

# URBAN MORPHOLOGY AND CHANGES OF LANDUSE

### INTRODUCTION :-

The term 'urban Morphology' refers to the physical arrangement or structure of a town, its pattern of streets, buildings, their different functions, densities and layout. The morphology of any city is dynamic in nature. Definite zones for different urban functions are found in the city landscape. Moving across the city, one passes from one zone to another with change landscape and socio-economic environment (Ghosh. Sumita, 1998 ). The urban morphology is determined by a number of predetermined general principles of land use and location. The morphology of any city is dynamic in nature.

The geographical setting of a town is of great importance in determining its morphology, quality of urban environment and also stimulating its further growth. The every change of altitude affects the flood history of a particular locality, and the river, which flows near the locality become the main source of water for this town as well as its main drainage and sewage channel. Primarily this affect the urban fabric. According to J.E.Brush (1960), interpretation of morphology is necessary not only to understand the relationship of the town to its site and situation, but also to identify the historical and social influence on its evolution. He also said that the interpretation of the morphology of Indian cities begin with mapping the existing layout to streets, the arrangement and characteristics of buildings, and the associated pattern of land use. Cities are continuously changing their land cover as old buildings are replaced with new structures and as rural land is converted to urban uses. It can be said that, the plan of a city, and its urban landscape are the results of past and present socio-economic processes. Generally the main commercial area lies on a part of the city and the competition for space leads to varying land values, which helps in the change of urban morphology. Technological development, continuous immigration and social segregation in the city also effects morphology.

The processes responsible for the spatial variation in urban morphology should be studied in the light of their inter relationship with functions. Specialization of activities in a specific area, so common in the western cities, does not take place in most of the Indian towns and cities. In Indian cities the diverse uses are mixed up in a small area. The western models of urban land use that necessarily imply segregation around C.B.D are not in general useful in India. Whereas, the western cities have different areal zones with consolidation of one single activity in each one, the Indian cities have different areal blocks with several activities in each one. The Indian cities are also differing from western cities, as there is no clear-cut segregation of commercial activities from other major functions. The old indigenous city or urban area evolved through a larger process of history usually in non-modern period and mostly in an unplanned way [Singh, D.P, Pandey. D.C, Tiwari P.C. 1999].

#### **4.1 Application of Models**

Traditional models relating to the growth and structure of town is partly applicable to Jalpaiguri town. The classical models deal with the internal structure of cities. According to the Burgess's Concentric Zone Model (1923) cities expand outward from the city centre (C.B.D) by creating concentric rings of commercial, transitional, residential of lower and higher income group respectively this concentric zone model was based on the land use pattern of Chicago, which is partly applicable in the early stage of development of some Indian cities as well as Jalpaiguri town. The other classical Models i.e. the Sector theory of Homer Hoyet (1939), Multiple Nuclei Model of Harris and Ullman (1945) are not applicable to Jalpaiguri town as there is no distinct pattern of sectors for specific land use in the town. Differential land use patterns around several commercial centers as per Multiple Nuclei Model is not possible in the case of Jalpaiguri as the town has only one commercial centre (Dinbazar). Robert. M. Haig (1926), R. Ratcliff (1949), William Alonso (1969), analyzed the pattern of urban land use according to the principles of rent to the land-values, land use and land use intensity. This theory helps to understand the outward expansion of Jalpaiguri town. The central part of the town has less land for more people as demand and land value both are high in the business area, which results in multistoried buildings and slum area around Dinbazar and more spacious houses are occupied by single families at the fringe as stated in this model.

With the help of satellite remote sensing the 'Global Model' of urban Morphology (Ridd, Merrill. R and Card. Don. H, 1992, I.G.C abstract, p-531) can be used to understand the urban landscape. The V-I-S Model (Vegetation-Impervious Surface-soil) shows the central business district is almost completely composed of impervious surface, which decreased outward. At the periphery more vegetation or more bare soil is found than the core, which is comparable to the townscape. Land values, family income and demographic patterns are usually related to V-I-S composition (Mondal.R.B). Those have an indirect effect on urban land use. According to Colby, 'Dynamic theory' the pattern of land use is the result of centripetal force that drawn the residents and business class people in the town, and also drawn people towards C.B.D from fringe and the centrifugal force that drive people and business away from the C.B.D into the outlying suburbs. This model is helpful to analyze the early expansion of the town. A new model suggested R. B Mondal (1989) is more helpful to analyze the morphology of Jalpaiguri town as well as any Indian city. According to his 'Anti Polar Concept' the market oriented development facilities helped in increasing intensity of land use near the C.B.D (Dinbazar), which decrease to the fringe. The central part of the town is occupied by central business area followed by light manufacturing, residential zones. Lastly, area of open space, agricultural fields, administrative centers are found while going away from the centre of the town. So, it can be said that the American-European patterns are existent only in Indianized forms (Fig. – 4.1).

## **DEVELOPMENT OF THE TOWN IN CONCENTRIC ZONE FORM**

The town depicted the concentric zone form in the early stage of its developmental process. The C.B.D (Dinbazar) consist of financial organizations with retail outlets. In the earlier period up to 1950, the town grew around this commercial center in a more or less concentric form. People of higher income group occupied the large plots at the fringe. Later with further expansion it reveal a semicircular form as river Tista restricted the expansion of the town in the east. The changes in the circulations of water, energy and materials produced by urbanization alter the landscape of the town.

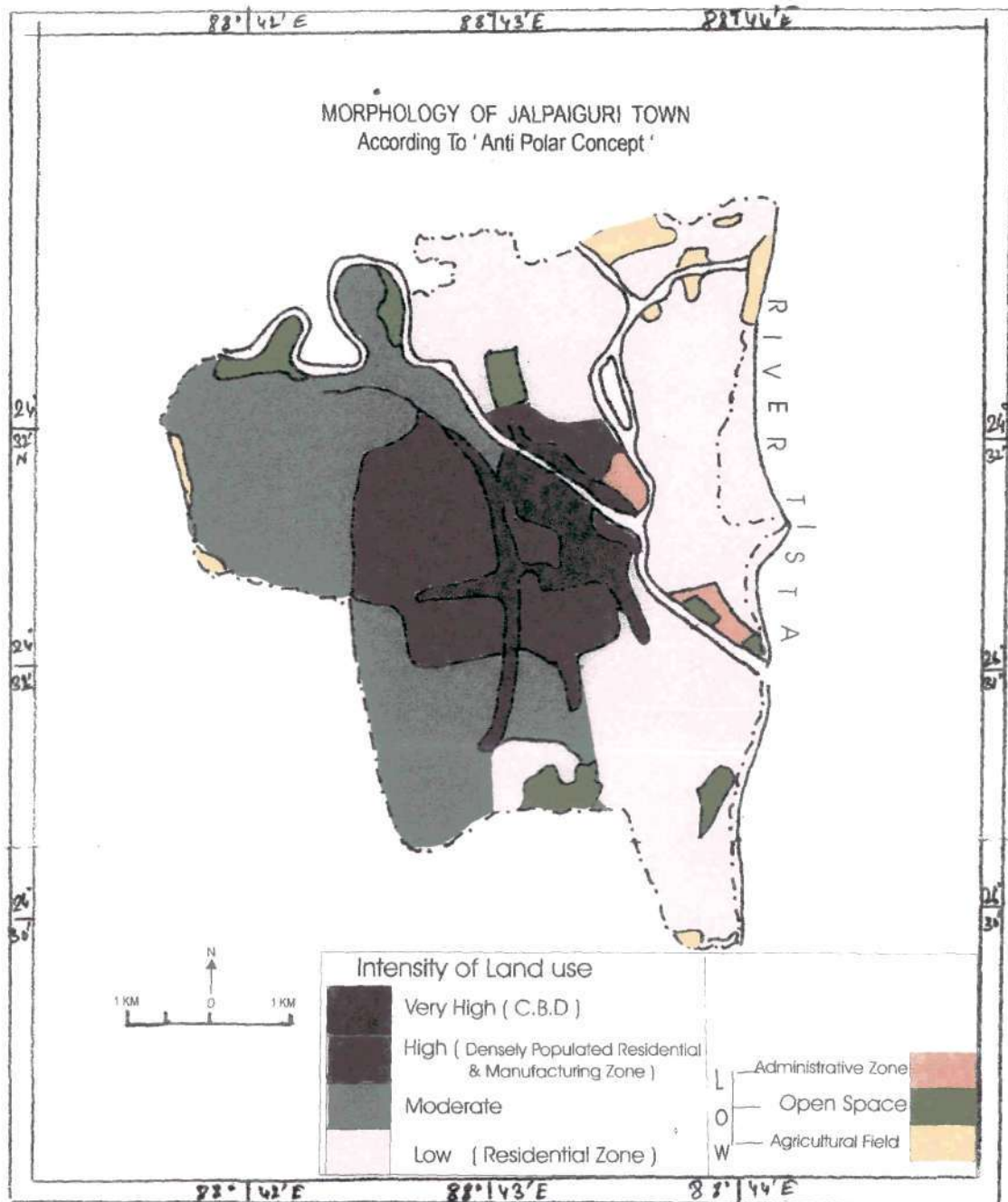


Fig - 4.1

**LAND USE PATTERN  
OF JALPAIGURI TOWN  
1900**

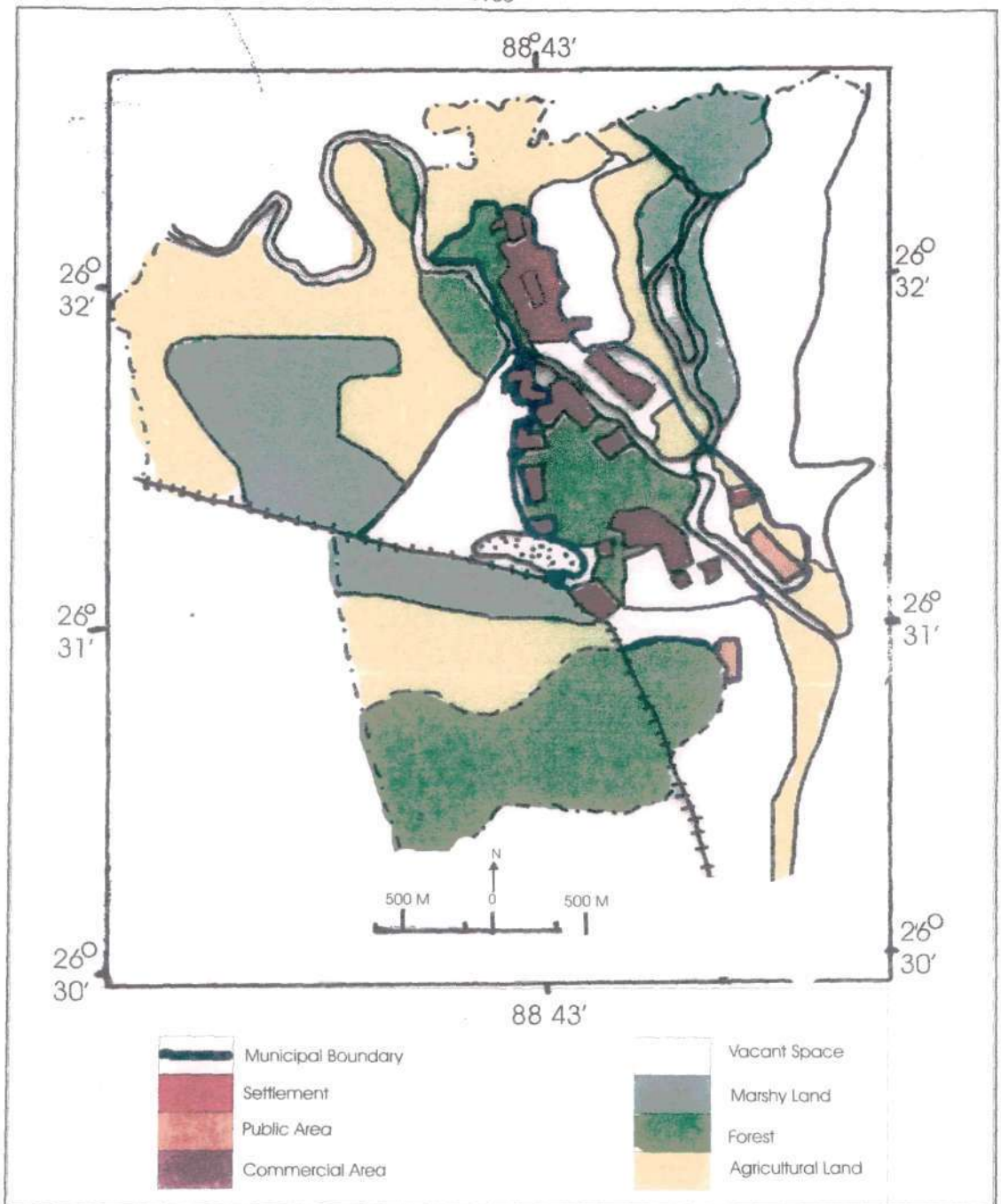


FIG - 4.2

## **4.2 CHANGING MORPHOLOGY OF THE TOWN**

The present morphology of the town is an example of an unplanned old Indian town, with narrow lanes, crowded shops and densely populated residential areas. The C.B.D areas developed in the heart of the town, is still maintaining its prominence. The slum areas are scatteredly distributed over the town specially in C.B.D area and along the railway line.

