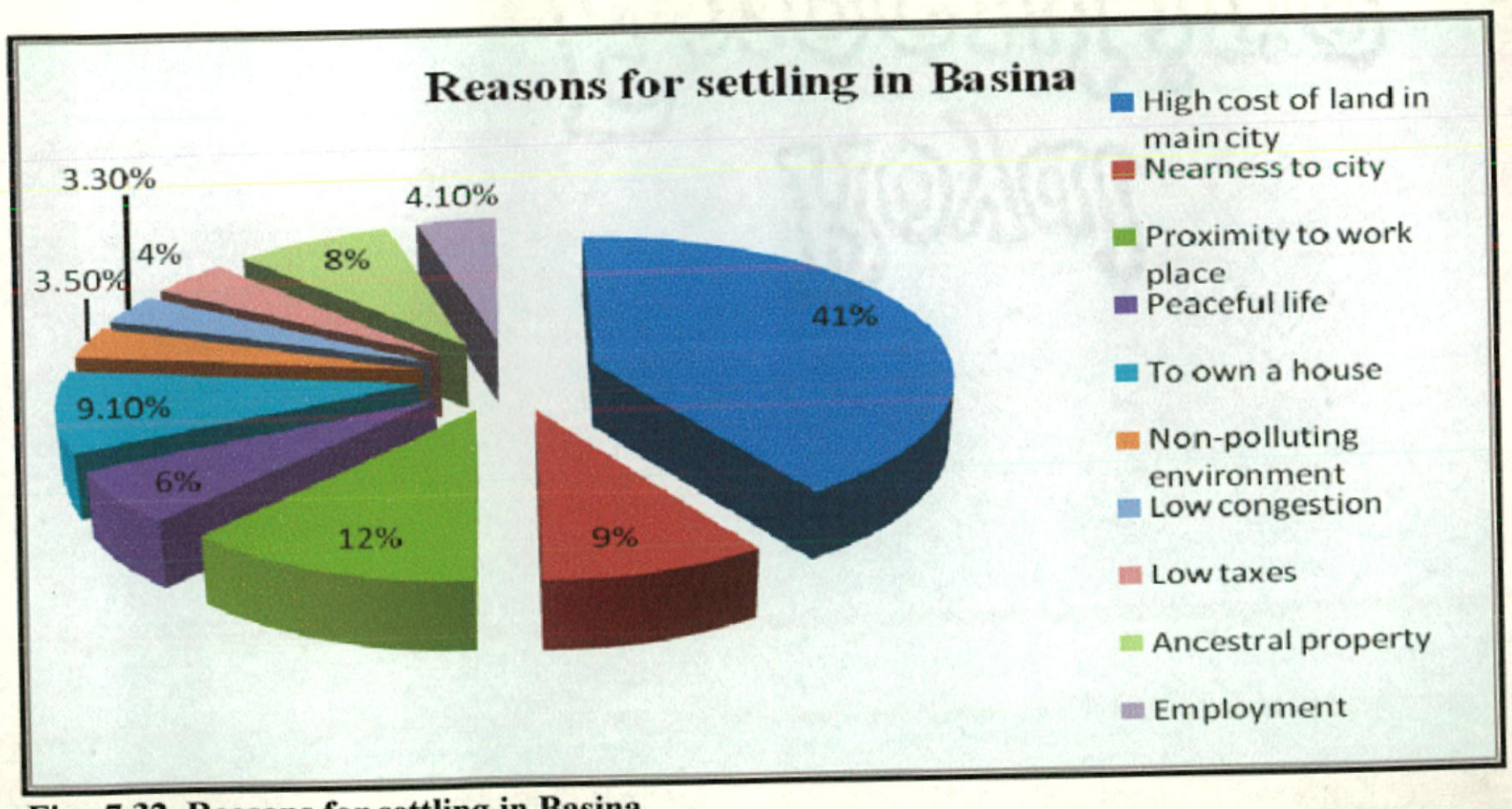


Fig. 7.32. Reasons for settling in Basina

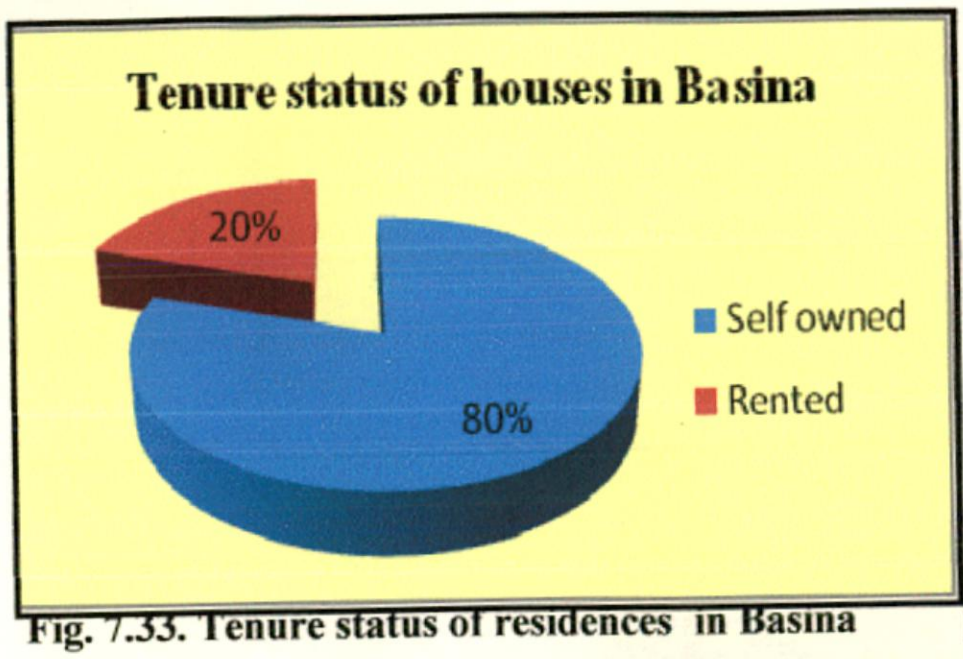


Fig. 7.33. Tenure status of residences in Basina

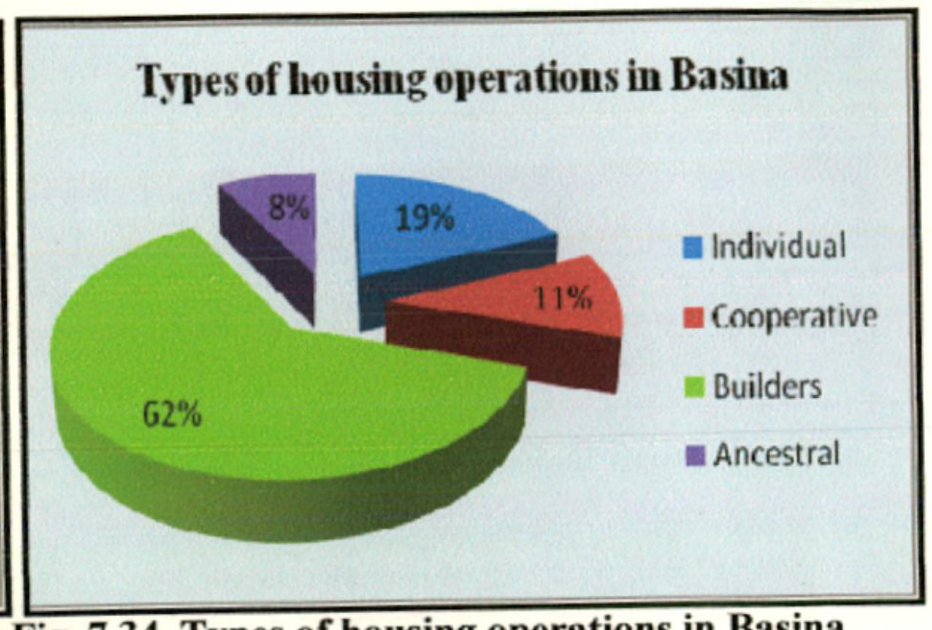


Fig. 7.34. Types of housing operations in Basina

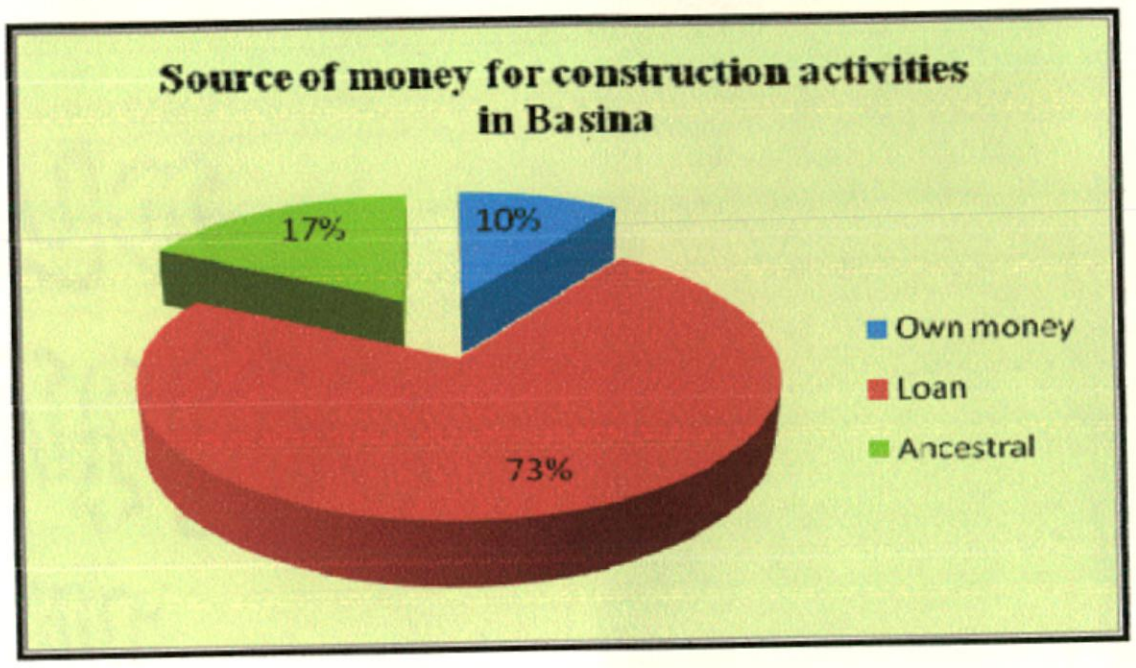


Fig. 7.35. Source of money for construction activities in Basina

INFERENCES

➢ Basina shows a very low level of urbanization. 90% of the people are living in their own houses as the land prices are lower than the main city.

➢Average amount of constructions are found in Basina and builders are developing 72% of the land and the total construction. Individual construction, co-operative and ancestral houses are 9%, 11% and 8% respectively. 67% of individuals are constructing their houses by taking loan, as cheap land in comparison to the main city is available.

➢Drainage: No storm water drains are there. One can find open drains everywhere, for which, no maintenance is done by the authorities.

➢Sewerage facilities and Electricity are same as the previously discussed villages.

7.4. DERIVATIONS FROM FIELD OBSERVATIONS OF 4 VILLAGES:

➢ Majority of the people living in these villages belong to the middle income and upper lower income group. A large portion of people who migrated and settled, are those who work in the main city but cannot afford to live there. Another portion of people work in the New Town and nearness to their work place is the main reason behind their stay. Others are those who have bought the land at cheap rates for future constructions or sale. Higher income groups occupy a few isolated pockets.

➢ Due to absence of any guidelines or building bylaws, development is taking place randomly. Infrastructure, both physical and social are lacking in this area and are mostly dependent on individual effort. Accessibility is restricted to a few public transports and the condition of roads are poor. Roads inside the villages are kuchcha and narrow.

➢ Availability and accessibility to finance is a big reason behind owned housing as people are preferring to construct their houses, even by taking loan, rather than going for rented accommodation.

➢ Water logging problems, scarcity of drinking water, unavailability of electricity and low altitude of land are some of the problems commonly faced in this area.

➢ These villages lie immediately next to the Action Area I and II of the New Town and bear the potential to develop as growth centres.

➢ Still a large portion of people are engaged in agricultural works. Floriculture, orchards and nursery are on rise.

CONCLUSION

8.1. EVALUATION OF VILLAGES

The study is based on 24 villages and the level of development is different in them. Some villages are in a better state and their preferable condition towards adoption to urbanism and development is more compared to those villages having less preferable condition. The planning policy have to be proposed according to the existing condition of the villages and their potential for future growth. The villages are first categorised based on the collected data under the following indicators:

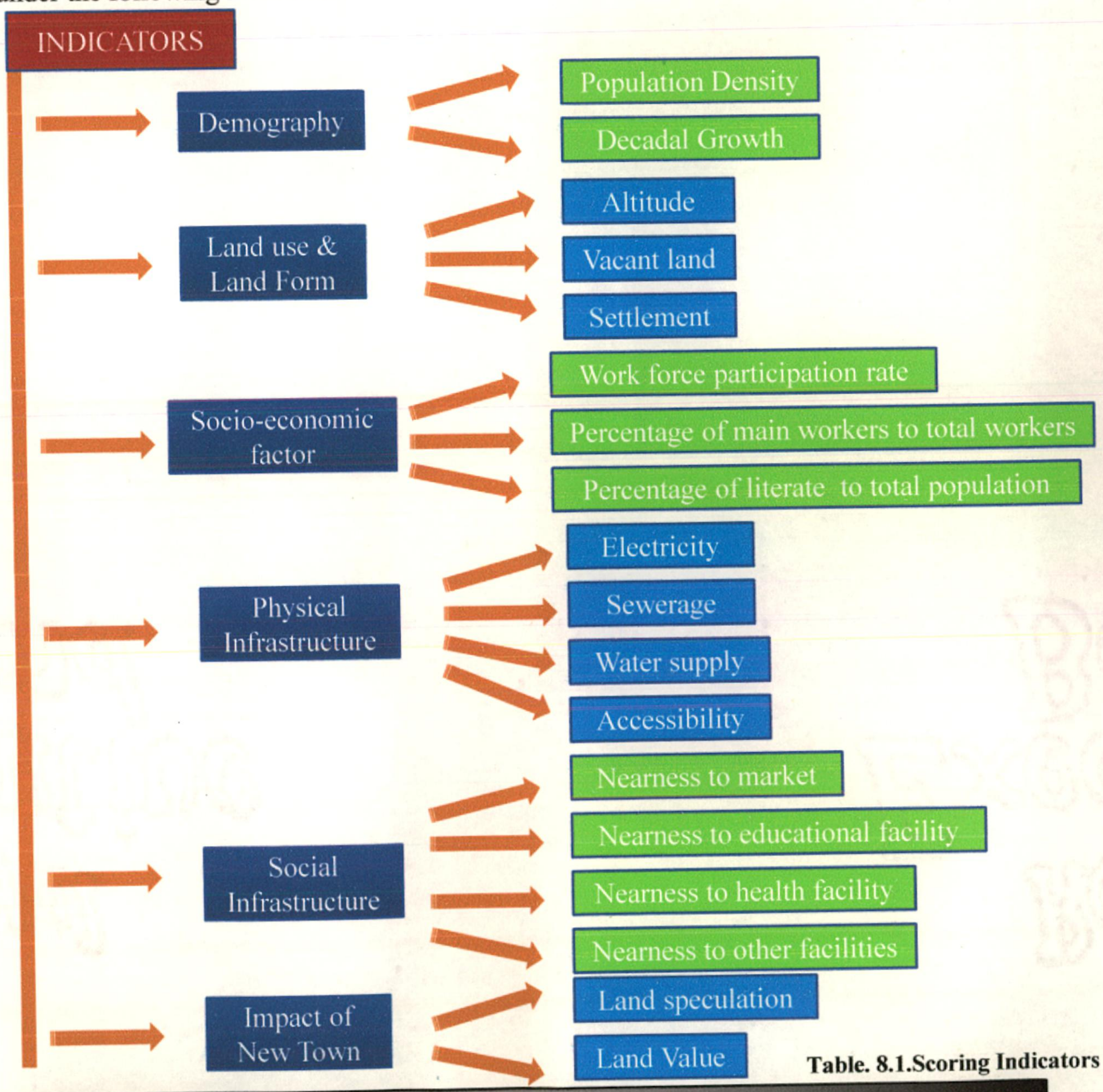


Table. 8.1.Scoring Indicators

8.1.1. DEMOGRAPHY

Population is one of the key factors in the development of any area. The villages having comparatively large population, high density and more percentage of decadal growth are considered as more suitable for future habitation according to the past trend. It should be also kept in mind that land form, accessibility, physical and social infrastructure are the guiding factors which will also reflect the same.