### **4.2.1 Jalpaiguri Town In 1900**

During the formative stage, the land use of Jalpaiguri town was characterized by the presence of jungle, marshy land and paddy field. According to Hooker many paddy fields were present in the midst of the settlements. By the beginning of the last century, the urban appearance of Jalpaiguri becomes visible with the population reaching to 10000 persons. A small commercial area was situated at Dinbazar. The only one industry, Mohini Mill (Cotton Mill) was established by Surendra Sanyal (1924) in Silpa Swamity Para. The main residential area was concentrate at the east of river Karala near Rajbari and in Raikat Para, Hakimpara area. At the right bank of river Karala the residential area was scatteredly situated around Dinbazar- Ukilpara area, Babu Para-Telipara area. Administrative units i.e. Head Post Office, Kutchary (court), Municipal office were the only brick built offices at that time, situated south-eastern part of the town. Other public offices were Kuncha houses, with tin or thatched roofs. The major roads of the town i.e. Jalpaiguri – Mainaguri Road, Kadamtala- Chaulhati Road and Kadamtala – Haldibari Road were narrow and unmetalled. Other roads were found in Hakimpara, Hospital Para, Babu Para area, those are also very narrow and unmetalled. The railway service was connected the town with Calcutta and Siliguri in 1877 and 1878 respectively and the Railway Station along with railway track was located at the southeastern boundary of the town. Between Railway Station and Rajbari there was huge Rubber plantation and at the north of the Rajbari there was a large mango groves. Rest of the town is covered with marshy land, water bodies and grassland. Dumping ground of the town was located along the railway line at the southwestern part of the town. Fig. 4.2 shows the land use pattern of Jalpaiguri town in 1900.

### **4.2.2 Jalpaiguri Town In 1951**

By 1951, the population of Jalpaiguri town reached up-to 41259 persons, and with this rapid growth of population the land use pattern has also been transformed from agrarian look to urban look. In Natun Para, Pahari Para, Samaj Para, Silpaswamiti Para, Ananda para area previously

covered jungle or paddy fields were converted into residential area. Immigrants were compelled to settle in the former marshy lands. Arable lands in the sub-urban areas i.e. NewTown, Bose Para, SantiPara, Bawbazar etc. Before 1950's one storied buildings with Kuncha roofs (Tin roofs) are predominant. Several new roads were constructed to link up the newly developed residential areas in an irregular manner. Most of these roads were narrow and crooked and interlinked with each other. At the north of Rajbari, western part of the residential area and left side of railway track arable lands were still predominant. Wetlands were still exist at the left of the newly developed residential areas of Bose Para, New town area. Kadamtala became an important commercial centre. Dipti Talkies, Alochaya (Rupmaya) Cinema Hall, Bandhb Natya Samaj auditorium added a new dimension along with shops and bus stand.

### **4.2.3 Jalpaiguri Town After 1960's And Onward**

By 1960's, the built up area of the town had expanded around the C.B.D (Dinbazar) mainly at the right bank of river Karala. There after the major developmental took place in this part and ultimately this new part become the main town ship. The rubber plantation was totally abolished from the town. With the rapid growth the land use pattern changed dramatically the water bodies were converted to the residential lands unscientifically in the town. The mango groves at the north of Rajbari was restricted in a particular area and most of the trees were cut down for residential purpose.

Slowly the town expanded. At the south and west. The area increased from 10.07km<sup>2</sup> in 1961 to 12.975 km<sup>2</sup> in 2001. After 1995 the built up area of the town which situated at the northwestern part (Arabindra Nagar etc.) South-western part (Danga Para , Pandapara) included in the municipal area. The number of wards increased from 6 to 19 and further increased to 25 in 2001. The town ultimately expanded both in size and population. But lack of formal planning in the early development of Jalpaiguri town and haphazard growth of its low lying mid-western part account for the unhealthy growth of the townscape.

## **4.3 LAND USES AND THEIR CHANGES**

The urban 'landuse' is a term, which denotes urban space, land area, water bodies in the cities and three dimensional spaces above the land of the city. The urban area is the centre of art,

culture, leisure and power. So, in essence the term 'urban land use' broadly refers to spatial distribution of city functions, its residential communities of living areas, its individual commercial and retail business districts or major work areas, and its institutional and leisure time functions (Chapin 1957). The existing patterns of a land utilization in any region are the result of a continuous inter-play of physical elements like topography, climate, soil and human efforts guided by a host of socio-economic condition (Sharma And Cutinho 1983). According to Bourne (1982), urban spatial structure is a set of organizing principles that define the relationship between the urban form and interaction. This results in different uses of land surface according to man's need.

The urban land use study is a new branch of geography and its importance has been aroused since the Second World War when its need for planning and replanning of urban places was universally felt (Dubey, 1969). There are several general definitions of land use, the earliest of which was given in connection with the first land utilization survey of Britain from 1931 onwards. Land use survey depends up on the scale and the purpose of study. The study of land utilization is become very important in present days, as it helps to identify the non used or mis used lands and also helps to develop comprehensive land policy related to re use of the lands. The study of temporal changes of lands is necessary for future use.

#### **4.3.1 Classification Of Land Use**

Classification is vital and most significant to the study of urban land use, because it provides an easy key to understand the complex character of the city structure. The use of land is influenced by the interplay of many factors, constantly changing their relationship with one another, which give birth of different uses of land in different places. So, it is impossible to deal with these large number of land uses in the urban area with out grouping of similar use. One of the earliest classifications made by Bartholomew (1955) is not entirely applicable in the present day, both in western countries and in India. The classification made by American Institute of Planners based mainly on the functional characteristics and other is more applicable in the present day. The geographical distribution of land use in urban areas is of prime interest to the geographers, urban sociologists and city planners, urban sociologists and city planners. In India, town planners quite often characterized urban land use into residential, commercial, industrial,

transport, communication, public utility, public and semi public uses, open space, agricultural, vacant lands and water bodies. On the other hand urban geographers classified urban land use into residential, agricultural, open space, military land, park, play ground, commercial, administrative, educational, industrial and burial ground (Singh. S 1964, Sinha 1970) etc. In the present study different land use of Jalpaiguri town are categorized based on different planning organizations and urban geographers, and are shown in Table 4.1 on the basis of the area of each land use category, the maps are drawn for the town (Fig.4.4)

**(i) Residential**

The residential land use in the town is the largest proportion of urban land and plays a significant role in shaping the urban morphology. There is a inverse relationship between the size of a town and the space occupied by residences, That is today, smaller the town larger the area under this use ( Attaullah, 1985). Residential use is controlled by the nature of land, growth and distribution of non-residential lands, time distance from the place of worth, urban amenities etc. The demands for housing in urban areas depend on income, taste and affinity in their economic and socio-cultural frame.

**(ii) Commercial**

Trade and commerce play an important role in the development of urban life and activity. Once the commercial centre is established, it starts affecting the residential growth, because most of the people like to reside near to the main commercial centre of the town. And the central business district becomes the centre of all economic activities.

**(iii) Public And Semi Public**

The public land in the urban area is largely utilized for administrative purpose, education, medical institution etc. Though it covers small percentage of land area, but there are important or essential in the social life.

**(iv) Industrial use**

The light industrial units or college industries are sometime developed around C.B.D or scatteredly develop in the town, which cover small percentage of land than other use.

**(v) Transport**

Transport is an important influence in land use economics and the amount of lands under this category varies from one place to another.

(vi) *Road*

In India the streets are as much as narrow as possible. Varying standard of street widths, prevailing policies of land use control and the density of development are all factors in the use of land for streets or roads

(vii) *Parks / Open Space And Water Bodies*

Looked at from the urban point of view the function of the open space in the town is positive as it is actively used for public purpose. Open space is inversely related to the size of a town. The larger is the town, the smaller is open space. Open space provides not only the space for recreation purpose, but also preserve open space character of selected piece of land with in the built up area. Water bodies includes river, pond tanks etc.

(viii) *Vacant Land*

Those lands are vacant at present, but have possibilities of use in the future are normally categorized as vacant land. It may remain as follow lands or vacant plots in residential, or commercial areas of the urban centre for future use.

**Table 4.1** TYPES OF LAND USE AND THEIR PERCENTAGE IN JALPAIGURI TOWN  
IN 1992 AND IN 2007

Category Of Land use	1992		2007		Growth Rate (in %)
	Area in km <sup>2</sup>	Area in %	Area in Km <sup>2</sup>	Area in %	
Residential	5.65	56.0	7.824	60.3	+7.68
Commercial	0.40	4.0	0.856	6.6	+65
Public & Semi Public	0.45	4.5	0.649	5.0	+11.11
Industrial	0.01	0.1	0.065	0.5	+400
Resi- Cum Commercial	0.01	0.1	0.324	205	+2400
Transport	0.01	0.1	0.129	1.0	+900
Road	0.60	6.0	0.908	7.0	+16.66
Agriculture	1.31	13.0	0.350	2.7	-79.23
Water Bodies	0.5	5.0	0.584	4.5	-10
Open Space	0.3	3.0	0.313	2.4	-20
Vacant Land	0.82	8.0	0.545	4.2	-47.5
Miscellaneous	0.02	0.2	0.428	3.3	+1550
Total	10.08	100.0	12.975	100.0	+28.72