At the same time, there are some other issues which cannot be always predicted, like social security, clogging of same community people etc. So the weightage are given to these factors are as follow:

a) Population Density

20 pph < = 5

20-10 pph = 3

10 pph > = 1

b) Decadal Growth of Population Density

70% < = 5

70-50% = 4

50-30 % = 3

30% > = 1

8.1.2. LAND FORM AND LAND USE

a) Altitude of land

Land with high altitude is more suitable for development because of the fact that natural drainage will be much easier as compared to a low land, where land filling and development of artificial drainage system will be needed. This will eventually increase the land development

cost. So the land with higher altitude will be given more preference, though the study area mainly lies on a low land with very less variation in altitude.

0-0.6 m = 1

0.6-1.2 m = 3

1.2-1.8 = 5

1.8-2.4 = 7

b) Settlement

Areas which already have settlements will tend to grow faster as those areas already have some basic infrastructure and some amenities, basically presence of community, social security etc. this will attract more people to accumulate there, rather than some area where no settlement is there and no development has taken place. Preparation of development control regulation is required urgently for these settlements, in comparison to some other barren areas. For these reasons the area having more settlements are given high weightages.

66% < =7

46-66 % = 5

46-20 % = 3

< 20% = 1

c) Vacant land

A lot of vacant land are available in villages which are mostly wasted as dump yards and evolve as marshy lands and breading ground of mosquito and other germs. These lands can be potentially used in a planned manner to set up industry or start some commercial activity which will provide employment and increase the economy of the area. So the areas having large chunks of vacant lands are given more weightages as compared to those areas having less vacant land. High rise developments can also be made in these lands to free the ground space while accommodating more people and activities at the same time.

>20% = 5

10%-20% =3

< 5% = 1

8.1.3. SOCIO-ECONOMIC FACTORS

a)Work force participation rate

Socio-economic condition of an area depicts its economic condition and its potential to develop as a growth centre. Areas having higher work force participation rate shows that people living there are more eager to work and improve their economic condition as compared to the areas having less work force participation rate.

>30% = 5

<30% = 1

b) Percentage of main workers to total workers

Similarly the areas having more percentage of main workers to total workers have higher potential of development and show a higher rate of improvement.

>90% =7

90-80% =5

80-70% =3

70-60% =1

c) Percentage of literate to total population

Literacy is a key factor that shapes the thinking process of a person. Educated individuals are more open to ideas for their improvement and are able to work in a better and specialized way as compared to the illiterate. So those areas having higher percentage of literate to total population has been given more weightage against those having less percentage of the same.

70-80% = 5

60-70% =3

50-60% =1

8.1.4. PHYSICAL INFRASTRUCTURE

Physical infrastructure plays a very important role in the development of a region as it is a key feature for the living comfort of the people. More an area is better infrastructure facilities, more it attracts people towards it as a magnet.

a)Electricity

The condition of electricity is more or less same in most of the villages with little variation in the duration of supply. Only a few villages have more than 8 hours daily availability of electricity. In other villages, it ranges from less than 4 hours to 7hours. Categorization have been done based on the duration of electric supply per day

> 8 hours = 5

8-6 hours = 3

6-4 hours = 1

< 4 hours =0

b) Sewerage

As discussed earlier, sewerage facilities are restricted to private soak pits and septic tanks and no connection to the main sewer is there. The weightages are given according to the percentage of presence of soak pits and septic tanks in individual houses of these villages. Scoring have been done based on presence of soak pit or septic tank

> 60% = 5

60 - 40% = 3

40-20% = 1

< 20% =0

c) Water supply

Water supply for drinking, household and irrigation purposes are fully dependent on ground water. Weightage is given to the villages depending on the availability of water.

Availability and Quality

Good = 5

Average = 3

Bad = 1

d) Accessibility

It mainly indicates location of the area. More is the area approximate to the main road it is accessible. With this, availability of different mode is also an important factor. So, it is predictable that the areas whose accessibility index is high will experience faster growth.

Distance from Major Arterial Road

0.5 km > = 5

0.5-0.7 km = 4

0.7-1 km = 3

Availability of Mode of Transport

All the villages are scored according to their present condition and then the index have been prepared according to the available modes of transport. Para-transit modes are mostly distributeduniformly throughout the area. So only the bus routs are taken into consideration. The routs and availability of buses from different settlements are the basic criteria for scoring.

After scoring, villages are grouped in 3 categories –

1) Above 34 are those villages which are in better condition;

2) Villages scoring between 14 and 34 are taken as second category which are in average condition and,

3) Third are those villages which have scored less than 14, these are very much poor in condition.

These categories are given the weightages as listed below:

34 < = 5 14 - 34 = 3 14 > = 1

VILLAGES	Bus Routes											Score
	211	211A	211	211B	91	91A	91B	91C	L91B	MS91B	T11	
Raigachhi												41
Rekjuani												41
Bhatenda												41
Khamar												32
Kalaberia												39
Basina												30
Ganragari												22
Jhalgachhi												17
Kashinathpur												19
Kalikapur												15
Umarhati												19
Jamalpara												20
Choto Chanpur												29
Bishnupur												35
Mobarekpur												24
Bagdobamachhi Bhanga												15
Panapukuria												14
Chandapur Champagachhi												20
Sikharpur												25
Bazetaraf												18
Arbelia												19
Bagu												14
Nawabad												15
Hudarait												14

Colour Code	Description	Weightage
	Availability Within 0.5 km	4
	Availability Within 0.5-0.7 km	3
	Availability Within 0.7-1 km	2
	Beyond 1km.	1

Table. 8.2. Availability of Mode of Transport for Different Villages

8.1.5. SOCIAL INFRASTRUCTURE

Social infrastructure is essential for urbanization and it also plays an important role to attract people. The main indicators under this category are:

a) Nearness to Market

Availability of market facility is an added facility for the dwellers of an area. Market is necessary for daily merchandise as well as selling of the produced crops.

Maximum scoring in this indicator is 5.

3 for presence of daily market and

2 for haat or weekly market.

b) Nearness to Health Facility

Provision of health facilities in an area proves to be one of the very important indicator as it acts as a catalyst in attracting people. People tend to settle in an area where there is health facility nearby as it is something that gives mental security. This factor is given maximum of 5 weightage.

Distance within 0.5 km = 5

Distance between 0.5 to 1.5 km = 3

Distance between 1.5 to 2 km = 1

Distance more than 2 km = 0

c) Nearness to Education Facility

Same as the previous, this indicator is also given maximum of 5 weightage. If there is at least one primary school within 0.5 km from locality and a secondary or higher secondary one within 1km, is scored as 5.

If the secondary or higher-secondary school is in between 1to 1.5km but the primary school is within 0.5 km then it is scored as 3.

If the primary school is between 0.5 to 1 km and secondary or higher-secondary school is beyond 1.5 km then it is scored as 1.

If primary school is beyond 1 km along with a higher-secondary or secondary school also further than 1.5 km, the score will be 0.

d) Nearness to Other Facilities

This indicator includes facilities like banks, recreational, religious, telephone exchange, petrol pump, cinema hall, post office and graveyard. This indicator is given a maximum score of 4.

8.1.6. IMPACT OF NEW TOWN

All the other mentioned parameters going in favour of population growth, the demand of land of the area automatically increases. Again the development of some new projects in virgin land with improved infrastructure and facilities also acts as catalyst to increase the demand of adjacent lands. With the development of roads and other infrastructure, commercial growth of the area is also on the rise which in turn will increase the cost of land.

a) Land Value

Land value > Rs 4 lac. = 5

Land value between Rs 4 to 2 lac. = 3

Land value between Rs 2 to 1 lac. = 2

Land value < Rs 1 lac. = 1

c) Land Speculation

As an inevitable impact of New Town, a number of private companies are tending to develop various projects on vast area of cheaper agricultural land adjacent to the New Town. This will result in population growth in surrounding areas. The existence of good infrastructure, services, better environment and facilities alone do not indicate good prospect of future population growth. Speculators also play an important role in the total development of the area. Therefore, this factor is needed to be handled carefully. Depending upon the market condition, weightage has given to these villages, varying from 0 to 5.

8.2. CONCLUSION

The scoring of various indicators are done according to the analysis of the present condition of the 24 villages.

After grading, it is clearly visible that the villages have different characteristics and thus have different potential of growth.

Some villages have scores as high as 88 and some have as low as 28. So the gradation have been done accordingly:

Villages having score more than 73 - Grade I

Villages having score between 73-54 - Grade II

Villages having score between 54-35 - Grade III

Villages having score less than 35 - Grade IV

	Villages	Grades
1	Raigachhi	Grade I
2	Rekjuani	Grade I
3	Bhatenda	Grade I
4	Khamar	Grade II
5	Kalaberia	Grade I
6	Basina	Grade II
7	Ganragari	Grade III
8	Jhalgachhi	Grade III
9	Kashinathpur	Grade III
10	Kalikapur	Grade III
11	Umarhati	Grade III
12	Jamalpara	Grade II
13	Choto Chanpur	Grade II
14	Bishnupur	Grade I
15	Mobarekpur	Grade III
16	Bagdobamachhi Bhanga	Grade IV
17	Panapukuria	Grade IV
18	Chandapur Champagachhi	Grade II
19	Sikharpur	Grade II
20	Bazetaraf	Grade III
21	Arbelia	Grade III
22	Bagu	Grade III
23	Nawabad	Grade III
24	Hudarait	Grade IV

Table. 8.4. Grades of the Villages

According to this grading, the villages are clubbed together on the basis of some homogeneous characteristics. The statistics shows downfall with the grades.

The villages which have scored more than 73 are presently in better condition for living and they have maximum potential to develop in faster rate than the rest.

VILLAGES	SOCIAL INFRASTRUCTURE				IMPACT OF NEW TOWN		Total Score
	arness to market	Nearness to educational facility	Nearness to health facility	Nearness to other facilities	Land specula tion	Land Value	
	(5)	(5)	(5)	(4)	(5)	(5)	(100)
Raigacchi	5	5	3	4	0	5	82
Rekjauni	0	5	5	4	0	5	80
Bhatenda	5	5	3	4	0	5	88
Khamar	3	5	3	4	0	3	70
Kalaberia	0	5	3	4	0	3	83
Basina	3	3	0	4	0	2	60
Ganragari	0	1	0	3	3	5	49
Jhalgachhi	0	1	0	0	0	2	45
Kashinathpur	0	1	0	0	5	1	44
Kalikapur	2	1	0	0	5	5	45
Umarhati	0	1	0	0	0	1	35
Jamalpara	0	3	0	4	3	3	56
Choto Chanpur	0	5	0	4	1	5	68
Bishnupur	0	5	1	4	1	5	76
Mobarekpur	5	1	0	4	0	0	54
Bagdobamachhi Bhanga	0	1	0	0	0	0	34
Panapukuria	0	1	0	0	0	0	34
Chandapur Chapagachhi	0	5	1	4	0	0	55
Sikharpur	0	5	5	3	0	2	64
Bazetaraf	3	3	3	0	0	1	53
Arbelia	0	1	5	0	0	0	51
Bagu	0	5	1	0	0	0	38
Nawabad	0	1	0	0	0	0	44
Hudrait	0	1	0	0	0	0	28