# LANDUSE JALPAIGURI TOWN 1992

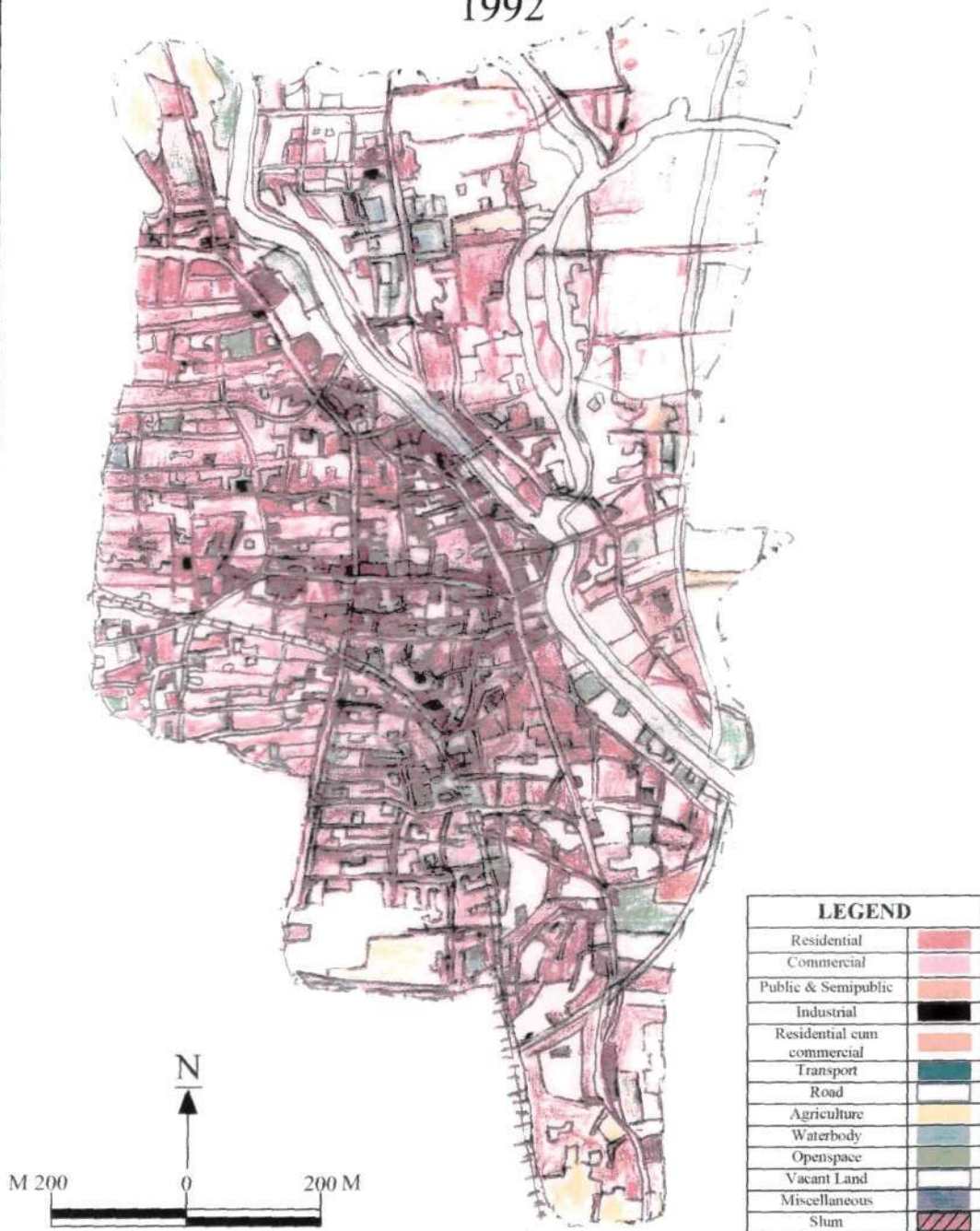


Fig - 4.3

### **4.3.2 Land Use Scenario In Jalpaiguri Town In 1992**

#### **4.3.2.i Residential**

In 1992 the town has devoted 56% (5.65km<sup>2</sup>) land under residential use, which is distributed mainly between the River Karala and railway track. The main residential zones were located -

- (a) Around the C.B.D (Dinbazar) of the town, which covered 70% lands under residential use.
- (b) Between the railway track up to the southern part of municipality.
- (c) North-eastern part of the town, which was backward in respect to the other parts of the town.

#### **4.3.2.ii Public & Semi Public Use**

In 1992 about 4.5% (0.45 km<sup>2</sup>) lands, where occupied by public and semi public use, which was concentrate –

- (a) Between River Karala and Railway Station, which include municipal office, Telecom department, Head Post office etc.
- (b) At the east of River Karala with major government offices.
- (c) At the central part which included hospital, Jail etc.

#### **4.3.2.iii Commercial Use**

The commercial use (4%) was extended covering 0.40 km<sup>2</sup> area in a linear form in the central part of the town and along the main through fares like D.B.C. road, Merchant Road, and Kadamtala. Some isolated pockets of commercial use and daily markets are found in the town.

#### **4.3.2.iv Residential-Cum-Commercial**

Land under this category (0.1% to the total) was occupied by 0.01 km<sup>2</sup> and mainly found near the major through fares of the town.

#### **4.3.2.v Industrial Land Use**

The percentage of land under industrial use was 8.1%, which covered 0.01 km<sup>2</sup> areas of the town, and found near fringe area.

#### **4.3.2.vi Transport and Communication**

The percentage of land under this use is also small (0.1%) and found at the northwestern fringe and at Kadamtala of the town.

#### **4.3.2.vii Roads**

The percentage of land, which is used as road, was only 6% (0.60 km<sup>2</sup>) of the total area of the town. The lands and by lanes were more in number at the western part of the town comparing the other parts.

#### **4.3.2.viii Water Bodies**

Except River Karala several points and water logged low lands were found scatterdly, which occupied 5% (0.5 km<sup>2</sup>) of the total area of Jalpaiguri town Dulal Deeghi, Kantashwary Deeghi, Rajbari Deeghi were the major water bodies of the town.

#### **4.3.2.ix Agricultural Land Use**

The agricultural zones (13.0% of the total of the town) were found at the periphery of the town. The maximum concentrations of agricultural lands (75% of the total) were found at the north eastern past and other were found in pockets at the southern part of the town.

#### **4.3.2.x Open Space**

The open space covered 0.3 km<sup>2</sup> (3% of the total area), which included several play grounds, parks and Town club ground, scatterdly distributed all through the town.

#### **4.3.2.xi Vacant Land**

Vacant lands were unevenly distributed away from the C.B.D, especially in the east of river Karala and was recorded 8% (0.82 km<sup>2</sup>) land of the town.

#### **4.3.2.xii Miscellaneous Land Use**

The land under this category occupied 0.2% (0.02 km<sup>2</sup>) of the land, which was evenly distributed among the C.B.D area.

### **4.3.3 Land Use Pattern In Jalpaiguri Town in 2007**

In this chapter the study aims to represent the land use pattern of Jalpaiguri town and to find out the space and direction of land transformation in the town. The land use of various sort are so mixed type, which is related with the type of activities in different parts of the town. The structural form of the town helps the residents to find every necessary thing within their walking distances. Urban landscape is therefore undergoing alteration at all times as it grows in size.

Land use survey was made for several times due to non-availability of land use maps and published materials. The distribution of different land use functions in the wards of the town is shown in Figures starting from no 4.1 to 4.25. It reveals that the residential use is spread through out the length and breath of the town, while commercial, administrative and industrial uses are localized. It is also evident that in the bigger wards, the percentage of land under residential and commercial uses was less in comparison to the smaller wards lying near the central part of the town and newly added wards at the fringe.

## DISTRIBUTION OF FUNCTIONAL ZONES

A closer link between the two approaches is provided by the realization that certain functional types of towns produce specific morphologies (Smailes, 1955). The function of a town may be studied by dividing it into certain functional zones. But unplanned town like Jalpaiguri have no clear-cut zones. On the basis of field survey and other sources of information's the distribution of land use of each ward as well as the whole town has been illustrated in this chapter.

### 4.3.3.i. Residential Land Use

In residential areas of the townhouses are not constructed in a planned way. They are constructed in a haphazard fashion along roadside with out functional, income or class homogeneity. Table 4.2 shows the land under residential use in different wards in Jalpaiguri Town.

**Table 4.2** WARD WISE DISTRIBUTION OF RESIDENTIAL LAND USE IN THE TOWN

Percentage of Residential Land	Category	Wards	Percentage Of Wards	No. Of wards
<40	Very Low	1, 2, 5, 8	16	4
40-50	Low	4, 6, 9, 21., 25	20	5
50-60	Moderate	3, 17, 22,24	16	4
60-70	High	7, 10, 11, 12, 13, 14, 15, 18, 20	36	9
>70	Very High	16, 19, 23	12	3
			100	25

It is found that very low percentage of residential lands (<40% are found in the northeastern part, and in C.B.D area those are shared by 16% of the total words. The percentage is low (40-

50%) in the wards located in C.B.D area, and northwestern (ward no. 21), southeastern (ward no. 9) corner of the town, which is shared by 20% of the total words. The percentage is high (60-70%) in the wards located in central and southern part of the towns, which is shared by (36%) of the wards in the town. The land under this use is very high (>70%) in only there wards found in the central part, which include Mahamaya Para, Ukil Para and Arabindra Nagar etc. and is shared by 12% of the total words. The highest percentage (78%) of residential land is recorded in ward no 23 and lowest (15%) is found in ward no 5. land under residential use played a dominant role in all the wards except in ward no 5 and 8, where commercial or public lands are predominant.

### **Residential Zones**

The town has 60.3% lands devoted in residential use, which is distributed in all the wards unevenly and covers 7.824 km<sup>2</sup> areas of the municipality. It is found from Fig- 4.4, that the lands under residential use are dissected by River Karala in the east and by North-eastern Railway line at the south. The residential areas of the town can be grouped into.

#### **Zone I [North-Eastern Part]**

Morphologically the town may be divided into two distinct parts, which have been separated by River Karala, flowing through the heart of the town. This enclosure delimiting the North-eastern part of the town, situated at the left bank of river Karala. Zone I is spread in this part of the town, which is the older part of the town and is characterized as less developed residential zone. Out of three wards are (Ward no 3), have 50-60% land under residential use, where as the other two (Ward no 1 & 2) represent <than 40% land under this use. As a whole 39.94% of the total area of Zone I is occupied by residential use. Agricultural land was predominant here till 1992, but at present vacant land, open space together occupied 22.88% lands and agricultural land covers only 9.22% of the total area of this Zone. In this zone, residential landuse is low in percentage due to backwardness and remoteness. A few slums have filled in the gaps lying between the residential areas and vacant land.

#### **Zone II [South-Eastern Part]**

Zone II is located in the west of river Karala, and extended up to the railway track at the west and in the south up to the municipal boundary. This zone consists of three wards (ward no 8, 9, 10) and characterized by public sectors, where residential lands are segregated in pockets and

covers only 44.78% lands in this Zone. This zone is located far away from the city centre, but government housing (ward no 10), police housing (ward no 9) and some government quarters, college hostels (ward no 8) help to increase the percentage of residential purpose. Some slums such as Gorumara basti, Subhash Unnayan Palli etc. are developed in between public and residential sectors.

### Zone III [Southern Part]

This zone is developed at the southern part of the railway track and extended up to the southern limit of the municipality. This zone is purely residential and out of (wards 5 have high percentage (60-70%) of lands under residential use. In only one ward (ward no 6), use of land under residential purpose is maximum that is >70%. This zone is characterized by rectangular street pattern and radius size plots (2-5 kathas). One major slum area (Harizon Basti) is located between the Panda Para Road and Railway track at the northern part, and another is found near Dulal Deeghi at the southern part of this zone. Other slums are scatteredly developed in Bowbazar. Pan Para, Mahamaya Para near 4 no. Ghoomti etc. by occupying, public land or vacant lands.

### Zone IV [Central Part]

Zone IV is located at the west of River Karala and extended upto the railway track, station Feeder Road at the south and upto the western limit of ward no 19, and 24. As this zone is lying around the C.B.D (Dinbazar) and central commercial zone (Kadamtala) more people are attracted to reside here. Among 8 wards three (ward no 4, 5, 6) have low share of land under residential purpose, as main business centre and commercial zone are situated here. But other wards have large to very large share of residential lands under this zone. As area is low but population pressure is high. This zone lying as the most congested zone of the town.

### Zone V [Northwestern]

This zone is located at the south of River Karala and delimited by railway track at the southwestern part and municipal boundary at the west. About 51.2% land of this zone is occupied by residential use. Out of five wards, two (ward no 20 & 23) have large (60-70%) to very large (>70%) share of land under this use. Residential use of land is increasing in this zone,

because land price is comparatively low, between congested and well connected – With the other part of the town.

#### 4.3.3.ii. *Public And Semi Public Zones*

As Jalpaiguri town acts as a District Head Quarters of Jalpaiguri district, it has a important percentage (5%) of public and semi public land use, which has its main concentration in the mid- eastern part of the town.

**Table 4.3 WARD WISE DISTRIBUTION OF PUBLIC AND SEMI PUBLIC LAND USE**

%Of Public & Semi Public Land	Category	No of wards	% Of Wards
<5	Low	12	50
5-10	Moderate	6	25
10-15	High	4	16.6
>15	Very High	2	8.4
		24	100.00

Table 4.3 shows that majority of the wards (50%) have a low percentage (<5%) of land under public or semi public use. Three wards are mainly residential in character and located mostly at the fringe area. The percentage in wards (6.6%) is high (10-15%) Those are located at the mid-eastern part and northwestern corner of the town. Only two wards (ward no 1 and 8) have maximum area (>15%) under this use, and majority of administrative offices, educational institutions, hospital and Jail are located here. Public and Semi Public land use can be grouped into three Zones.

#### Zone I/ Administrative sector

During British period administrative sector are located in a area that had both geographical and political advantages, Jalpaiguri is not an exception. Zone I is the most important sector, and lying at the eastern part and extended up to the embankment of river Tista and covers 0.157 km<sup>2</sup> area. All most all important administrative, public and semi public centers such as D.M. Office, Revenew, Motor Vehicles Department etc. and a number of bungalows of administrative officers, Circuit House, etc. showed true urban character of the town. This zone is well connected with other parts of the town.

### Zone II / Administrative And Public Sector

This Zone is located at the north of the town and delimited by River Karala at the west and river Dhardhara at the east. This is this largest public Zone covering 0.315 km<sup>2</sup> area. Important administrative feature of this zone is the locations of Jalpaiguri Jail and public sectors like Jalpaiguri Sadar Hospital.

### Zone III / Institutional And Public Sector

This zone is lying at the west of River Karala and extended upto the embankment near Shubhash Unnayan Pally at the south. This is the 2<sup>nd</sup> largest public zone, where 0.277 km<sup>2</sup> area (Ward no 8, 9, 10) is used for both public and institutional purpose, which included Zilla Parisad, Municipal Office, Head Post Office, Telecom Service, District Library, Fire Brigade, Police Line and Schools, Colleges and some cultural centers.

### Zone IV

This zone is located in and around C.B.D, which covers the smallest area (0.0593 km<sup>2</sup>) among the other public Zones of the town. Administrative units like district court, police Station Dak Banglow, several public and private offices, educational institution college etc utilize this area. Besides a number of government offices located in the different part of the town, a number of private, public or semi-public sectors are distributed in other wards in a haphazard manner.

#### **4.3.3.iii Commercial Zone**

Urban geography is largely concerned with the city as a commercial system, as the place, where commodities are manufactured, brought and sold. Commercial land use occupies pivotal but not a very big area of land utilization in the town. It covers only 6.6% (0.856 km<sup>2</sup>) of the total area of the town. The commercial zone covers the central area of the municipality, but it also spread along the main arterials in a narrow ribbon form. The distribution pattern of commercial lands among the wards (Table 4.4) shows that, the percentage is very low (<15%) in the peripheral and main residential wards, which is shared by 48% of the total wards of the town. The percentage is moderate (5-15%) in 40% of the wards. Mainly retail shops, daily markets, isolated store clusters are found in these wards where commercial land is present in a low to moderate percentage. Commercial land is high (15-25%) in only one ward (ward no 6) and very high (>25%) in two wards (ward no 4 & 5), those all together forms the C.B.D of the town. The

highest (49%) and lowest (1%) percentage of commercial land is found in ward no 5 & 3 respectively.

**Table- 4.4** WARD WISE DISTRIBUTION OF COMMERCIAL LAND USE

% Of Commercial Land	Category	No. Of Wards	Percentage of Wards
<5	Low	12	48
5 – 15	Moderate	10	40
15 – 25	High	1	4
>25	Very High	2	8
		25	100

#### C.B.D. In The Middle Sector

Dinbazar is the central commercial zone, which is specialized for varieties of items such as garments, furniture, electrical goods, hardware, stationary equipments, grocery, fish, meat etc. along with banking and other financial institutions. Dinbazar plays an important role in commercial exchange and interlinked the supply of food and resources to the town. This sector is characterized by old congested part of the town. The near by location of hospital have added a new color to this sector.

#### Other Commercial Pockets

The commercial land use is extended from the C.B.D towards south along the major thoroughfares like merchant Road, D.B.C Road up to Zilla Parisad Road and Kadamtala to Haldibari Road. Another commercial land use is found in a ribbon form, along the Silliguri-Jalpaiguri Road. In addition some important marketing centers like Station Market, Bawbazar, Municipal Market etc. have come up as the commercial pockets in the town.

#### **4.3.3.iv. Residential Cum Commercial Land Use**

Residential cum commercial land use added a special character to the town. Field survey reveals that residential cum commercial land use is absent in ward no 1, 2, 9 and 25, those are residential wards with negligible percentage of commercial activities. The highest percentage (12%) is found in ward no 6 and lowest (0.3%) is found in ward no 14.

**Table- 4.5 WARD WISE DISTRIBUTION OF RESIDENTIAL CUM COMMERCIAL LAND USE**

% Of Resident Cum Commercial Land	Category	No. Of Ward	% Of Wards
<1	Very Low	8	39
1 – 3	Low	3	14
3 – 5	Moderate	4	19
5 – 7	High	3	14
>7	Very High	3	14
		21	100

Resident cum commercial land use is found very low (<1%) in southern fringe and a pocket, which is far away from the commercial centre of the town. Land under Resi-cum-commercial use is high (5-7%) in three wards (14% of the total wards) through which the major business thoroughfare is plying, such as Kadamta M.G. Road, Panda Para Road etc. It is very natural that the percentage is very high (>7%) in C.B.D. area, which consist of ward no 4, 6 and 7. Due to the increase of land value near C.B.D. the residential houses are converted to residential-cum-commercial use. Some residential houses of rich Marwari business families carried out this character of the town.

#### **4.3.3.v Industries**

The percentage of area under industrial land use is 0.5%; which covers 0.065 km<sup>2</sup> area of the town. Several small-scale industries and cottage industries are scatteredly situated in the town. The industrial land use is not related to the size of the town and only 56% (14 out of 25) wards have lands under industrial use. Among these wards, ward no 20 has highest percentage (3%) of land under this use. Construction related units and foodstuff units are dominant here. Machinery, vehicles, repairing industries, publishing units is dominant near C.B.D and along the main business thoroughfare.

#### **4.3.3.vi Transport and Communication**

Transport has an important influence in land use economics, as well as economic activities as mobility of people; goods and information are related with transport and communication system. This function covers 1% (0.129 km<sup>2</sup>) of the total area. There is one distinguished zone of railway that is Jalpaiguri Town Station situated in ward no 8 and covers only 0.1% of the total

land of that ward. There are five taxi stands, one truck stand and four major bus stands scatterdly located in the town. Among these, ward no 7 and 25 have 2% land under this use. The N.B.S.T.C and Duars Bus Stand are located in Netaji Para, and Siliguri Jalpaiguri Bus Terminus is located near Municipal Market at Kadamtala Road. One private Taxi Stand is also located near the Siliguri Jalpaiguri Bus Terminus. Public telephone booths are unevenly distributed all over the town, which occupy a negligible percentage of each ward.

#### 4.3.3.vii Roads

The amount of space devoted to streets varies according to the characteristics of individual town. The main road of the town is Siliguri-Jalpaiguri Road, Jalpaiguri – Maynaguri Road, Jalpaiguri – Haldibari road etc. those are connected by lanes at right angle. Most of the lanes and by lanes in the west of Jalpaiguri – Siliguri Road have east- west extension. The percentage of land under roads occupy only 7% (0.908 km<sup>2</sup>) of the total area, of the town. It is found that 40% of wards have less percentage (<6%) of lands under this use. Wards under this category are mostly situated in fringe area having large area and less developed than the wards of central part. So, new roads are not developed here. About 36% wards have lands more than town average (>7%) under this category. These wards are mainly densely populated wards, where new roads are developed with the expansion of residential use of land.

**Table- 4.6 WARD WISE DISTRIBUTION OF LAND UNDER ROADS AND STREETS**

% Of land	Category	No. Of wards	% Of wards
<6	Low	10	40
6 - 7	Moderate	6	24
>7	High	9	36
		25	100

#### 4.3.3.viii Water Bodies

Water bodies are the important aspect of urban ecology. In Jalpaiguri town the river Karala, Dhardhara along with a number of ponds such as Rajbari Deeghi, Kanteswari Deeghi, Masjid Deeghi. Dulal Deghi etc. occupy 4.5% area (0.584 km<sup>2</sup>) of the total. Among the wards, ward no 25 is boarderd with river Karala and represent the highest percentage (16%) of water bodies , as river Dhardhara and Rajbari Deeghi are also located here. Ward no 20 (12%) and 24 (10%) have considerable percentage of water bodies.

#### 4.3.3.ix Agricultural Land

Agricultural Zones are found in the north-eastern periphery of the town and covers 2.7% (0.350km<sup>2</sup>) lands of the total. The north-eastern zone consists of two wards, of which ward no 2 records the maximum area (20% of the ward), and rest one (ward no 3) covers on 1.5% land of that ward. Other peripheral wards, such as ward no 20, 21 and 25 have 1% to 2% land under this purpose.

#### 4.3.3.x Open space

Open space is the most important factor of urban ecology. In Jalpaiguri town open spaces are scatteredly distributed and occupy only 2.4% (0.313 km<sup>2</sup>) of the total area. The largest amount (17% of the total area) of open space is found in ward no 1 and 22.

**Table- 4.7**                      **WARD WISE DISTRIBUTION OF OPEN SPACE**

% Of open space in wards	Category	No of wards	% Of wards
<3	Very Low	4	16
3 - 7	Low	9	36
7 - 11	Moderate	8	32
11 - 15	High	1	4
>15	Very High	3	12
		25	100

Table 4.7 shows that open space is low to very low (up to 7%) in C.B.D. and in congested residential wards of the town. A moderate percentage (7-11%) is found in 32% of the words, where play ground, parks are located. Among these wards, ward no 3 (near P.W.D more) has a considerable percentage of open space as Jubilee Park, Tista Uddyan along the River Karala and Town Club ground and play ground of Zilla School are located in this ward. Ranching ground near Paresch Mitra Colony (Ward no 25) and open spaces along the river- side also contribute to the amount of open space in the town. The percentage is found high (11-15%) in only one ward (ward no 9) where Police Parade Ground, play ground and spur of River Tista exist as open spaces. In Jalpaiguri 12% of the total wards have open spaces in a very high percentage (>15%), those include Sports Complex (ward no 1), Children's Park, JYMA and Other play grounds (Ward -8), open field between Polytechnic college and burning ghat (Ward no -22).

#### 4.3.3.xi Vacant Land

Vacant land is distributed scatteredly all over the town away from the C.B.D and especially in the east of River Karala. At present 4.2% (0.545km<sup>2</sup>) land of the municipality is occupied by vacant land. The highest percentage (17%) vacant land is found in two wards located in north-eastern corner (ward no 2), and southern part (ward no 11) and lowest is found in ward no 12.

**Table- 4.8** WARD WISE DISTRIBUTION OF VACANT LAND

% Of Vacant Land	Category	No. Of Wards	% Of Wards
<2	Very Low	7	29
2 - 6	Low	8	34
6 - 10	Moderate	2	8
>10	High	7	29
		24	100

It is found that, the percentage of vacant land is very low (<2%) in 29% wards of the town, those are situated in the central business area and central part of the town. The percentage is low (2-6%) in residential wards, those are situated at riverside area, near Rajbari (northern part), Mashkalaibari, Bose Para (North – western part), Danga Para, Pan Para, etc. (southern part) of the town and is shared by 34% of the wards. The percentage of vacant land is high (>10%) in 29% of the wards, those are located at the fringe area. These lands may be regarded as the provision for future changes.

#### 4.3.3.xii Miscellaneous Use Of Lands

Miscellaneous land use is multi-dimensional in nature. Land under this use occupies 3.3% (0.428 km<sup>2</sup>) which includes auditoriums, cinema halls, clubs, social forests and other recreational places and crematorium, graveyard, church, orphanage etc. The highest percentage (12%) is found in ward no 22, where crematorium, graveyard, several temples are located and lowest percentage (0.3%) is found in ward no 12, where small temples are included under this category. This type of land use is dominant due to the existence of Ram Krishna Mission in ward no 10, Rabindra Bhavan in ward no 5, Jogomaya & Madan Mohan Temple, Netaji Bhavan in ward no 7, Rupmaya & Dipti Talkies, Bhandhab Natya Samaj Bhavan in ward no 17 etc.