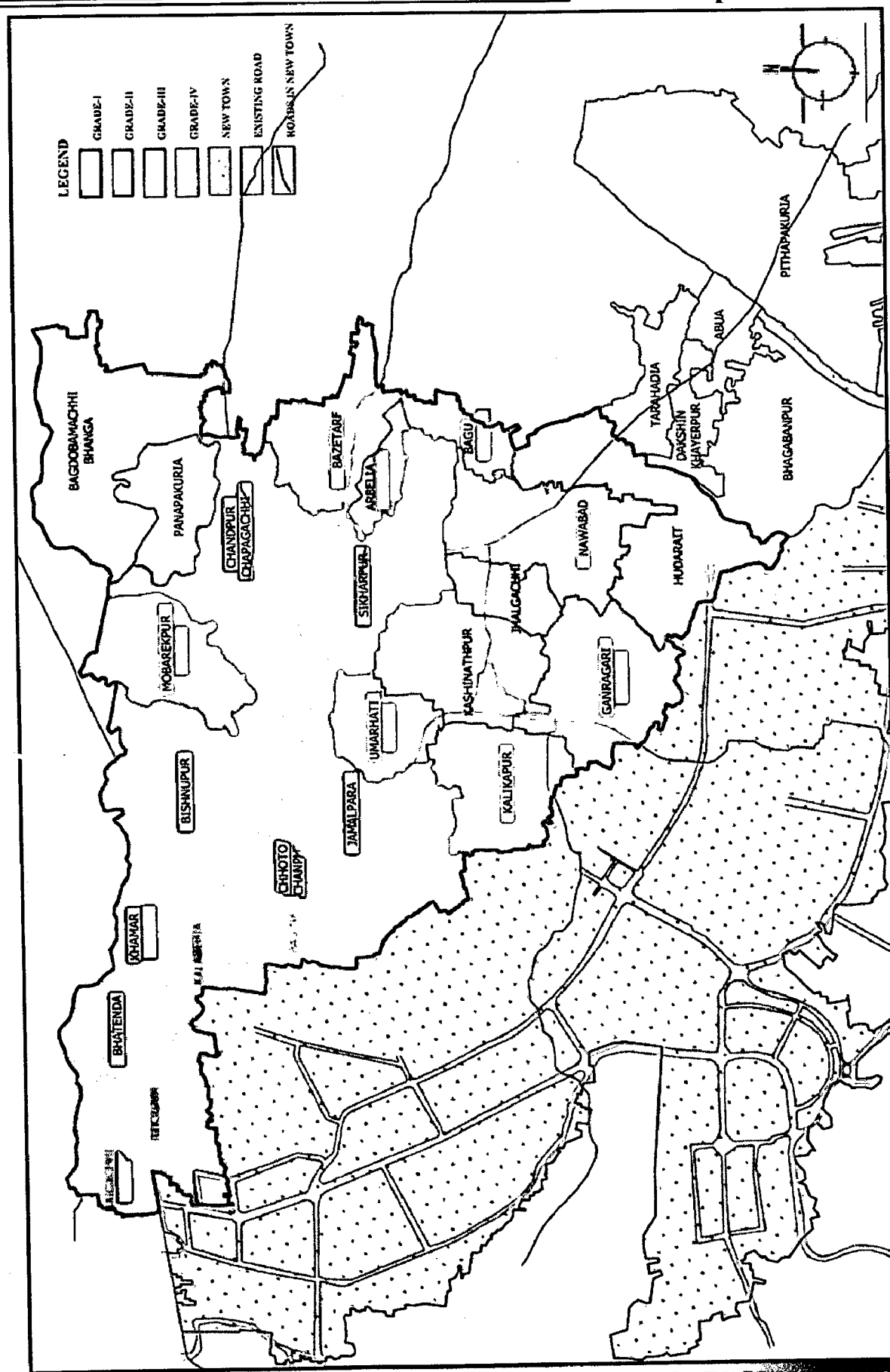
Table. 8.3. Sc

Grade II Grade III Grade IV

VILLAGES	DEMOGRAPHY		LANDUSE & LAND FORM			SOCIO-ECONOMIC FACTORS			PHYSICAL INFRASTRUCTURE					SOCIAL INFRASTRUCTURE				IMPACT OF NEW TOWN		Total Score
												Accessibility								
	Population Density	Decadal Growth	Altitude	Vacant land	Settlement	Work force participation rate	% of main workers to total population	% of literate to total population	Electricity	Sewerage	Water supply	Nearness to main road	Availability of mode of transport	Nearness to market	Nearness to educational facility	Nearness to health facility	Nearness to other facilities	Land speculation	Land Value	
	(5)	(5)	(7)	(5)	(7)	(5)	(7)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(5)	(4)	(5)	(5)	(100)
Raigacchi	5	4	7	3	7	1	7	1	5	5	5	5	5	5	5	3	4	0	5	**82**
Rekjauni	5	3	7	1	7	1	7	5	5	5	5	5	5	0	5	5	4	0	5	**89**
Bhatenda	5	4	7	1	7	5	7	5	5	5	5	5	5	5	5	3	4	0	5	**88**
Khamar	3	5	7	1	7	5	7	1	3	3	3	4	3	3	5	3	4	0	3	70
Kalaberia	5	4	7	3	7	5	7	5	5	5	5	5	5	0	5	3	4	0	3	**83**
Basina	5	4	5	3	5	1	7	1	3	3	3	5	3	3	3	0	4	0	2	60
Ganragari	1	1	1	5	3	5	7	3	1	1	1	5	3	0	1	0	3	3	5	49
Jhalgachhi	5	1	7	5	5	1	7	1	1	1	1	4	3	0	1	0	0	0	2	45
Kashinathpur	3	1	5	5	3	5	3	1	1	1	1	5	3	0	1	0	0	5	1	44
Kalikapur	3	1	1	5	3	5	1	3	1	1	1	4	3	2	1	0	0	5	5	45
Umarhati	1	3	5	5	5	1	1	1	1	1	1	5	3	0	1	0	0	0	1	35
Jamalpara	3	3	5	3	3	1	5	3	3	3	3	5	3	0	3	0	4	3	3	56
Choto Chanpur	3	5	5	3	3	5	7	5	3	3	3	5	3	0	5	0	4	1	5	68
Bishnupur	5	4	7	3	5	5	5	1	5	5	5	5	5	0	5	1	4	1	5	**76**
Mobarekpur	5	1	7	3	7	1	5	5	1	1	1	4	3	5	1	0	4	0	0	54
Bagdobamachhi Bhanga	3	1	5	3	5	1	5	3	0	0	0	4	3	0	1	0	0	0	0	34
Panapukuria	3	3	5	5	5	1	5	1	0	0	0	4	1	0	1	0	0	0	0	34
Chandapur Chapagachhi	5	3	5	3	5	1	7	1	3	3	3	5	3	0	5	1	4	0	0	55
Sikharpur	3	3	7	3	3	1	7	5	3	3	3	5	3	0	5	5	3	0	2	64
Bazetaraf	5	1	1	5	3	5	7	5	1	1	1	5	3	3	3	3	0	0	1	53
Arbelia	3	3	1	5	5	5	7	5	1	1	1	5	3	0	1	5	0	0	0	51
Bagu	3	5	1	5	3	1	1	5	1	1	1	4	1	0	5	1	0	0	0	38
Nawabad	3	1	7	5	3	5	5	3	1	1	1	5	3	0	1	0	0	0	0	44
Hudrait	1	3	5	5	1	1	5	1	0	0	0	4	1	0	1	0	0	0	0	28

Table. 8.3. Scoring of villages

Grade I | Grade II | Grade III | Grade IV

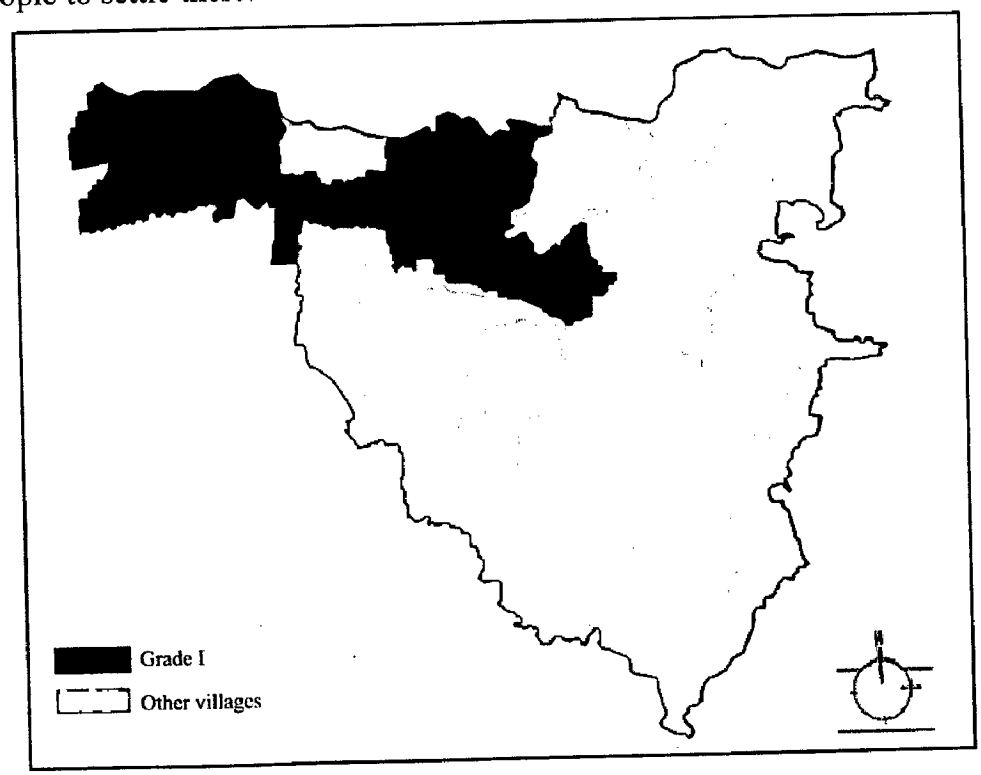


Map. 7.4. Villages according to their Grades

8.2.1. GRADE I VILLAGES

The 5 villages which are in **Grade-I** are having good connectivity, infrastructure, and some other basic facilities. Population density, decadal growth are high; so as in land-use, percentage of settlement is also high in the Grade-I villages. Altitude, physical and social infrastructure are better in these villages. The land values of these areas are the highest in the region. The socio-economic factors are favourable in this region and the amount of vacant land available is the least. This is mostly due to the fact that most of the area is already developed.

These villages mainly lie in the northern and north-western part of the study area, adjacent to the Action Area II of the New Town. After the analysis of the comparative weightages of the different indicators of these villages, it is seen that although all the facilities are there, land speculation is comparatively low in these areas. This may be because the land availability is less Adaption of urbanisation is highest in these villages and they can develop as potential growth centre for the surrounding area. Its tendency will be to grow as residential belt along with some commercial activities, as some part of it is performing as the nucleus of the area, attracting people to settle there.

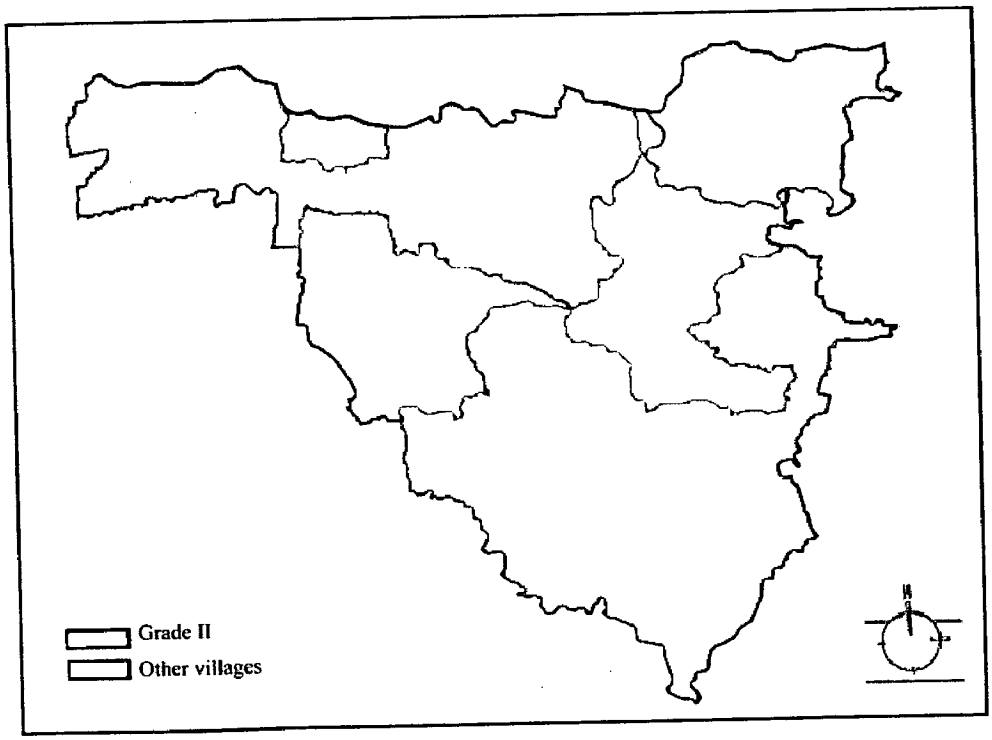


Map. 7.5. Location of the Grade I villages

8.2.2. GRADE II VILLAGES

Grade-II villages are in above average category. 6 villages lie in this grade. These villages are located along the Grade-I villages, and even one village (Khamar) is surrounded by Grade I villages. Therefore, these villages are also experiencing faster rate of development in influence of the Grade-I villages.

These villages are facing the same kind of situation like Grade I villages, due to the influence of urbanization. These are mainly located on the eastern and south-western zone of the region adjacent to the Action Area II and I of the New Town. Here the speculation factor higher than the previous. This factor is high due to of some villages are very much near to the New Town's development, with this availability of land with lower prices. Available mode of transport is averagely good in comparison with the others, the area lags in some basic social and physical infrastructure facilities. Problems of physical infrastructure is everywhere in this area, but looking at the natural drainage and altitude of land, this zone is in average category. And presence of greenery is high with some less dense areas.

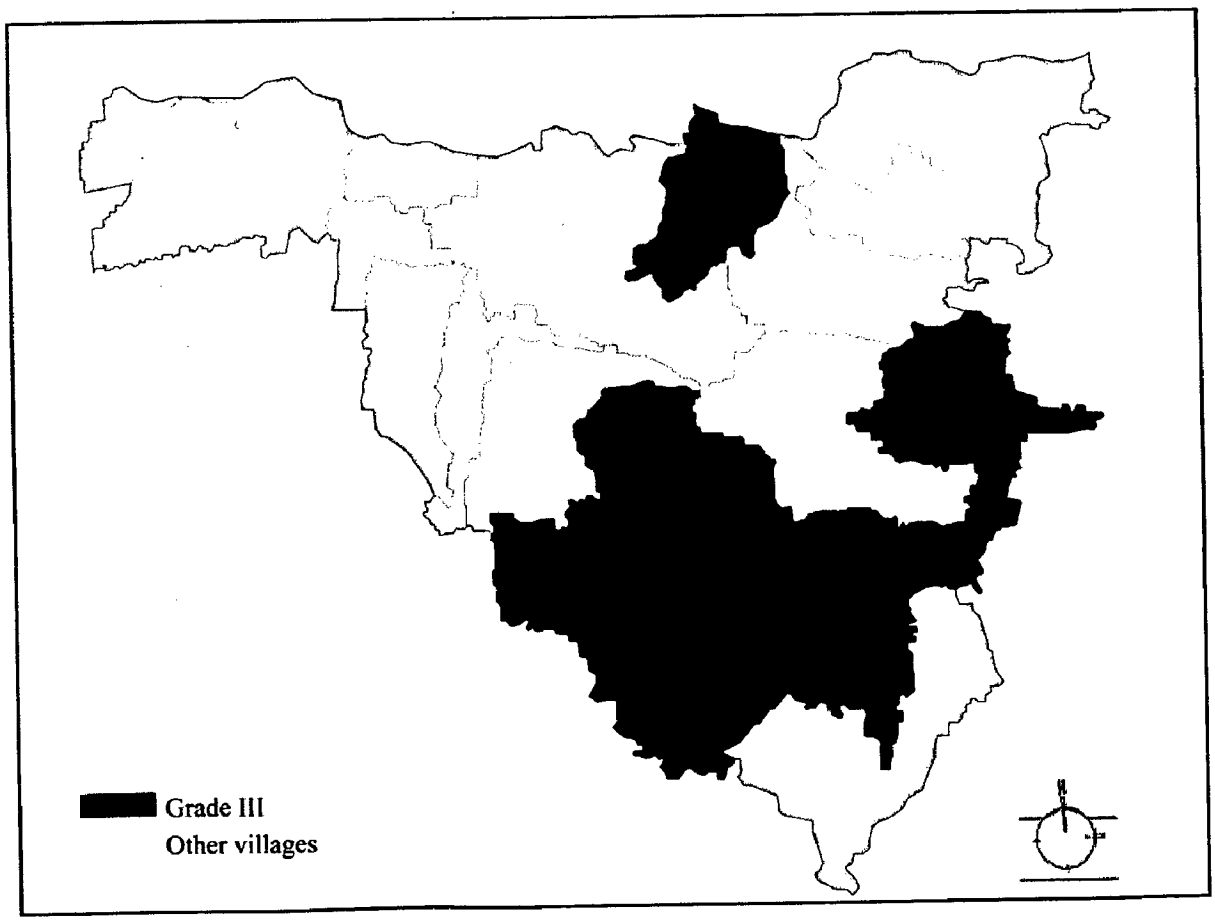


Map. 7.6. Location of the Grade II villages

8.2.3. GRADE III VILLAGES

The 10 villages in **Grade-III** are in below average category. The villages belonging to the **Grade-III** are mostly located in the southern part. Some of the villages are much more nearer to the Action Area I, so the speculation for land is much higher in comparison to other indicators. The land values are much lower because of the lack of infrastructure through out all the villages belonging to this category. The land form is good here, altitude of land is above average level, and vegetation is also high in this zone. A good amount of vacant land lies in these villages.