# **LANDUSE** **JALPAIGURI TOWN** **2007**

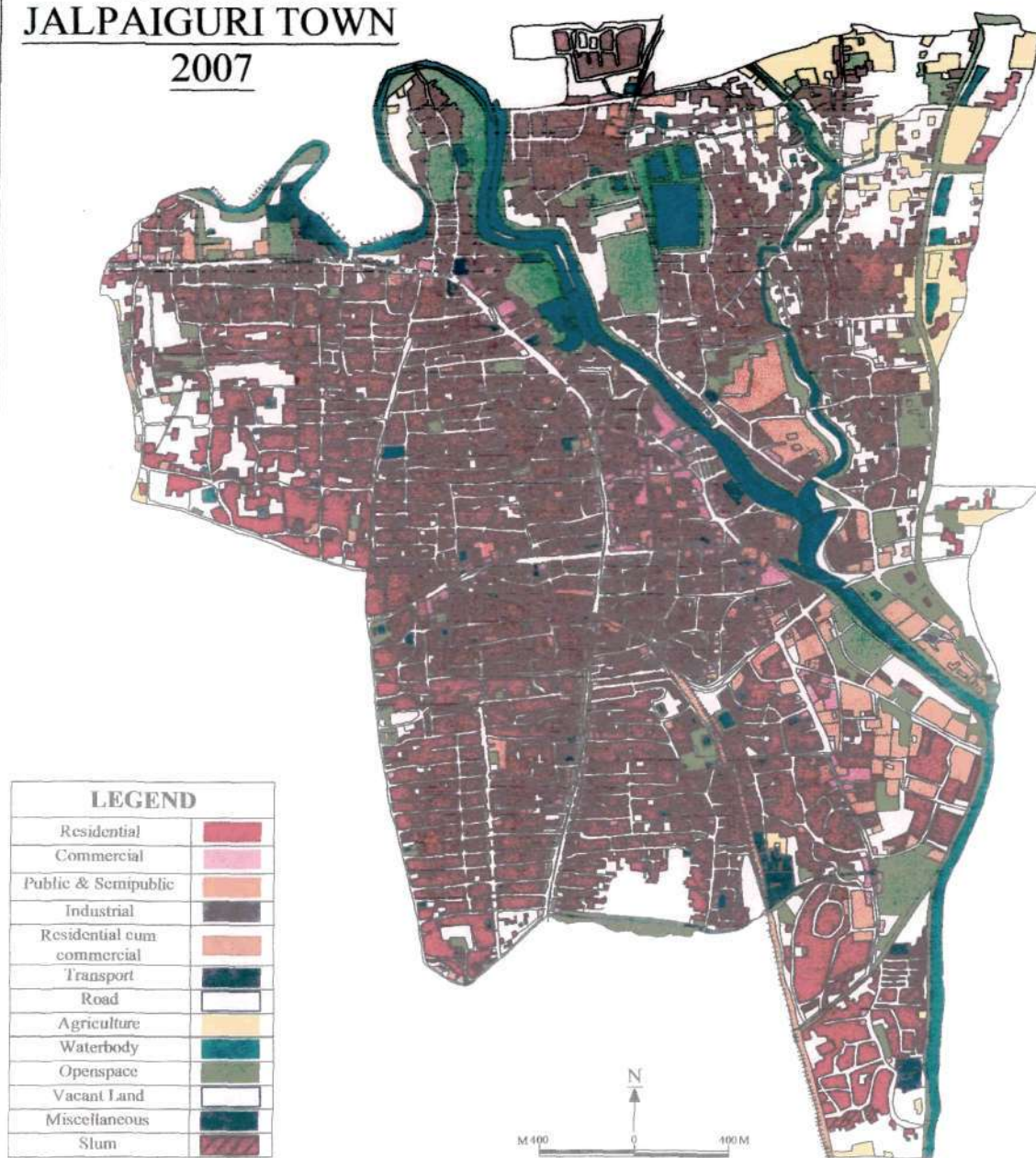


Fig - 4.4

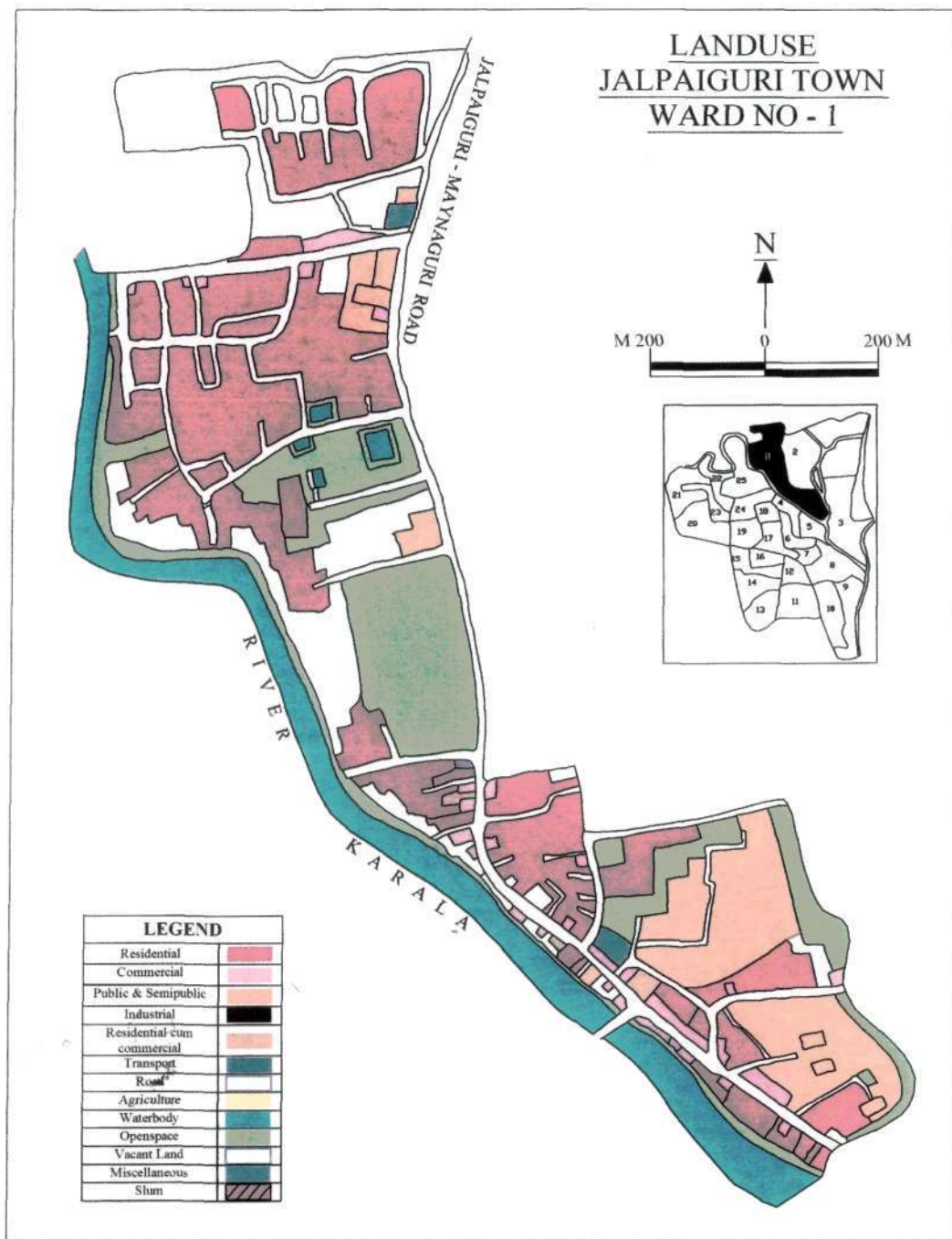


Fig- 4 5

LANDUSE  
JALPAIGURI TOWN  
WARD NO - 2

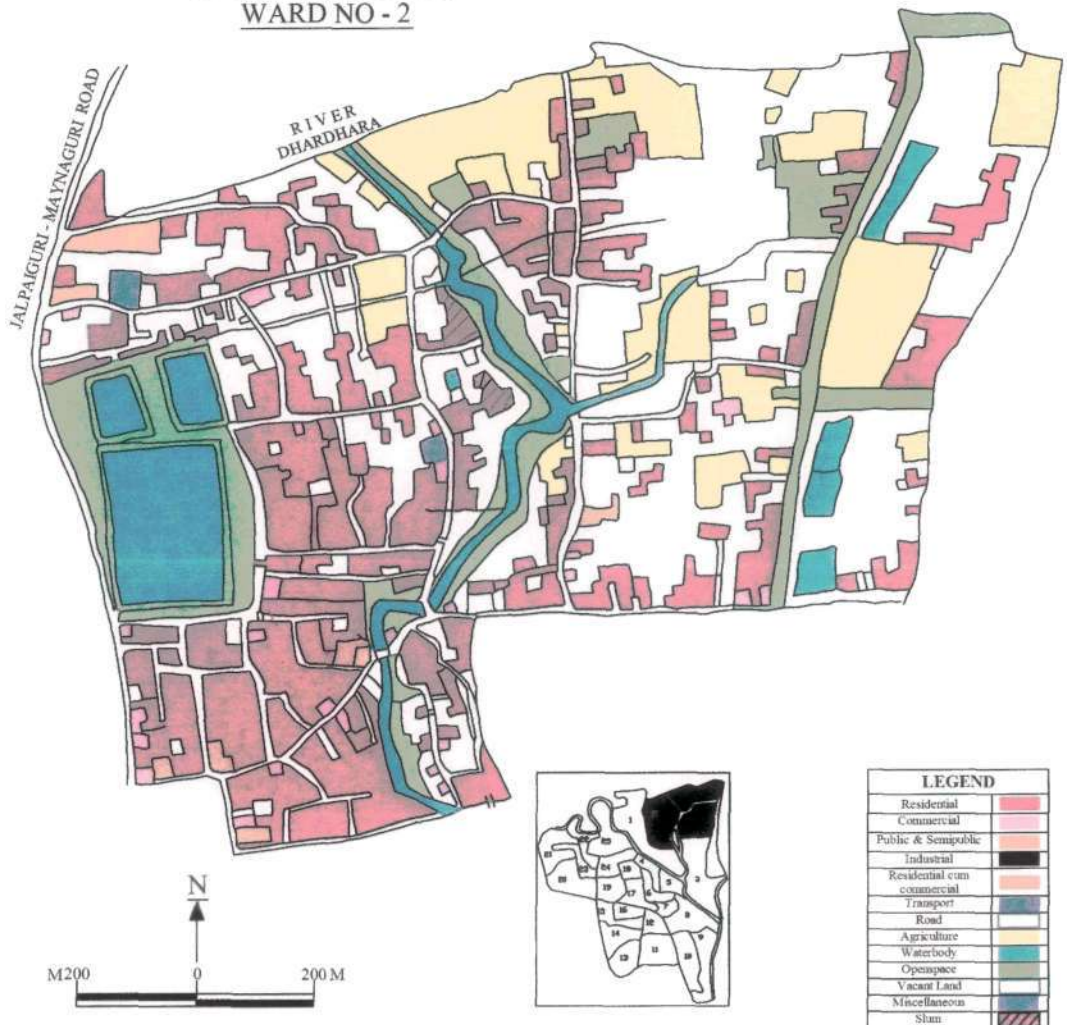
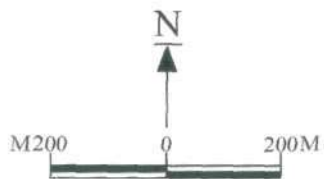


Fig- 4.6

LANDUSE  
JALPAIGURI TOWN  
WARD NO - 3



LEGEND	
Residential	[Pink]
Commercial	[Light Pink]
Public & Semipublic	[Light Orange]
Industrial	[Black]
Residential cum commercial	[Dark Orange]
Transport	[Dark Blue]
Road	[White]
Agriculture	[Yellow]
Waterbody	[Teal]
Openspace	[Green]
Vacant Land	[White]
Miscellaneous	[Dark Green]
Slum	[Hatched]

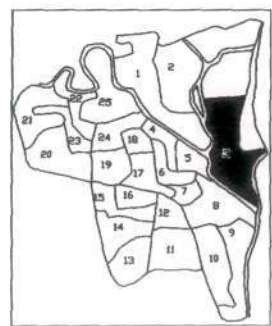


Fig- 4.7

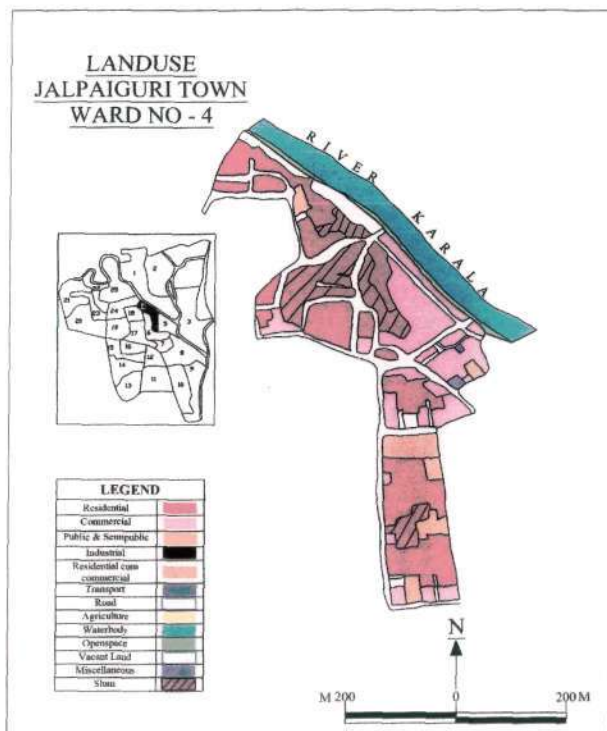


Fig- 4.8

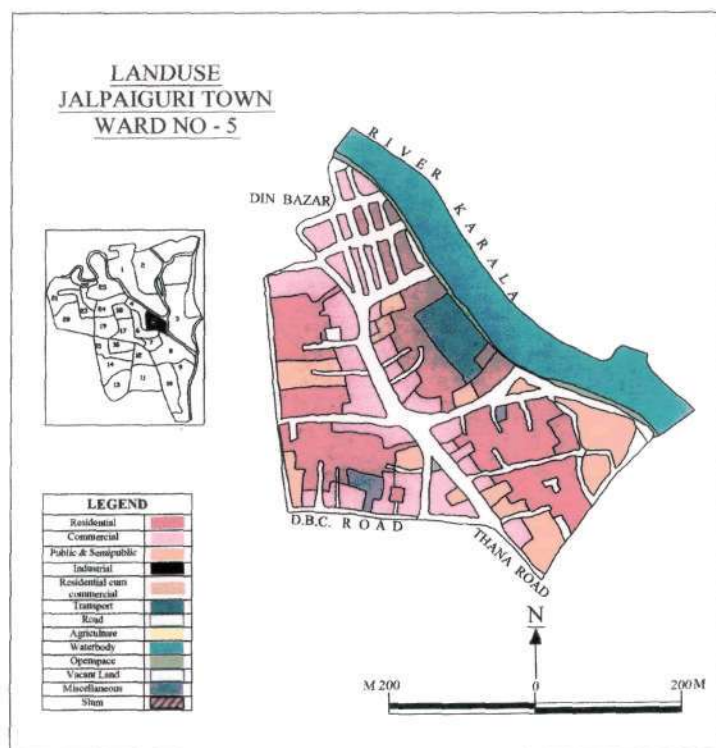


Fig- 4.9

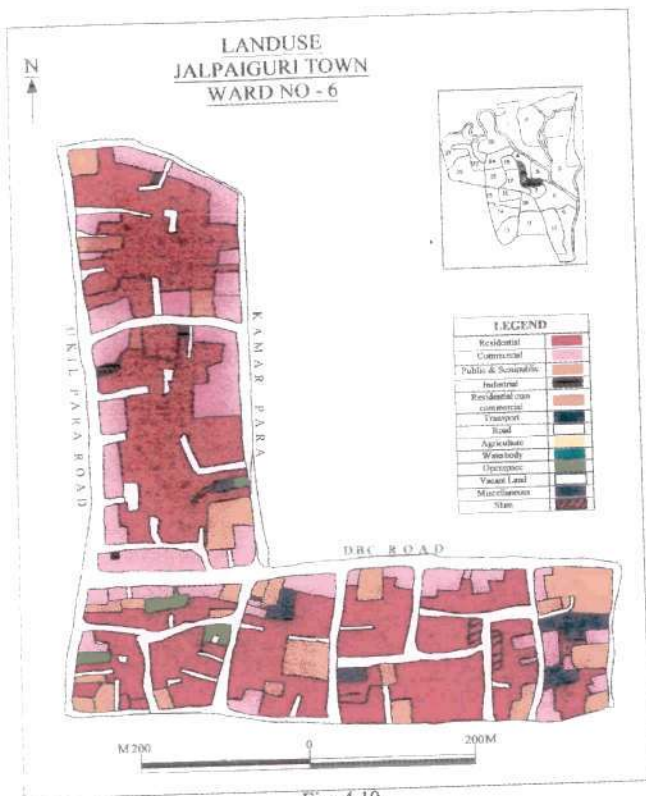


Fig- 4.10

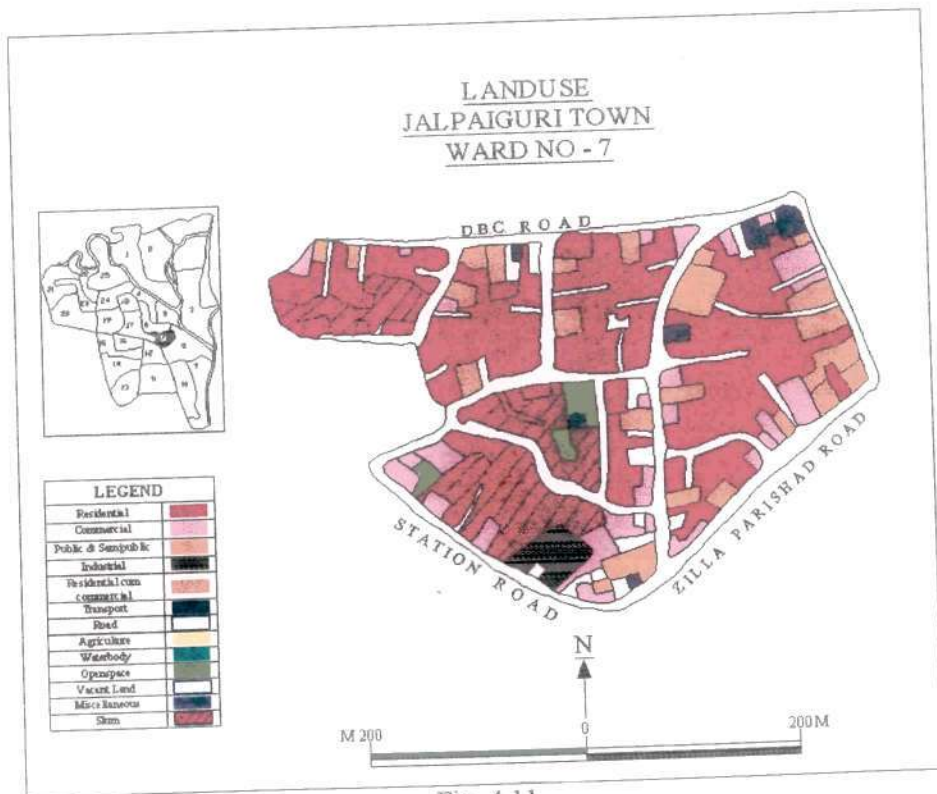
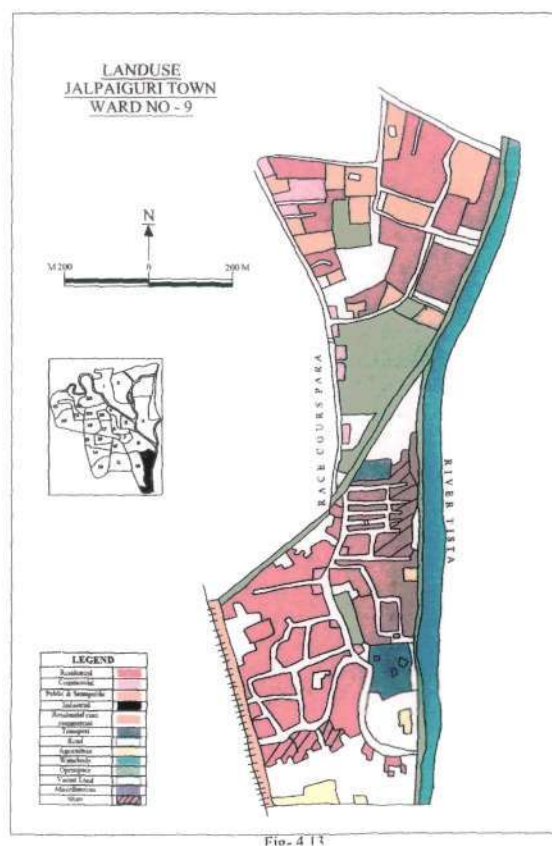
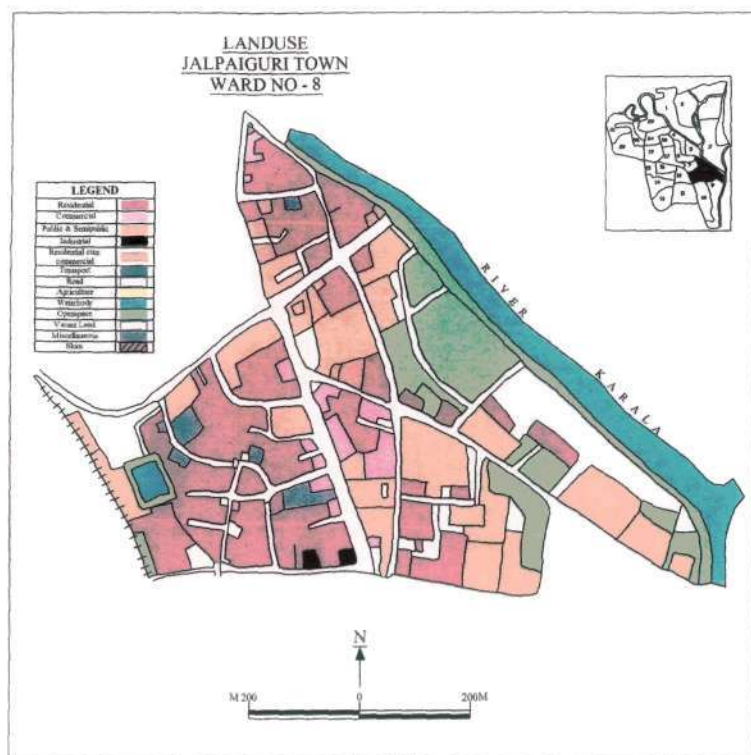