This area may develop in influence of New Town and can act as the extended part of the CBD of Action Area I of New Town. As the percentage of settlement is low here and large chunk ofland is available for development, newer development from western side may flourish here, if some improvement on connectivity and social infrastructure are done.

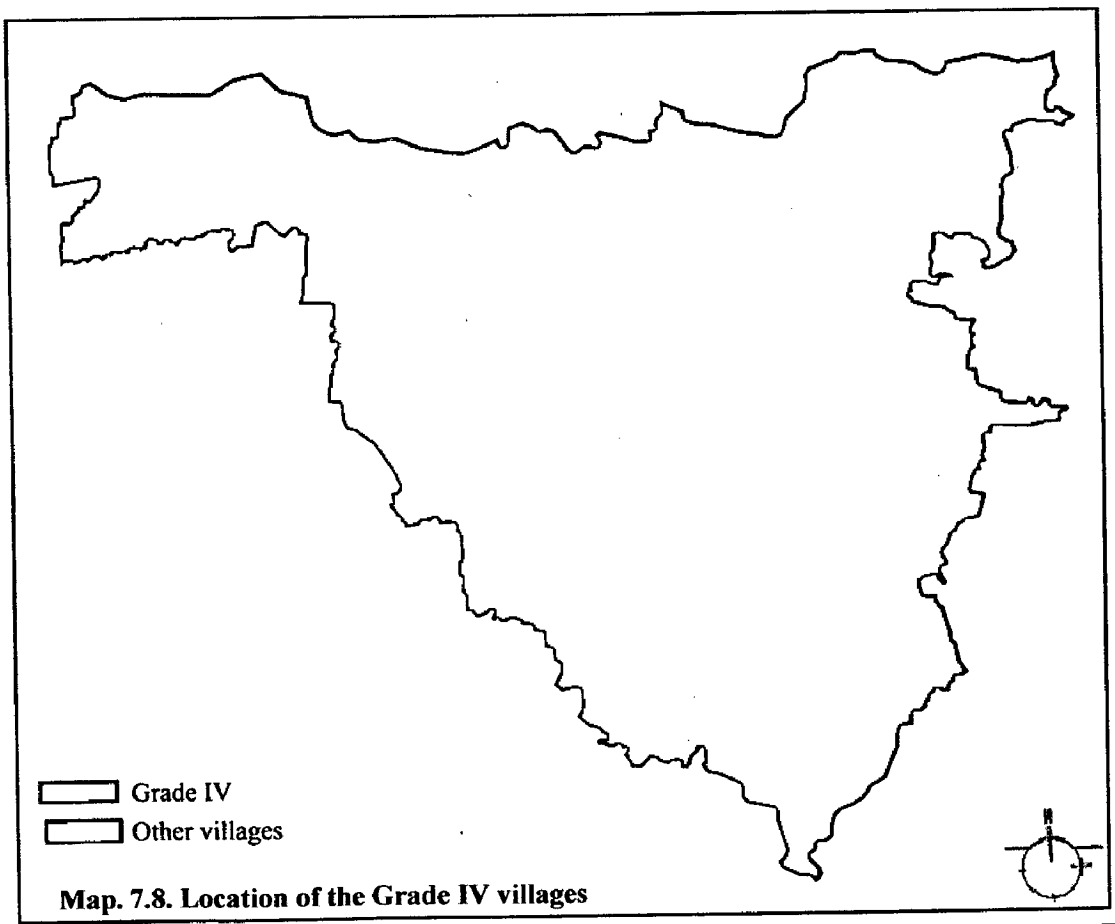


Map. 7.7. Location of the Grade III villages

8.2.4. GRADE IV VILLAGES

The 3 villages in the **Grade-IV** category are those villages which are in bad condition, in terms of all the indicators taken. These villages are located in the southern most end and north-eastern end of the region. These areas are the most interior portions of Rajarhat and are farthest from the New Town, leading to urbanisation being least in these villages. Inadequate physical and social infrastructure and socio-economic facilities, along with poor landform are the reasons behind its present condition. Beside, these areas are low lying, arising the problem of water logging. This leads to extra cost of land filling for any type of development.

More on that, accessibility is also in below average situation. So development is not much prevalent here and can be done in some later stage in this area. These villages have least credibility to develop as urban areas in a few days. Lower density, lack of social and physical infrastructure will not attract people to settle down there. So, these villages will retain its rural characteristics, at least for a while.



Map. 7.8. Location of the Grade IV villages

ISSUES

9.1. GENERAL ISSUES

The fringe is not just a place where the town meets the country, but it is a collection of dynamic and productive environment meeting today's needs and paving the way to future. So the rural urban fringe should be visualised as an aesthetically pleasing, easily accessible, diverse and multi-functional entity, serving both the rural and urban population and contributing towards sustainable development of the region. To modify the development of the study area to be a planned development, some strategies are to be formulated.

Some of the common questions that frequently come to our mind are - Who will monitor the whole process and how; How will the owner and the developer get benefit in this total process; How those villages will be developed etc. To resolve this quarries some recommendation and strategies are prepared, keeping some parity with the influence area New Town.

9.2. DEVELOPMENT OBJECTIVES

The development objectives have prepared taking care of the development objectives of the New Town, so that this new area will have some similarity with its influence area. The development objectives for the study area are as follows:

9.2.1. Environment and ecology

- To facilitate investors for setting up of non-polluting, inoffensive and nonhazardous industries in some selected part of the area.
- To provide an environment-friendly and aesthetically attractive urban settlement functionally integrated with the future metropolitan structure.
- To preserve the prime agricultural lands.

- To protect rivers, ground water and potable water quality.
- Preserve and protect watersheds.

9.2.2. Overall growth

- To control and protect the newly grown unplanned existing settlement areas from flooding and drainage congestion by creating new drainage channels and utilizing the large water bodies, reservoirs and lakes, existing within the project area.
- To promote economic growth.
- Manage impacts from residential, commercial and industrial growth.
- Facilitate governmental coordination
- Formulate services and facilities for both rural and urban development.
- Promote agriculture and allied industries.
- Overall health and welfare of individuals residing.
- Reduce middlemen and commercial leakages.
- Identification of growth centers for overall economic growth of the region.
- To update the area in terms of required infrastructure facilities for sustaining residential and business activities.
- Promote planned residential growth in the areas where services can be easily and efficiently installed.

9.2.3. Community facilities

- To provide new areas for setting up regional level centres of community facilities.
- Proposals for streets, storm water drainages, utilities, fire services etc.
- Provide and maintain transportation corridors in and around the region.
- Minimize conflicts between agricultural and non-agricultural population.

9.3. PROJECTED POPULATION & DENSITY

The projected population density is taken 240pph (same as BRADA) which is slightly lower than the New Town (264 pph). So the projected population will be about 7,60,000.

The issues are identified based on the outcome of analysis of both primary and secondary data.

9.4. LANDUSE

➢ **Decrease in agricultural land**

Agricultural land is fast decreasing in the fringe areas of New Town. Farmers are getting more price for the land compared to their income from agriculture, leading to the preference of selling their lands to private developers. The private developers, on the other hand, hold the land till they get desired price. Development of industries and commercial working opportunities in New Town has a great effect on the occupational structure of the fringe villages and there is a sharp shift from primary to secondary occupation.

➢ **Unauthorized construction on agricultural land**

The Rajarhat area is outside the KMDA limit, so there is no regulation for land development in this area. People constructing their houses and other buildings in this area without any permission and pay some fine after a long period of time. No bylaws are applicable in these lands as they lie beyond the municipal limits and the Panchayats do not have any separate bylaws. As no zoning is done beforehand, haphazard development takes place in the fringe areas.

➢ **Shape of land**

Land is subdivided into any shape and size. Very often it is in the shape of thin strips of land which is neither fit for agriculture nor for residential use. These subdivisions are generally done without any considerations of its serviceability.

➢ **Increase in land value**

The increase in land values in the adjoining New Town area encourages urbanization in the fringe areas. This leads to further subdivision of the plots as a result of people's desire to demarcate their property.

9.5. INFRASTRUCTURE

The condition of infrastructure in the fringes of New Town are in a very bad condition as we found in the analysis in the previous chapters. The existing infrastructure is barely enough to support the load of the rural population.

The increase of population and urban facilities increase the pressure on the rural body both financially and physically. The major problems can be categorized as:

- **Drinking water supply:** Water supply is not being provided by the city authorities. So the people of the study area fulfill their requirements from ground water through wells and tube wells.

- **Garbage disposal:** The solid wastes are not managed by any authority and mostly handled at private level and dumped in vacant plots and occasionally burnt.

- **Sewage disposal:** The storm water is drained through natural slopes, mostly over the streets which are often flooded due to absence of drains.

- **Poor condition of toilets:** The toilets in the households of the fringe areas are constructed without any expert supervision and people build their own individual septic tanks and soak pits. There is a high risk of the ground water contamination. Cleaning of these pits after construction, is rarely done and in most cases a new pit is dug when the old one starts overflowing.

- **Deficiency of electricity:** electric poles are present in all the villages of Rajarhat block but availability is between 4-8 hours daily.

9.6. INSTITUTIONAL SET UP

Issues related to institutional set up and legal aspects in the fringes of New Town are:

- Inclusion of villages in the KMDA limit increase the area under jurisdiction but the members of the governing body is not increased.
- Weak or no control over illegal constructions in the fringes.
- No rules, regulations or bylaws of any sort is framed till date for the fringe areas.
- There is no act in cases of violations whatsoever.

Chapter 10

STRATEGIES

10.1. OBJECTIVES FOR FORMULATING STRATEGIES

➢ **Preservation of rural character of the fringe**

Atleast some areas of the growing fringe has to be preserved as agricultural and green areas as they were before.

➢ **Control of development activities**

Haphazard and uncoordinated growth along with exploitation of land resource in the fringes are to be checked. This will prevent degradation of built environment and fairly distribute the development cost between the agencies and people.

➢ **Growth of the fringe**

Planned development with appropriate location of infrastructure facilities and services to give a positive direction and stimulation to the growth of the area.

10.2. PLANNING STRATEGIES

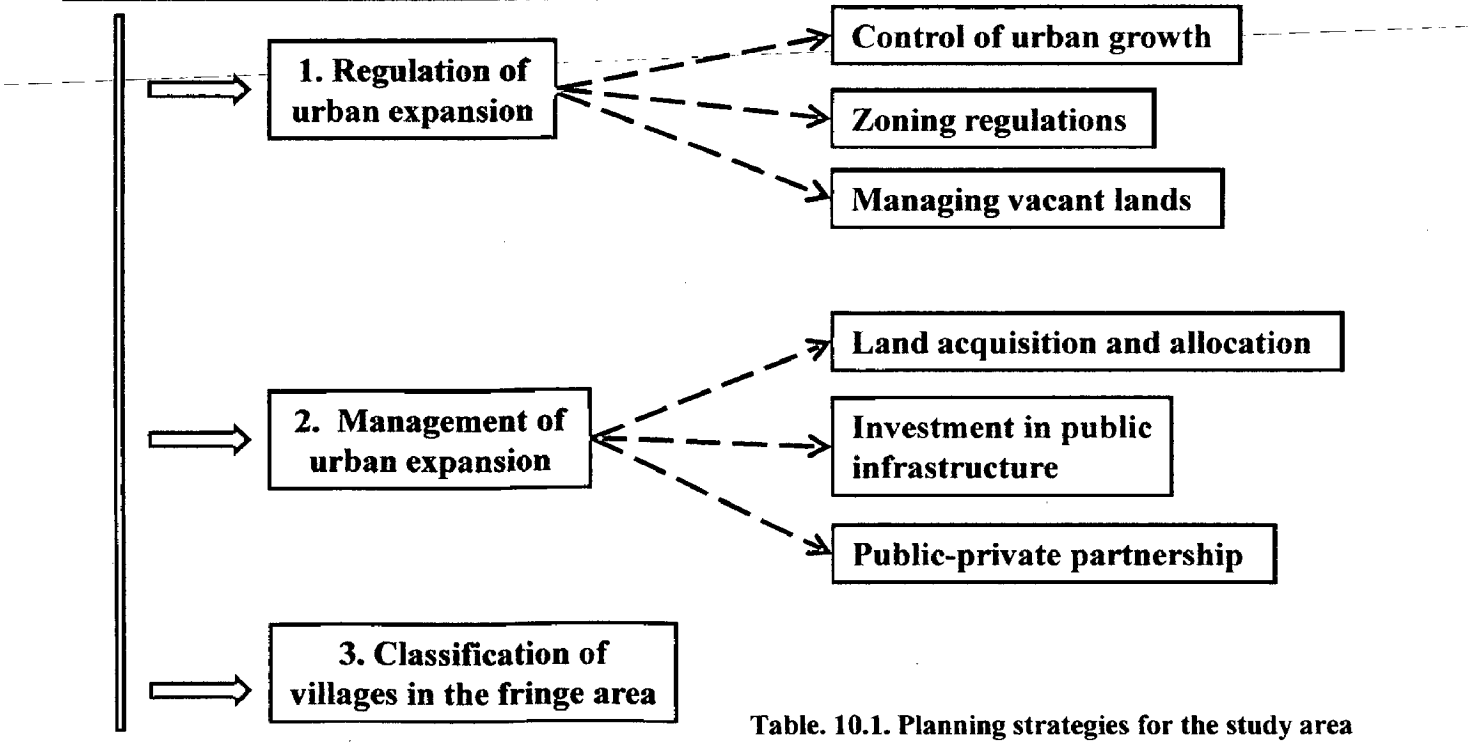


Table. 10.1. Planning strategies for the study area

10.3. STRATEGY I - REGULATION OF URBAN EXPANSION

10.3.1. Control of urban growth

- Green belts to be implemented to prevent the conversion of rural land to urban ones in the fringe areas of New Town.
- Issue of building permits.
- Not leasing public land for urban development.
- Increasing the infrastructure cost for private builders.
- Prohibiting developments that will further congest the existing road network and create more pollution.
- Restricting the powers of the municipalities to extend city limits and infrastructure networks.
- Increasing the risk of litigation to residential developers by environmental groups.

10.3.2. Zoning regulations

- Identification of lands on which no development is allowed.
- Prescribing the type of urban use that may be allowed.
- Restricting lands for single type of use - residential, commercial or industrial, thus preventing multiple use of a single piece of land.
- Limitations of building density, FAR and building height restrictions.

10.3.3. Managing vacant lands

Patchy developments are found to occur on the outskirts of the community and numerous overlooked vacant parcels of land. One of the most strategic ways to limit this is to identify and utilize existing vacant plots with full services.

Establishing an catalogue of vacant land with information on allowable uses, ownership and public facilities can be instrumental in efforts to prohibit patchy developments.

10.4. STRATEGY II - MANAGEMENT OF URBAN EXPANSION

10.4.1. Land acquisition and allocation

Land can be acquired by government and its development can be regulated by them. Afterwards, land can be subdivided and infrastructure can be provided, and then sold to private developers.

10.4.2. Investment in public infrastructure

Kolkata is a fast growing metropolitan and is facing problems related to increase in population density and required housing. Public investments in infrastructure can be enabled of guidance in urban infrastructure. Inter city roads, constructed to connect one city to another result in enabling developments along their routes. Similar is the case of rail-routes and railway stations that attracts development around it.

10.4.3. Public-private partnership

Public-private partnership can be used as a tool for readjustment of land, involving collaboration between the government authorities and the land owner in the fringe areas. Both the parties can come to the agreement that the land owners will give away their land to the government and get back a smaller plot, leaving adequate land for urban infrastructure.

The study area is one of the most suitable sites for residential development and it will be most advantageous to develop residential townships with its own infrastructural facilities rather than scattered small scale developments. Private townships can be permitted for threshold population and a certain size of land so that infrastructure facilities can be provided.

Some land can be sold to pay for the construction of urban infrastructure and public facilities and utilities. Land owners will agree to this scheme as the smaller plots that they get back from the authorities are in a fully serviced urban neighbourhood that can fetch much higher prices than the original larger plots that they owned.

10.5. STRATEGY III - CLASSIFICATION OF VILLAGES IN THE FRINGE AREA

The villages in the fringe area are in different stages of development. These villages are to be classified into different categories depending on the influence of the urban areas and policies should be formulated based on their analysis. The 24 villages are divided with different landuse classes for urban fringes for further development:

- Rural conservation area
- Rural-urban transition area and
- Urban service area

10.5.1. RURAL CONSERVATION AREA

This area is intended to be rural and agricultural in nature throughout the time of the proposal. These will be protected from any kind of urban intrusion and the rural character will be preserved.

- **Landuse**: Intended for agricultural and very low density of residential development, related to farming and allied activities preserving the actual rural nature. Adequate road access and drinkable drinking water supply has to be there. The rural conservation area must be designed to avoid interference to agricultural activities by urban characters.

- **Transportation:** The rural conservation area will have the existing country road system with gravel and hard-surfaced roads. Paved roads and addition of new roads are not generally proposed by the concerned Government agencies until there is an increase in traffic flow.
- Street system shall protect the character of the existing areas and new roads have to be proposed as an on-going process with time. It should be flexible , open to public participation and having a long-term focus.

- **Wastewater management:** There is no immediate need for a centralized wastewater management system as there will be limited growth in these areas. Wastewater generated by agricultural and limited commercial, industrial activities can be treated with on-site systems.

➢ **Public facilities**: Public services will be cost-effective, efficient and according to the increase of population density. This will be definitely be less in comparison to the urban areas.

➢ **Agriculture and Farm Service:** Farming and agricultural production is the predominant characteristic of the Agriculture and Farm Service areas. The designation comprises of 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.

10.5.2. URBAN-RURAL TRANSITION AREA

This area will be planned to accommodate rural development and is capable of adapting to urban standards at a later stage and can be accommodated within the municipal jurisdiction. This area is a critical transition area between rural and urban areas and is not expected to be developed under any municipal jurisdiction during the life of the plan. But due to its proximity to city limits, these areas can be carefully developed to be compatible to city standards for a later stage.

The urban-rural transition area, if developed carefully can contribute to the needs of the growing city and also meeting the market demand of large residential lands in better environmental settings. A certain percentage of land in this area can be identified for future industrial and commercial growth.

1. **Landuse**: In the rural-urban transition area, residential areas are typical of rural areas in some cases, where density is low and low-rised. While in other cases where city is likely to be expanded in near future , residential density is more typical of urban areas. Urban infrastructure can be applied to certain critical areas while other areas are subject to a minimum urban standards for smoothening of potential inclusion into urban limits.

2. **Wastewater:** The provision for wastewater management has to be handled carefully in this area ensuring that needs of all communities area met without unnecessary expenditure on urban-type services in areas where urban expansion is not expected in near future. Installation of dry sewer and water services can be installed to ensure the environmental soundness and health of on-site wastewater treatments.

3. **Transportation:** The existing rural road system with gravel and hard-surfaced roads will continue to be used in the rural-urban transition area. Addition to the roads by developers will continue to improve the standards. The location of new facilities should be compatible to the city street network and transportation plans. The transportation system of the rural-urban transition area should be flexible , open to public participation and having a long-term focus.

4. **Public facilities**: Public facilities in rural-urban transition area will not be at par with that in urban areas. Service and facilities will increase with the increase in population density and new services will be built as the area develops, making the services cost-effective and efficient.

5. **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. Resulting in non-requirement of full urban infrastructure standards. But infrastructure provided should meet the village standards. Clustering of residential land shall be encouraged to limit the costs associated with infrastructure improvements and the distribution of public services.

   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. These land uses shall make provisions to protect environmental resources or environmentally-sensitive areas. Storm water run-off, soil erosion, and wastewater discharge must be managed.

6. **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.

7. **Gateway Protection:** Entries into the City are extremely important to the community as they 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.

8. **Highway-Oriented Commercial:** This applies to commercial land uses along arterial corridors that are primarily designed to accommodate automobiles 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.

9. **Transportation Corridor Protection Area:** Major transportation corridors provides 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.

10. **Industrial Reserve:** Industrial Reserve areas 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.

11. **Natural Resource:** Natural Resource areas are vital as they provide habitat for wildlife, minimize storm water run-off, stabilize soils, modify climatic effects, provide for visual attractiveness, and serve some recreational purposes and conserve natural resources. This also intends 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:

12. **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.

13. **Parks and Open Spaces** – Facilities, land, and structured programs for a variety of public recreational opportunities. Open Space refers to primarily undeveloped areas; such areas are typically maintained and managed as natural areas for passive recreational uses.

14. **Future Parks** -- General areas where future parks are anticipated.

15. **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.

10.5.3. URBAN SERVICE AREA

The urban service area lies next to the city and represents the land where the city may expand its municipal boundaries as development occurs. This area should be provided with the urban development standards of all types so that it can easily merge with the city during expansion occurring in future.

➢ **Balanced Growth:** Rural and city residents are affected by scattered development in the Urban Fringe. Development that occurs in a disorderly, unplanned pattern can create barriers for 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 and 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. It should not create a barrier to future infrastructure expansion and growth.

Such development should involve explicit development and may require the installation of "dry" sanitary and sewer systems —installing the necessary water and sewer infrastructure that will eventually connect to municipal services. There should be sufficient capacity to serve the

location with municipal infrastructure and services, including public safety services, water, sewer, and road maintenance. Reasonable availability of adequate municipal water and wastewater service will be extended to existing developed parcels.

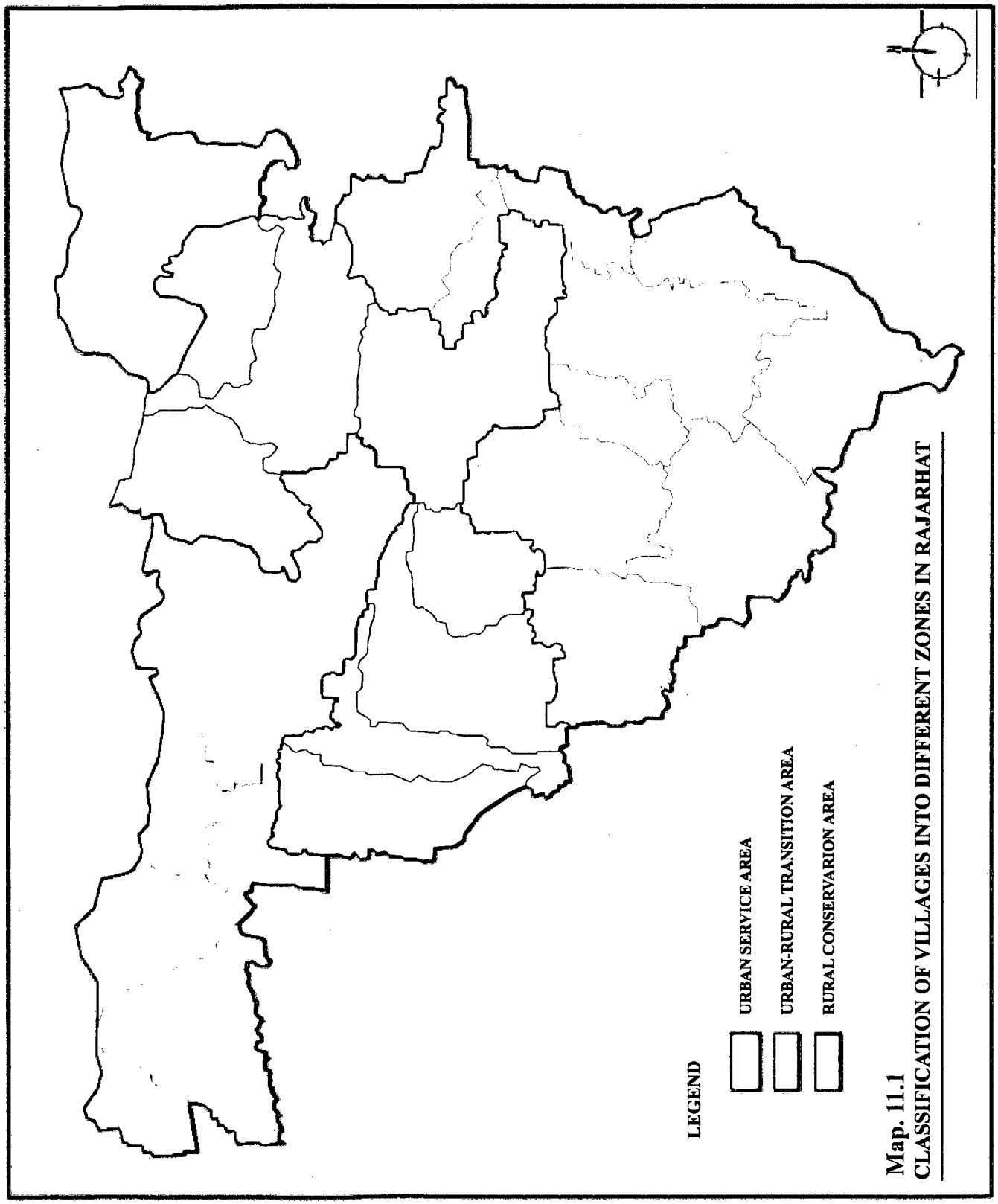
➢ **Rural Planning and Development Regulations:** Rural residential development may consume valuable farmland, generate public services demands usually exceeding revenues from the development, often interfere with normal farm practices, and increases pressure on the conversion of farmland. Designated 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.

➢ **Urban Residential:** This land use 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



Map. 11.1
CLASSIFICATION OF VILLAGES INTO DIFFERENT ZONES IN RAJARHAT

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 and urban infrastructure standards may be applied. Temporary common water distribution systems, like 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.

10.6. STRATEGY IV - CLASSIFICATION OF VILLAGES IN THE FRINGE AREA

As the area is arranged in four zones which are in varying condition in terms of the indicators, their development strategies may differ from zone to zone and even village to village.

10.6.1. Zone 1

The villages which are grouped in Grade-I during the analysis are considered in this zone. The scores tell that these villages are having the best connectivity, infrastructure, and other basic facilities in the whole region. Considering the comparative mean weightages of the different indicators of these villages, it is seen, all though all the facilities are available here, land speculation is comparatively low in these areas. The reason behind this may be that the availability of vacant land is less and also that it is located near the Action Area II of New Town.

The area has potential to develop as growth centre for the region. Its tendency will be to grow as residential belt along with some commercial activities, as some part of it is already performing as the nucleus of the area attracting people to settle here.

Density of population is the highest in these zone which is, in turn asking for a better infrastructure facility. So the first work of the planning body is to take care of the infrastructure along with upgradation of the existing condition of the localities which already have some good number of houses.

10.6.2. Zone 2

The villages that are categorized in Grade II during analysis stage are the villages of Zone 2. As stated before, these areas are mostly located around Zone 1. Therefore, these villages are going face the same kind of situation like Zone 1, due to the influence of urbanization and are needed to taken care of almost along with the previously stated zone. These villages have the next level of infrastructure and other facilities after the villages of Zone 1.

Availability of vacant plots are low here also but the speculation factor higher compared to the previous. This factor is high due to of some villages are very much near to the New Town's development, with this availability of land with lower prices. Available mode of transport is not so bad in comparison with the others. Problems of physical infrastructure is everywhere in this area, but looking at the natural drainage and altitude of land, this zone is in average category. Presence of greenery is high with some less dense areas.

10.6.3. Zone 3

These are the Grade-III villages which mostly belongs to the southern part of Rajarhat. Some of the villages are very near to the Action Area I. Availability of vacant land is high in this zone and so the speculation for land is much higher in comparison to other indicators. The land values are much lower because of the lack of infrastructure. Land form is good here with the altitude of land is above average level, and vegetation is also high in this zone.

So this area can be develop in influence of New Town and can act as the extended part of the CBD of Action Area I of New Town. As the percentage of settlement is low here and large chunk of land is available for development, new development from western side may flourish here, if some improvement on connectivity and social infrastructure are done.

10.6.4. Zone 4

The villages belonging in the Grade IV category during analysis belong to this zone and their scores suggest that they are in the worst condition among all the villages of Rajarhat. This zone is very much in poor condition due to inadequate infrastructure facilities. Beside that, these areas are low lying; and therefore the problems of water logging results in extra cost of land filling for any development. Apart from this, accessibility is also in below average situation and development is not much prevalent here.

Rural character is most prevalent in this zone and development can be done in this area in some later stage. Proposing of the planning authority for the fringes of New Town will help this area to develop it in a planned manner. The planning authority can facilitate the developer as well as can help the owner to get a better value of their land.