Fig- 4.11



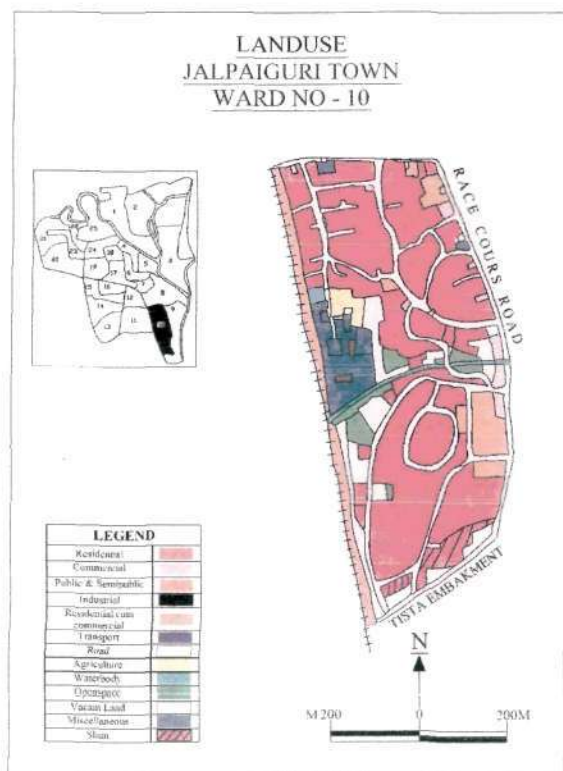


Fig- 4.14

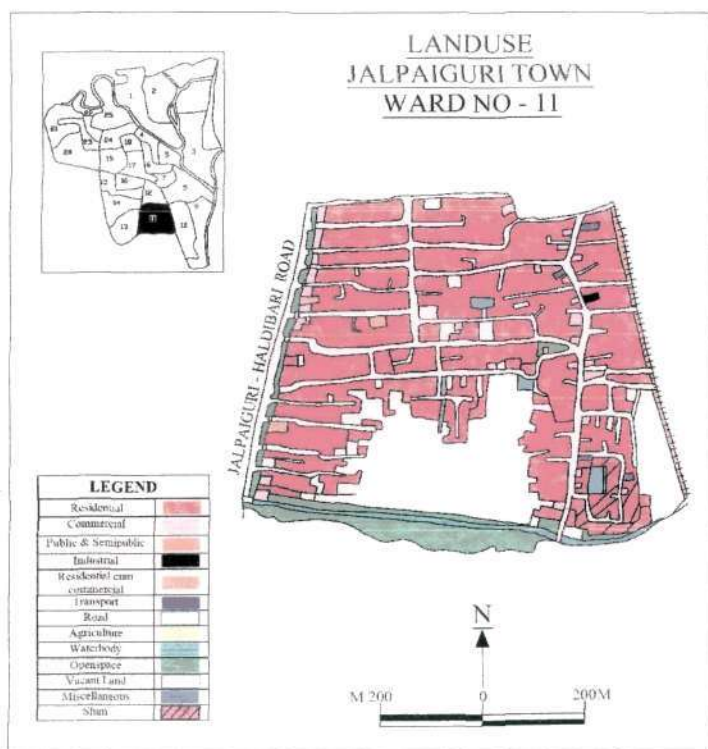


Fig- 4.15

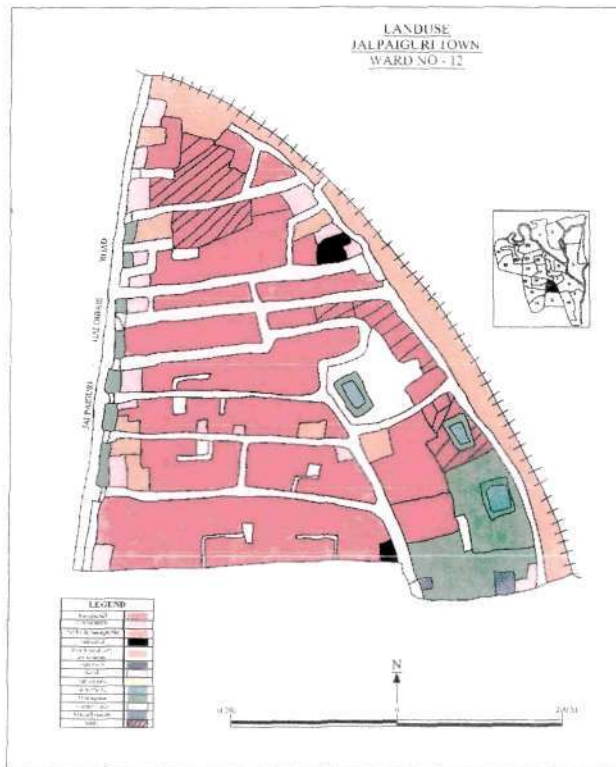


Fig- 4.16

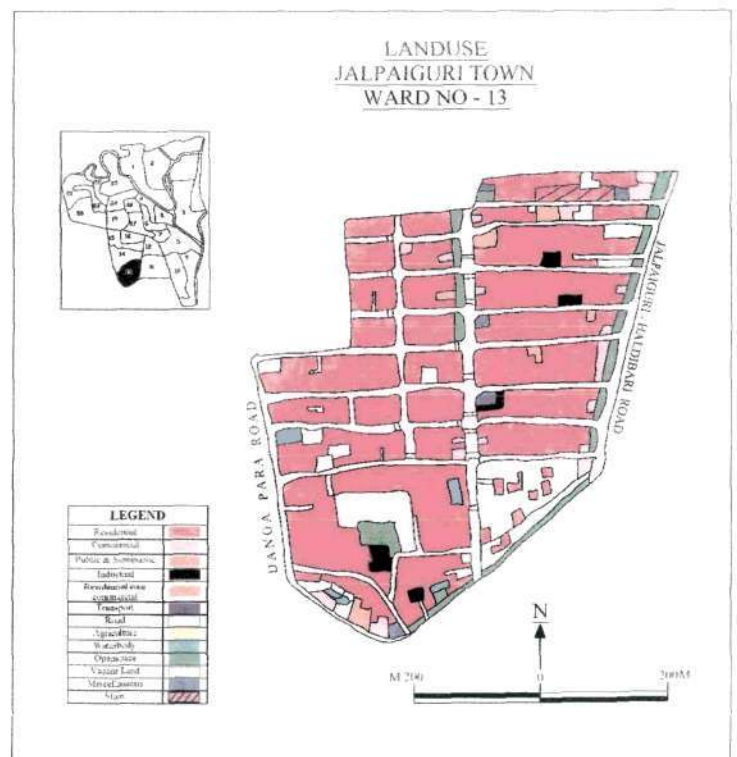


Fig- 4.17

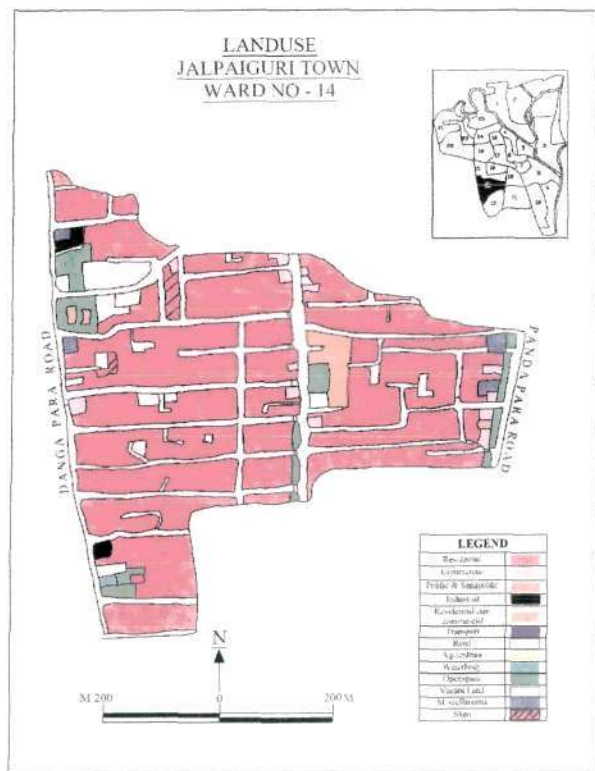


Fig- 4.18

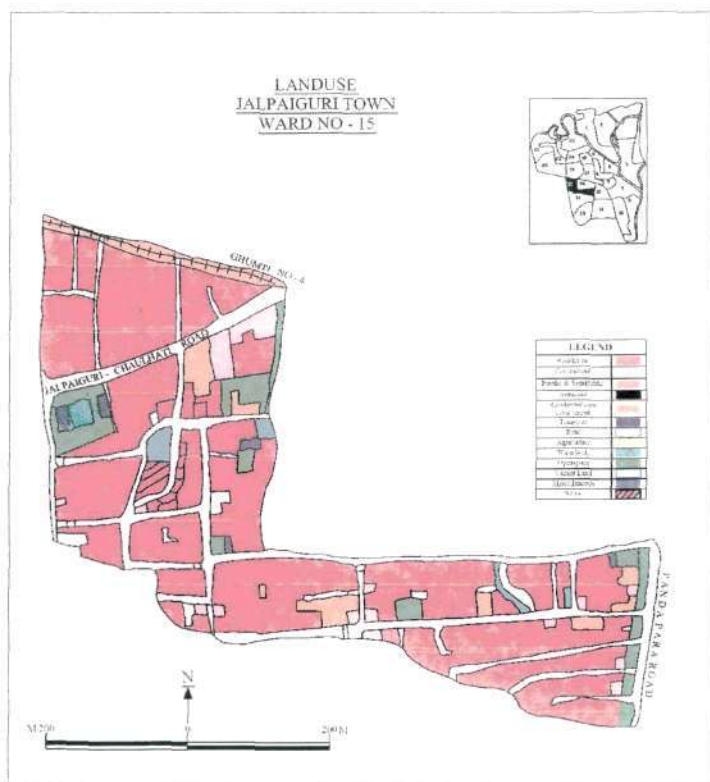


Fig- 4.19

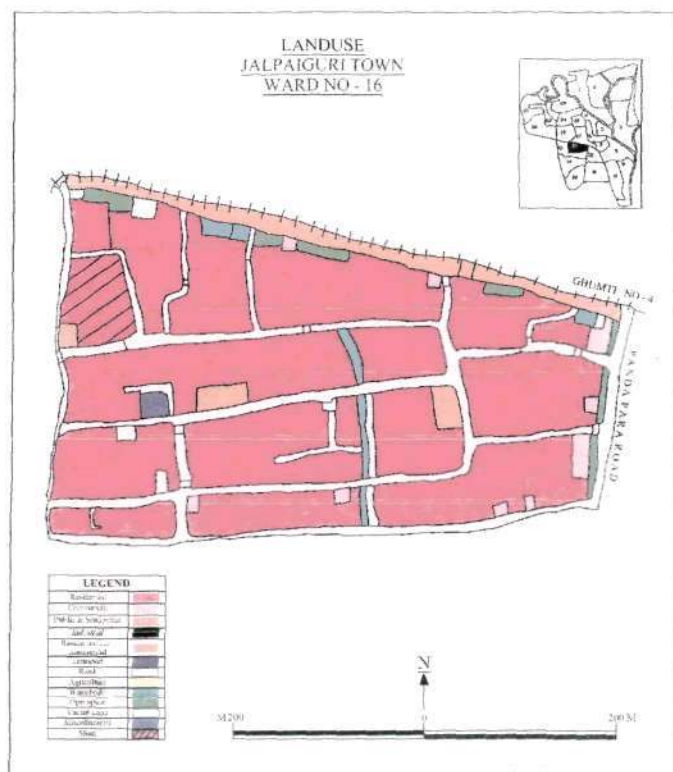


Fig- 4.20