Chapter 11

RECOMMENDATIONS AND PROPOSALS

The fringes of New Town, Kolkata has been thoroughly studied and the various options have been analyzed after assessing all the viable options, it is found that urbanization is bound to take place. Provision of green belts around the city and strict development regulations will restrict the growth only in certain areas and for a definite time period.

Keeping in mind, the ground realities and the existing conditions of the Rajarhat block, the problems of haphazard development along with illegal and unauthorized constructions, the following proposals are chalked out:

11.1. Form of the city development

➢ Growth of Polycentric city is proposed rather than linear city as in the later case distance from the parent city increases for every service and management. In linear development, distance keeps increasing from the parent city, increasing the journey trips. So in this case the distribution, management and maintenance of services become difficult. Polycentric and multi nodal growth, on the other hand supports development of the city core. Distribution, management and maintenance of services becomes easy and convenient in this case.

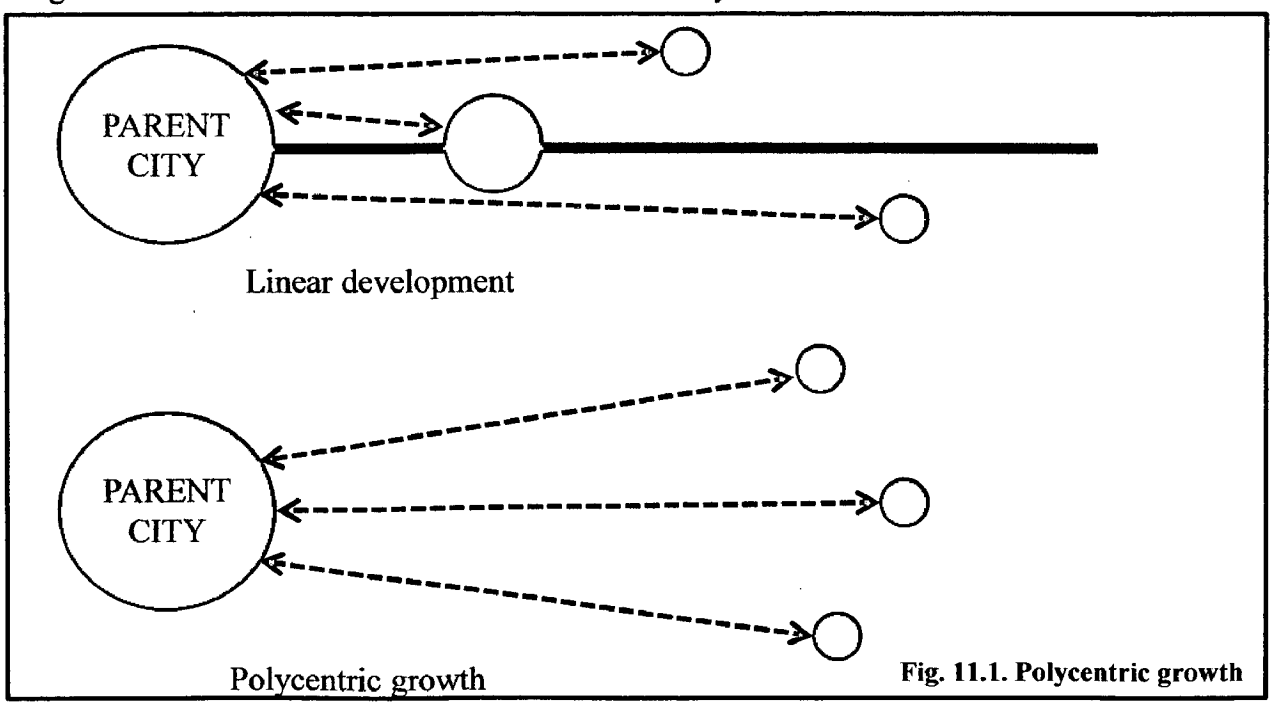


Fig. 11.1. Polycentric growth

➢ Multi-node development is proposed as this will lead to compact development as the distances from the parent city remains almost same from every point of the study area and thus the journey time is minimum.

➢ Considering the existing and future requirements of rural settlements in the fringes areas should be provided with a continuous belt of land around.

➢ The fringe area is proposed to be integrated with the metropolis in near future during the expansion of the boundaries of Kolkata.

11.2. Development of smaller towns

➢ Development of satellite cities is proposed as a solution for over crowded urban centre.

➢ All the satellite towns should be connected to each other by direct transportation systems with the core city and when possible, among themselves.

➢ Some areas of the study area can be densified with as much development as possible.

➢ Necklace developments is proposed with concentrating developments in the existing villages and market towns beyond the green belt.

➢ New towns are proposed in some locations.

11.3. Environmental consideration

➢Viable alternatives for people to enjoy environmentally enriched communities with proximity to an active centre, protecting the natural resources.

➢ Developments are proposed in selected locations in the green belt which are of less scenic value and not available for public use.

➢ The ecological balance of the fringes should not be disturbed.

11.4. Landuse policies

➢ Fusion of urban and rural features in the transition area with planning will conserve both interests. Land has to be used judiciously and keeping in mind the long-term benefits.

➢ The Master Plan of Kolkata should detail out the fringe zone with development rules and controls and the fringes are proposed as an integral part of the main metropolitan city area.

➢ Landuse policies are to be mixed for the best outcome.

➢ Maximization of the potentials of the sites in all the villages are proposed.

➢ Integration of all the governing bodies without any misunderstanding to plan for a comprehensive plan for the fringes is to be detailed out.

11.5. Type of housing

➢ Private housing schemes are to be allowed with on site infrastructural facilities.

➢ Promotion of high quality of life with respect to local context, history, built heritage, character and communities residing in the fringes.

➢ High rise structures are proposed in some areas for fitting more people per unit area.

➢ Attractive housing and business facilities are proposed in these fringe areas with reuse old and partly abandoned areas. This can be planned to take the advantage of the investments already done in the existing infrastructure facilities and other public services.

➢ Housing for EWS and LIG population are to be proposed so that slums and squatter settlements do not rise in the fringes of New Town.

11.6. Identification of growth centers

➢ In order to shift the pressure from the core areas of Kolkata and New Town, some growth points are identified which can act as nodes for future development of the entire region.

➢ Activity centers are proposed as a focus for high quality development, activity and better living for the rural and urban community.

➢ A portion of the new housing is proposed near the activity centers and other strategic points with good access to service and transportation facilities.

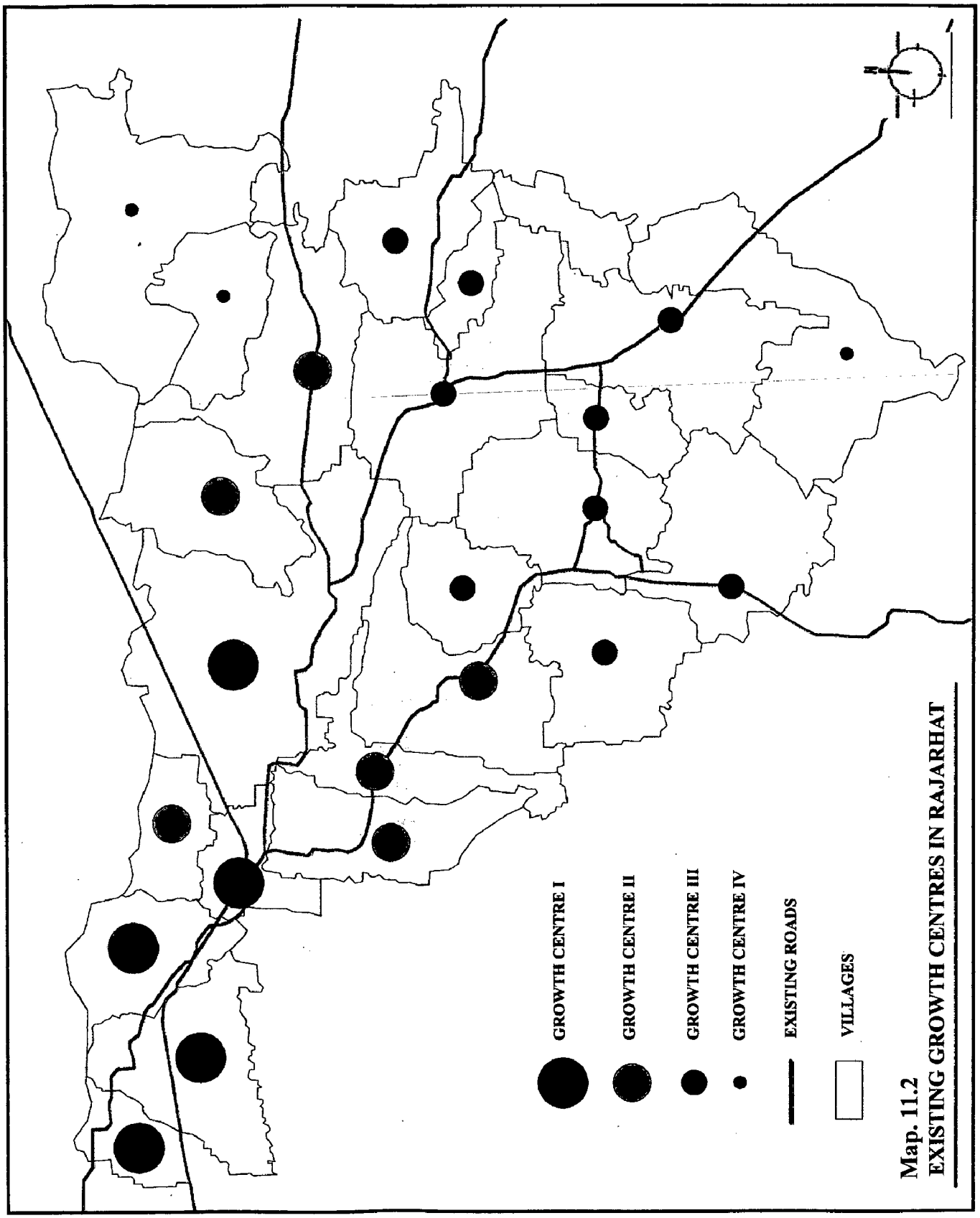
➢ Creation of high density nodes and sub-centers are proposed which will concentrate traffic flows sufficiently and will encourage public transport provision.

➢ Decentralization of the existing CBD to take off pressure from Kolkata is proposed.

11.7. Regional transportation system

➢ Developing the transport corridor of Rajarhat highway as the spine of growth is proposed as all the major developments are taking place near it.

➢ Developments are proposed in the areas within easy access of public transport corridor.



Map. 11.2
EXISTING GROWTH CENTRES IN RAJARHAT

High density development is proposed along the public transportation corridors.

11.8. Unauthorized constructions

➢ All the unauthorized constructions that has already taken place has to be regularized and registered.

➢ Compensation and fines are to be imposed.

11.9. Infrastructure provisions

➢ Provision of services is to be proposed for more than the target population.

➢ Upgradation of available infrastructure in the fringes including road network, water supply, sanitation so as to promote better quality of life in the rural zone and to minimize out migration and reduce the pressure on Kolkata.

➢ Certain infrastructures are proposed underground.

11.10. Separate Planning Authority for fringe areas

Due to the increasing pace of urbanization and infrastructure requirements in the urban fringe areas and to manage the overlap of the functions of various systems of the Panchayat, Municipalities and other development agencies, creation of a specialized urban development authority is necessary exclusively for the fringe areas. To prepare the development plan for the area and to execute that, a governing body is required. This body will have some responsibilities and power to be performed.

Within the urban fringe areas, Panchayat is the smallest unit with the same responsibility structure as that of municipal corporations. The 73rd and 74th constitutional 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.

11.10.1. Structure of the Planning Authority

➢ This planning authority will be set up under the West Bengal Town and Country Planning Act, 1974.

➢ Some members of this authority will be elected from the area itself and some of them will be appointed to this authority as executives.

11.10.2. Responsibilities of the Planning Authority

➢ To developed the area according the objectives.

➢ They have responsibility of preparing the proposed land-use for the area.

➢ This authority is solely responsible for developing the required infrastructure facilities and to maintain them till the area comes under any Urban Local Body. Same as WBHIDCO doing in New Town.

➢ This authority also has responsibility to prepare the building bylaws.

➢ To 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 fringe authority would have jurisdiction over all land that is not presently within an urban boundary but which falls within the accepted definition of the fringe 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.

11.10.3. Authority of the Planning Authority

➢ To implement the development guidelines and the land-use they will propose.

➢ Can do acquisition of land to develop the basic required infrastructure for the area. 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 KMDA

11.10.4. Development Strategies of the Planning Authority for overall Development

- This development will not be done by acquiring land from the farmers.
- But to develop the infrastructure facilities, authority can buy the selected plots to use it in development of basic infrastructure facilities.
- New infrastructure facility will increase the value of the land and then the farmers can sell that land to the developer in much higher price. So an economic gain is there for the original owner of the land.
- The private or the individual developer will have to buy the land directly from the original owner but to develop on that land, they have to follow the proposed land-use map.
- Therefore for any of these developments, the developers have to take approval from the planning authority, thus preventing the haphazard growth in the area.
- The planning authority is basically providing off site infrastructure facility in returns to this they can levy development charges (depending on the size and location of the plot) during the time of transaction and/or while asking for the permission of any development.
- A revised building tax system is required to develop the required fund for maintenance of the area.

11.11. 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, physical conditions (Landforms, climate, soils, land suitability)

11.12. 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.

11.13. Recommendations to be included in the byelaws

1. No construction is allowed within 5mt of the main road.
2. No tree is allowed to be cut without prior permission from the development authority and only after showing valid reasons.
3. No green area is allowed to be converted to any other area.
4. No direct access is allowed from the main roads to the plots.
5. Means of access has to be provided to every plot.
6. The landuse plan provided has to be strictly followed.
7. The height of the building is proportional to the access road as follows:

Width of means of access	Maximum permissible height
Upto 10 mts	1.5 x Width of means of access
Upto 20 mts	2 x Width of means of access
Above 20 mts to 40 mts	2.5 x Width of means of access

Table. 11.1. Permissible height of building

8. No objection certificate from the civil aviation authority has to be obtained for any building construction exceeding 15mts.
9. Lifts are to be provided in any structure of more than 4 floors.
10. Open spaces are to be provided in all the four sides of a building for habitation in a plot.

8. Minimum width and length of the internal roads to be provided are:

Minimum width of internal road	Maximum Length of internal roads closed at one end	Maximum Length of internal roads open to street at both ends
Residential	50 metres	100 metres
Institutional, Mercantile (retail) and Business (including IT & ITES)	100 metres	200 metres
Industrial, Mercantile (wholesale), Storage and Hazardous	150 metres	300 metres
Residential	No restriction	No restriction

Table. 11.2. Minimum width and length of the internal roads

9. Front of the building will be considered the side facing the means of access to the plot.
10. The minimum **front** open spaces to be provided are:

Type of building	Minimum front open space for building height	
	Upto 15 meters	Above 15 meters.
Residential	1.2 meters	15% of the building height or 3.5 meters whichever is more
Institutional, Mercantile (retail) and Business (including IT & ITES)	3 meters	25% of the building height
Industrial, Mercantile (wholesale), Storage and Hazardous	15% of the building height or 5meters whichever is more	

Table. 11.3. Front open paces to be provided

11. The minimum **rear** open spaces to be provided are:

Type of building	Minimum front open space for building height	
	Upto 15 meters	Above 15 meters.
Residential	25% of the building height or 2 meters whichever is more	25% of the building height or 4 meters whichever is more
Institutional, Mercantile (retail) and Business (including IT & ITES)	25% of the building height or 4 meters whichever is more	
Industrial, Mercantile (wholesale), Storage and Hazardous	25% of the building height or 5 meters whichever is more	

Table. 11.4. Rear open paces to be provided

12. The minimum **side** open spaces to be provided are:

Type of building	Minimum front open space for building height			
	Side 1 open space		Side 2 open space	
	Upto 15 meters	Above 15 meters	Upto 15 meters	Above 15 meters
Residential	1.2 meters	15% of the building height or 3.5 meters whichever is more	2.4 meters	15% of the building height or 3.5 meters whichever is more
Other buildings	15% of the building height or 3.5 meters whichever is more			

Table. 11.5. Side open paces to be provided

13. Permissible Floor Area Ratio and Ground Coverage for different buildings are:

Plot s Size (in sq.m and hect)	Residential and Institutional Buildings		Industrial, Storage, Mercantile (wholesale) and Hazardous buildings		Business and Mercantile (retail) buildings		IT and ITES buildings	
	Max. FAR	Max. ground coverage	Max. FAR	Max. ground coverage	Max. FAR	Max. ground coverage	Max. FAR	Max. ground coverage
Upto 1500	2.5	55%	1.5	40%	1.5	45%	2.5	45%
1500 to 4000	2.25	50%	1.5	40%	1.75	40%	2.5	40%
4000 to 2 Hect.	2.25	45%	1.5	40%	2.0	40%	2.5	40%
2-10 Hect	2	40%	1.5	40%	2.0	35%	2.0	40%
10 to 20 Hect.	1.75	35%	1.5	40%	2.0	35%	2.0	40%
Abov e 20 Hect.	1.5	35%	1.5	40%	2.0	35%	2.0	40%

Table. 11.6. FAR and Ground Coverage

14. Inter space between two buildings within a plot shall be 30% of the average height of the buildings subject to a minimum of 3.6 meters.

15. For corner plots of residential building of height upto 15 meters and plot size upto 1500

sq.mt, the mandatory open space for sides abutting roads shall be 1.2 meters.

16. The mandatory open space for other side shall be 2.4 meters and that for the rear side shallbe according to table 11.3.
17. Mixing of landuse shall be allowed in certain landuses and prior permission will be compulsory.

Type of buildings	Uses not permissible for mixing	Max extent of mixing (covg.)
Residential Building	Mercantile (Wholesale), Storage, Industrial.	10%
Educational Building	Business, IT business, Mercantile (Wholesale), Storage, Industrial	20%
Institutional Building	Assembly, Business, IT business, Mercantile	20%
Assembly Building	Educational, Institutional,Mercantile (Wholesale),Storage, Industrial,	20%
Business Building	Educational, Institutional,Mercantile (Wholesale),Storage, Industrial,	20%
Mercantile (Retail) Building	Educational, Institutional,Mercantile (Wholesale),Storage, Industrial,	20%
Mercantile(Wholesale)/ StorageBuilding	Residential, Educational,Institutional, Assembly,Mercantile (Retail),Industrial,	20%
Industrial Building	Residential, Educational,Institutional, Assembly,Mercantile (R),Mercantile (W),	20%
IT and ITES BusinessBuilding	Educational, Institutional,Mercantile (Wholesale),Storage, Industrial.	Principal Use/Occupancy

Note: No mixing of other uses is allowed with Hazardous building

Table. 11.7. Permissible mixing in landuse

18. For calculating ground coverage, all projection are to be included except chajja or weather shade and cornice.
19. Lift well, staircase well, lift machine room, covered area used for vehicle and generator room will not be included in covered space.
20. Dome, minarate, kiosk or any non-usable feature will not be included in covered space.
21. Rainwater harvesting shall be compulsory as there is no surface water source in the study area.
22. The main roads shall be metal roads. Internal roads shall be brick roads to reduce the heating of the surface.
23. Porous terracotta tiles shall be provided in the sidewalks along roads and pathways in plots and parks for active circulation of air.

The disorderly growth trends must be contained. The attack against disorder must be organized from the rear, that is, from the countryside to the city, from the periphery to the core. All uncommitted land on the periphery must be protected against the onslaught of urban sprawl. The existing predominantly built-up areas of the core should be surrounded by a planned periphery within which urban development would take place and which will in turn absorb development pressure within the core, thereby permitting redevelopment programs.

The planned periphery should emerge through extensive land consolidation in such a manner that the recognized plots are conducive to intensive agricultural practices. And at the same time it is in a framework compatible to an eventual urban sub-divisional pattern. In the new urban areas within the planned periphery, action could initially be limited to the reconstitution of the non-agricultural holdings into urban plots with clearly demarcated right-of-way of roads and drainage networks and reservation of sites for community facilities.

Jamalpara, a village of Grade II category is selected for detailed proposal. All the required infrastructure facilities are provided and the agricultural plots are left as it is. The green areas and water bodies within the proposal area are preserved. The layout has been made so that this village can grow as a growth centre and provide services to its surrounding villages. New roads and non-hazardous small-scale industries are introduced to strengthen the economic condition of the village and to provide employment to the villagers.

The three schools present in the village are preserved in their original positions. One medical facility is introduced. Stores of pesticide, fertilizer and agricultural implements and repair parts, hardware shops, general provision stores are introduced. Office for the village development officer is proposed in the central area.

Proposal for widening the 12mt road passing through Jamalpara to 18mt is given. The other roads proposed are

Collector roads - 12 mt. wide

Internal roads – 9 mt. wide and

Lanes – 6 mt. wide

The roads are with sidewalks for the pedestrians. Care has been taken so that the thorough vehicles do not have to cross the residential plots. The residential plots open to the 9 mt. wide internal roads which in turn connect to the 12 mt. wide collector roads. Bus stops are provided along the 18 mt. road.

Commercial areas including the retail and wholesale stores are provided on the sides of the 12 mt. roads and some community shopping areas are provided within the neighbourhoods also.

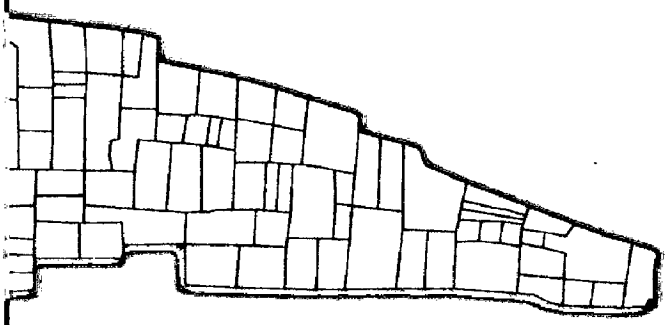
Waste recycle and biogas plants are introduced which can generate cooking gas and manure for the agricultural fields. Water tanks and electrical substations are provided. Individual boring and tube wells are not allowed and the villagers are provided with water supply from a common source. Sewerage treatment facilities are also provided within.

The small non-hazardous industries proposed are :

1. Flour mill
2. Handicrafts
3. Floriculture
4. Jute and coconut cottage industry
5. Pisciculture
6. Dairy farm etc.

Parks and play areas are proposed with abundant green areas in 5 places. One entertainment zone in proposed along the 18 mt. wide road. Two religious places and a community centre are proposed. The already developed big constructions are kept in their present locations.

An overall development with some specific zone oriented problem identification and resolving them is necessary, as this will help the planning authority to make their vision and planning objectives to turn in reality. Efficient land-use and land management, well developed infrastructure and their maintenance along with environment-friendly strategies will definitely turn Rajarhat into a better live-in destination free from all the ills of haphazard and random development acting as a relief to the much congested core of the Kolkata metropolitan.



END

AGRICULTURAL LAND

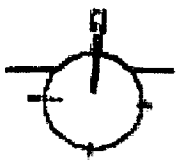
RESIDENTIAL LAND WITH MIXED LANDUSE

COMMERCIAL

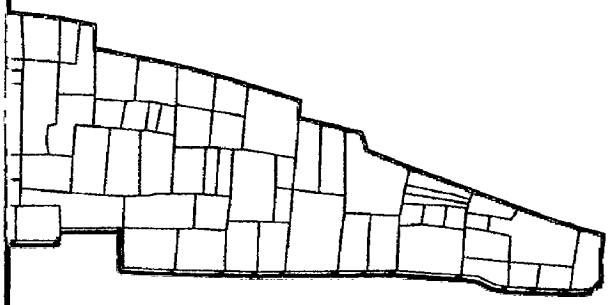
WATER BODY

INSTITUTIONAL / PUBLIC

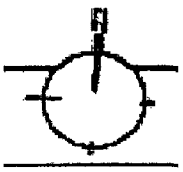
ROAD



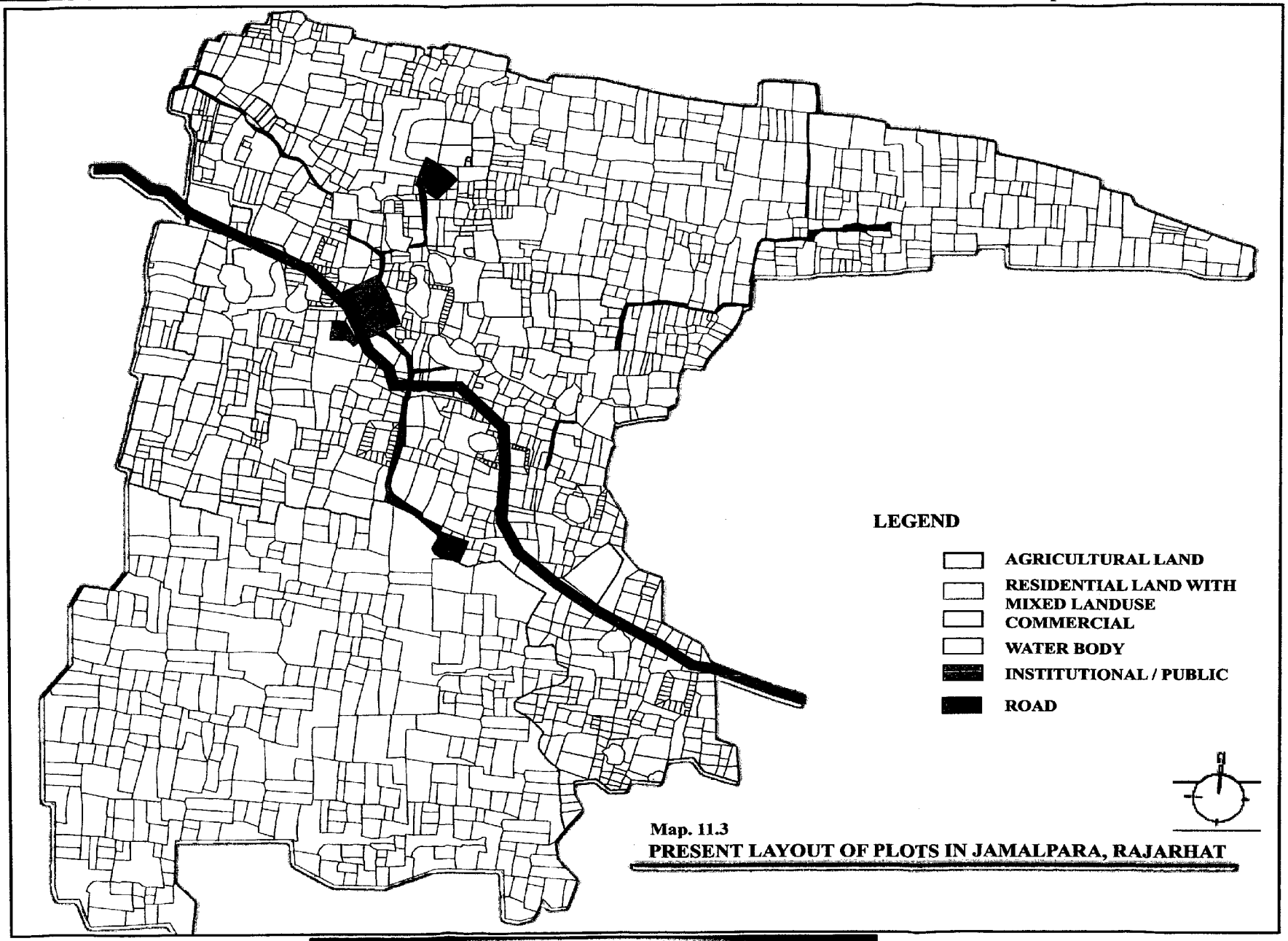
TS IN JAMALPARA, RAJARHAT



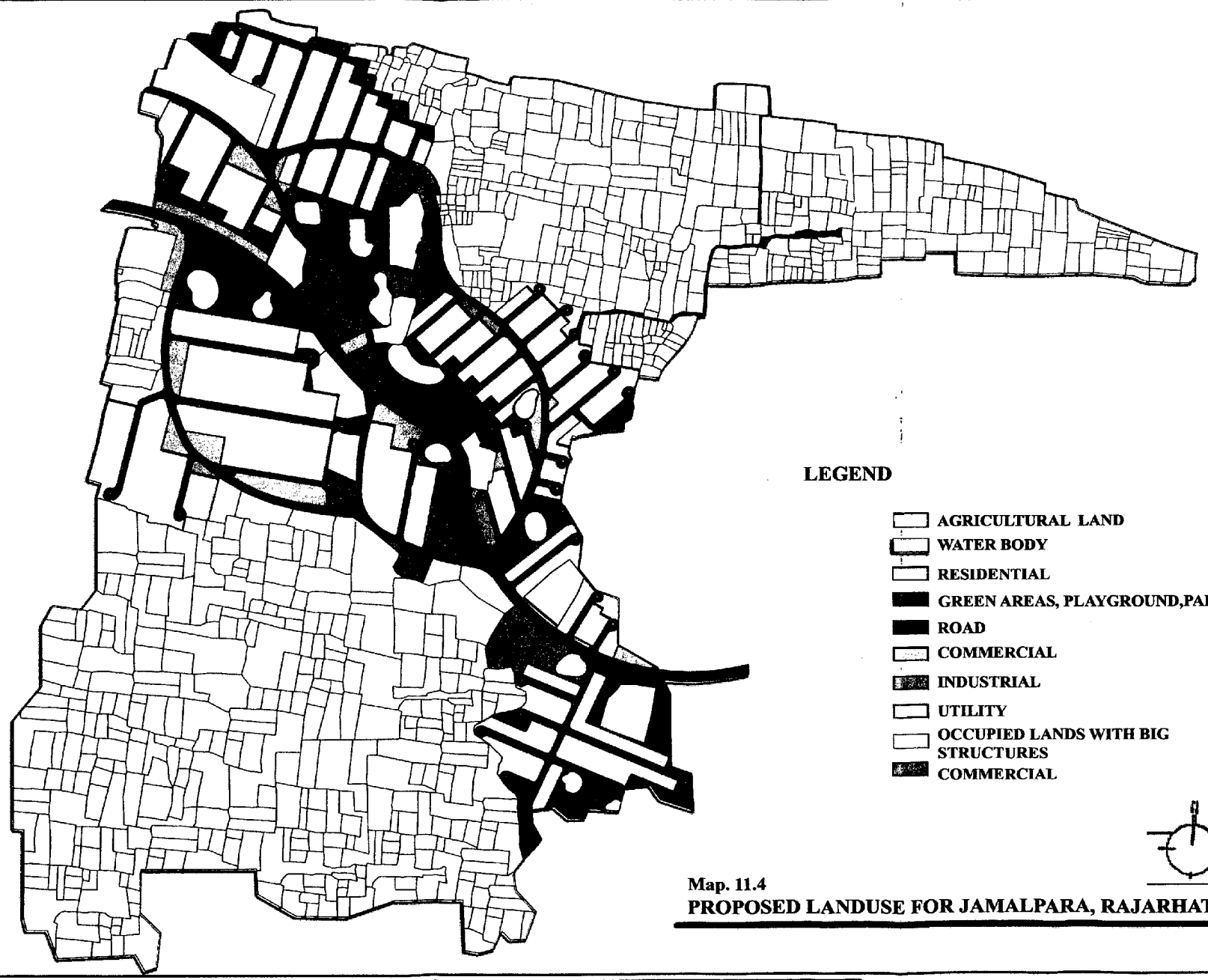
AGRICULTURAL LAND
WATER BODY
RESIDENTIAL
GREEN AREAS, PLAYGROUND,PARKS
ROAD
COMMERCIAL
INDUSTRIAL
UTILITY
OCCUPIED LANDS WITH BIG STRUCTURES
COMMERCIAL



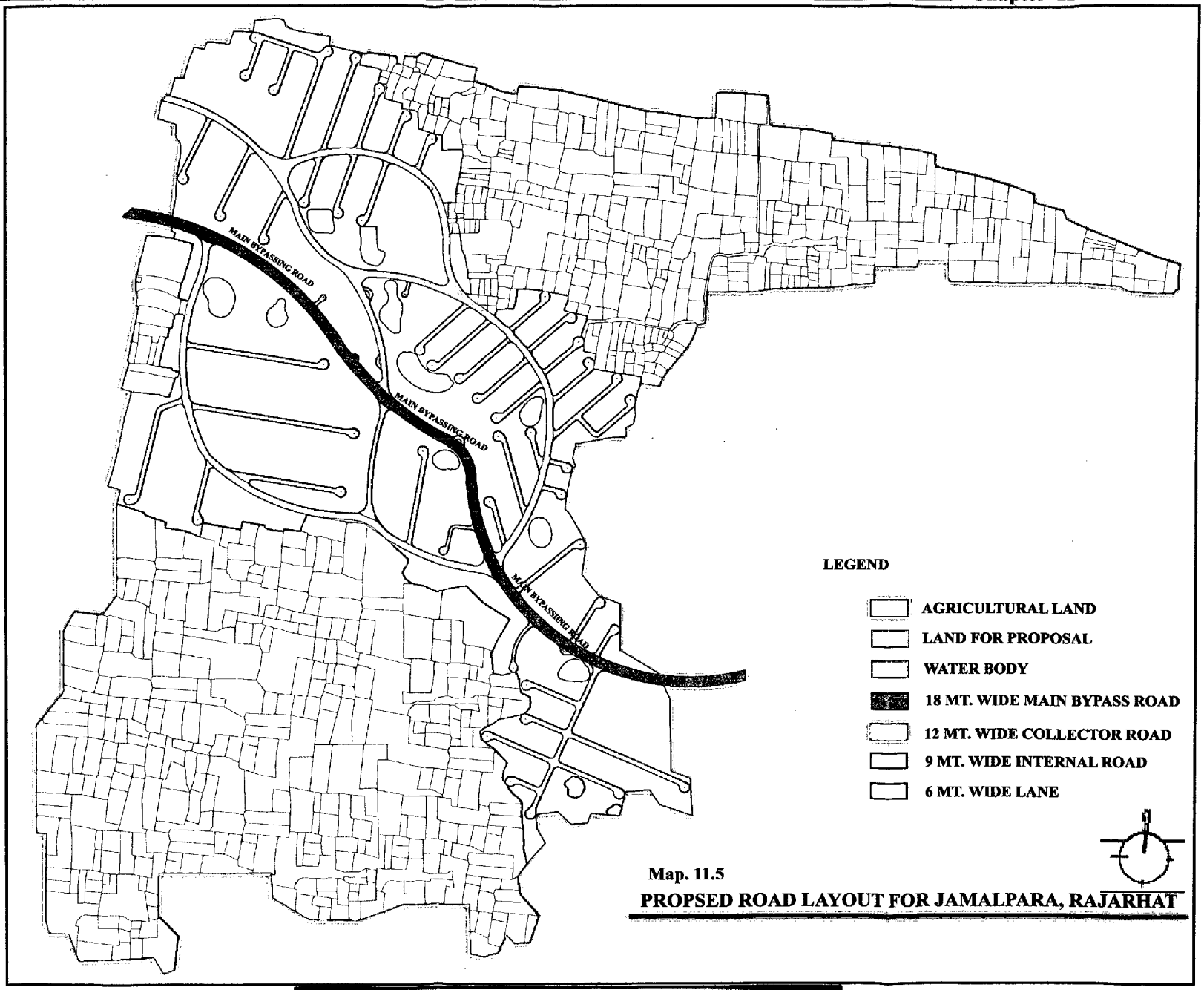
E FOR JAMALPARA, RAJARHAT



Map. 11.3
PRESENT LAYOUT OF PLOTS IN JAMALPARA, RAJARHAT

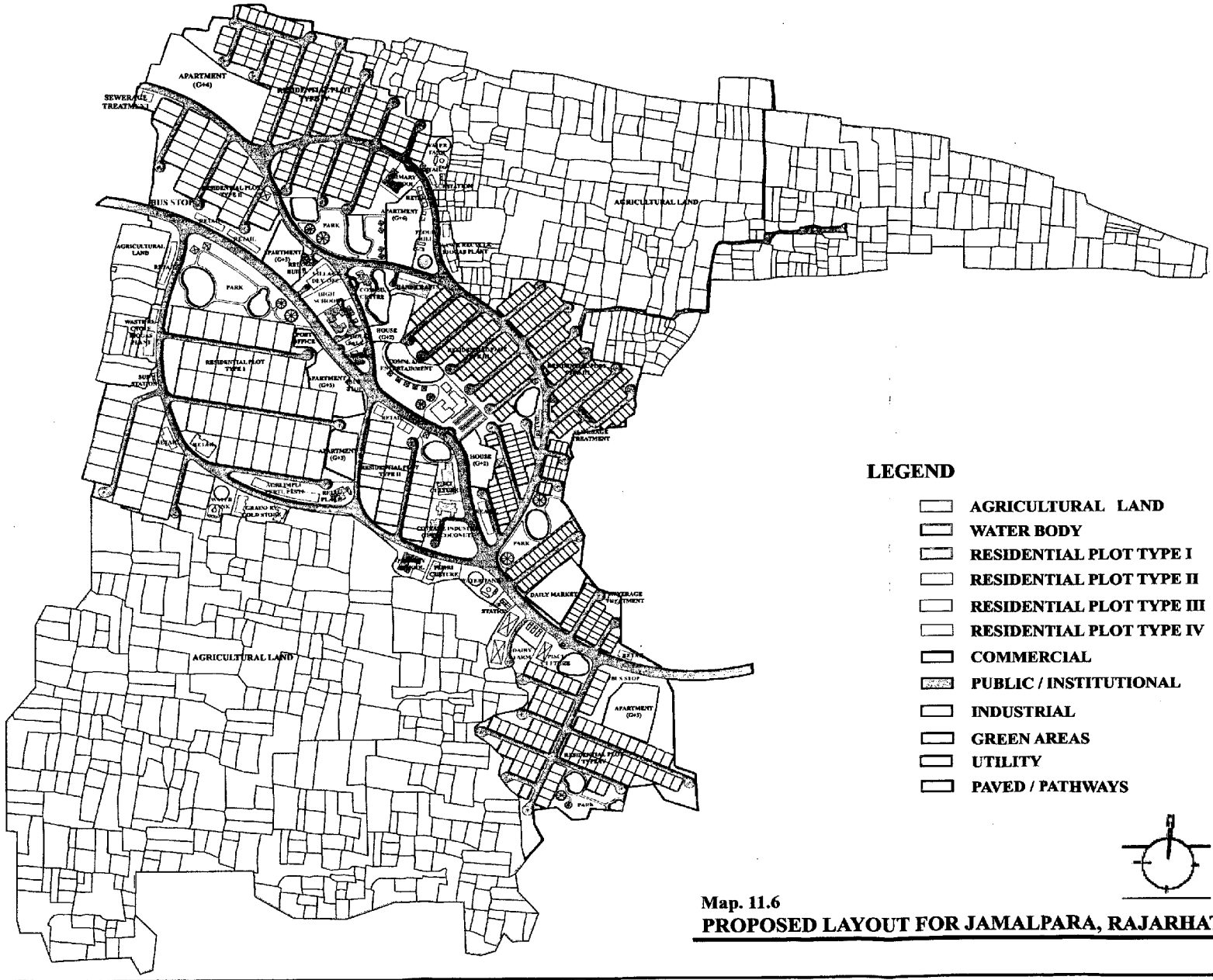


Map. 11.4
PROPOSED LANDUSE FOR JAMALPARA, RAJARHAT



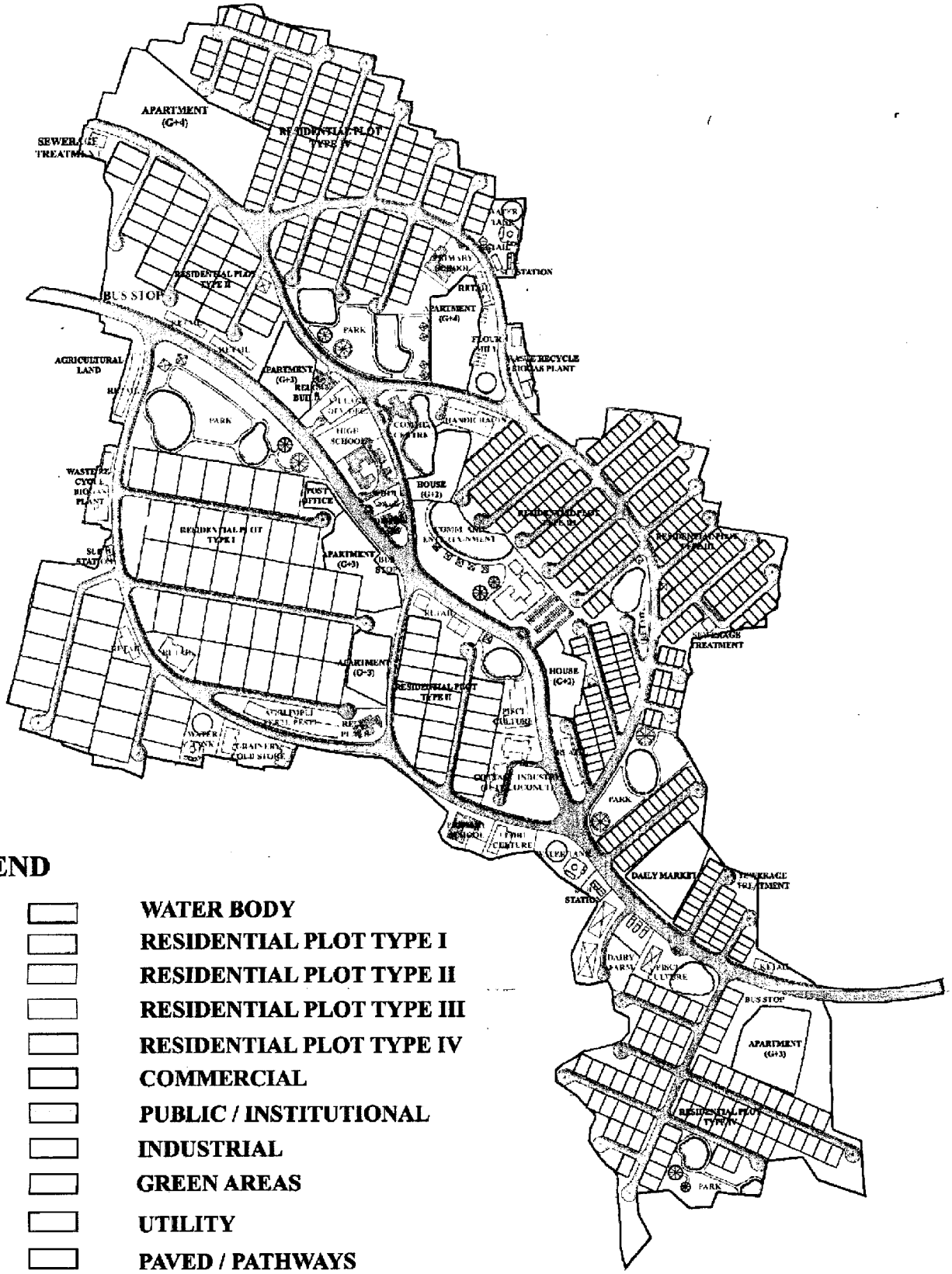
Map. 11.5

PROPSED ROAD LAYOUT FOR JAMALPARA, RAJARHAT



Map. 11.6

PROPOSED LAYOUT FOR JAMALPARA, RAJARHAT



LEGEND

- WATER BODY
- RESIDENTIAL PLOT TYPE I
- RESIDENTIAL PLOT TYPE II
- RESIDENTIAL PLOT TYPE III
- RESIDENTIAL PLOT TYPE IV
- COMMERCIAL
- PUBLIC / INSTITUTIONAL
- INDUSTRIAL
- GREEN AREAS
- UTILITY
- PAVED / PATHWAYS

Map. 11.7

PROPOSED LAYOUT FOR JAMALPARA, RAJARHAT (blow-up)

1. AR - Accommodation Reservation

2. CBD - Central Business District
3. CMA - Calcutta Metropolitan Area
4. CMC - Calcutta Metropolitan Corporation

5. Hidco – Housing and Infrastructure Development Corporation

6. KMA - Kolkata Metropolitan Authority
7. KMC - Kolkata Municipal Corporation
8. KMDA- Kolkata Metropolitan Development Authority

9. LP/R- Land Pooling/readjustment

10. PR Technique - Plot Reconstitution Technique

11. TDR - Transferable Development Rights
12. TPS - Town planning scheme

13. UDA- Urban Development Authority

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