Fig- 4.21

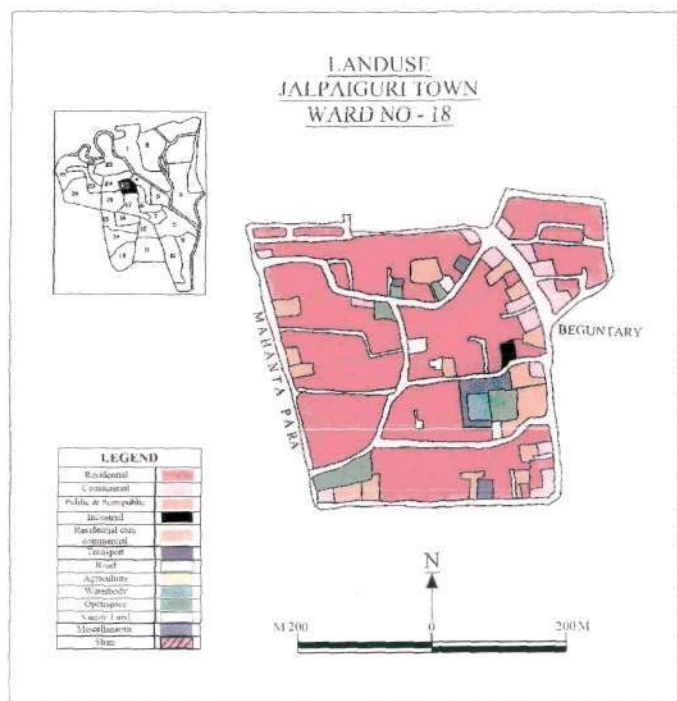


Fig- 4.22

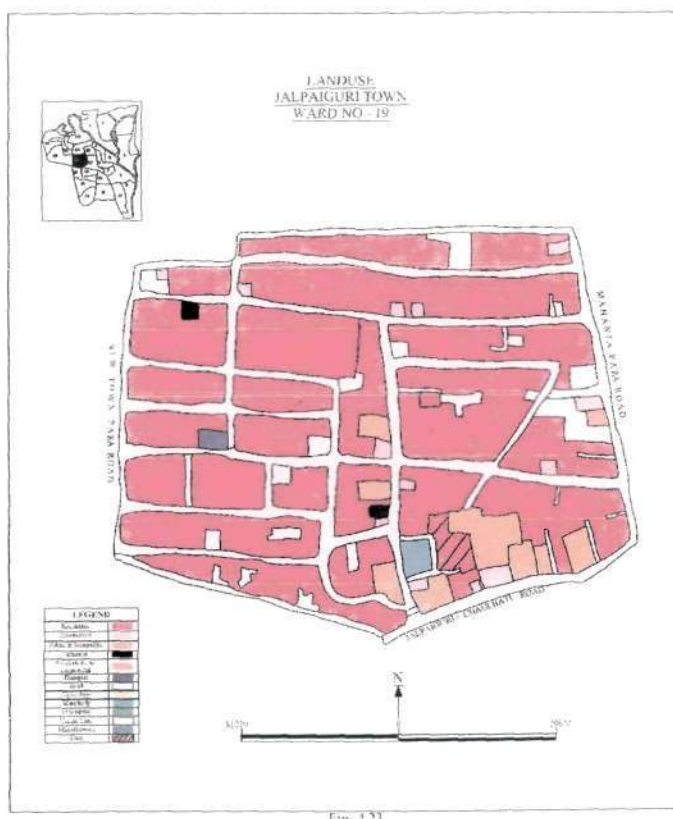
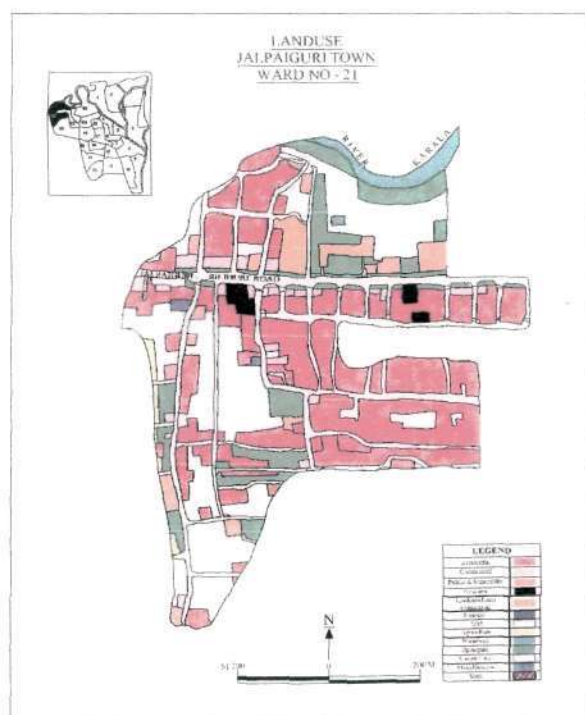
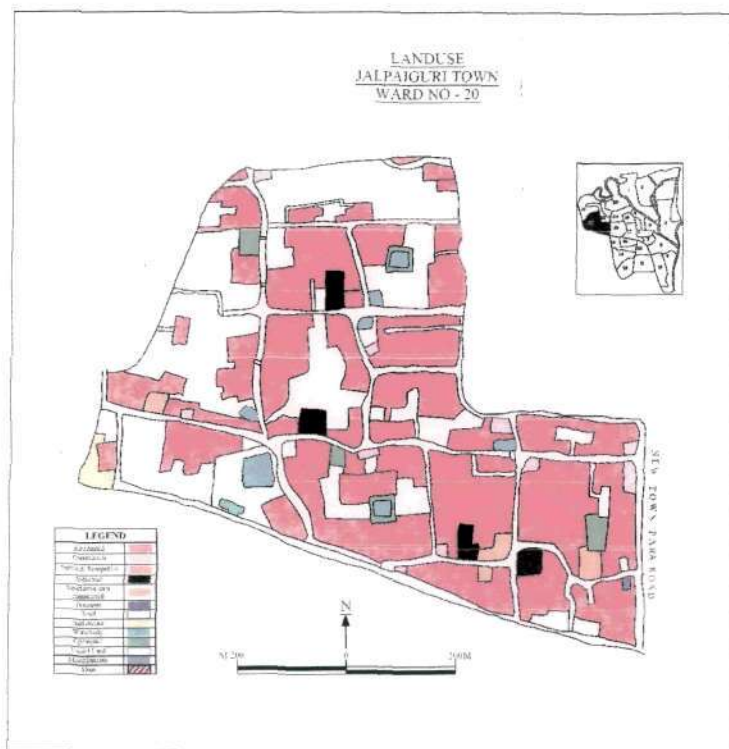
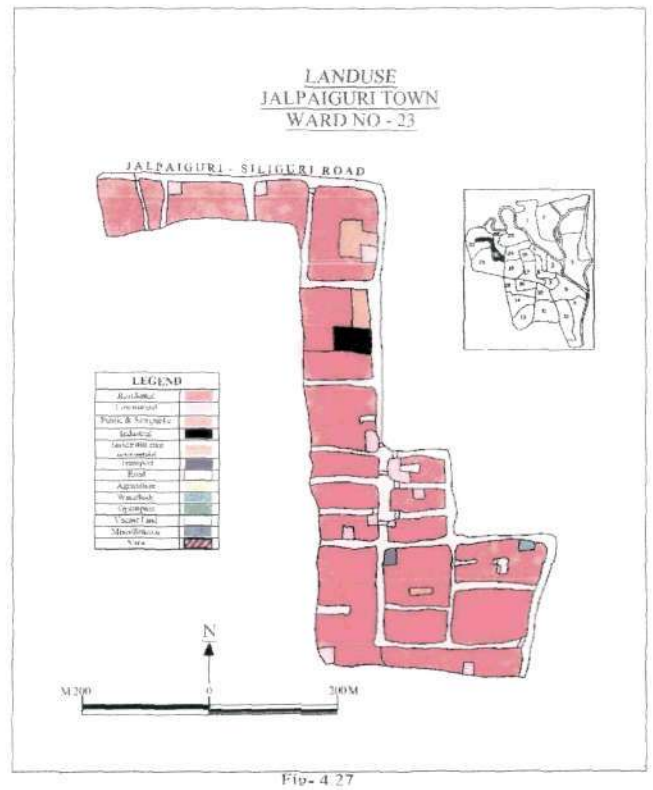
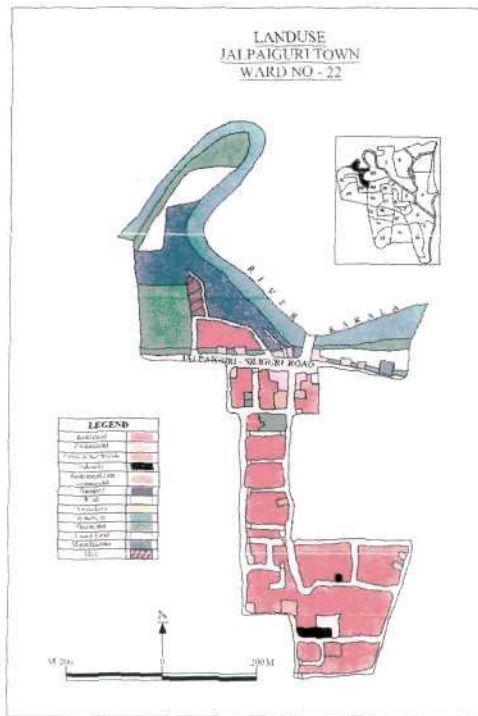


Fig. 4.23





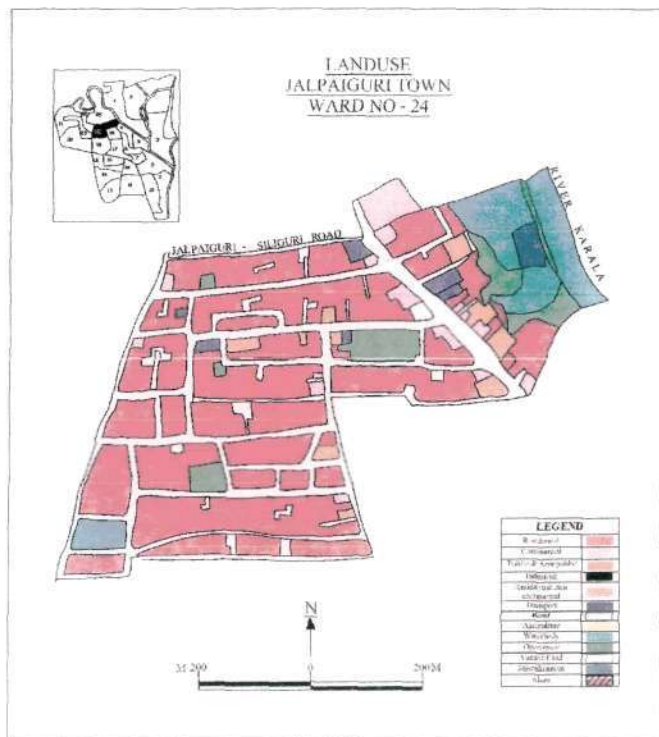


Fig- 4.28

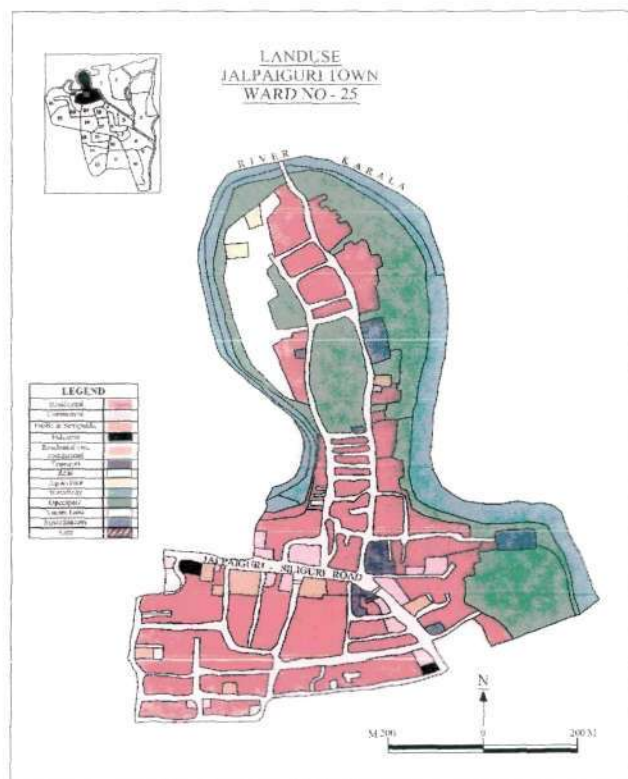
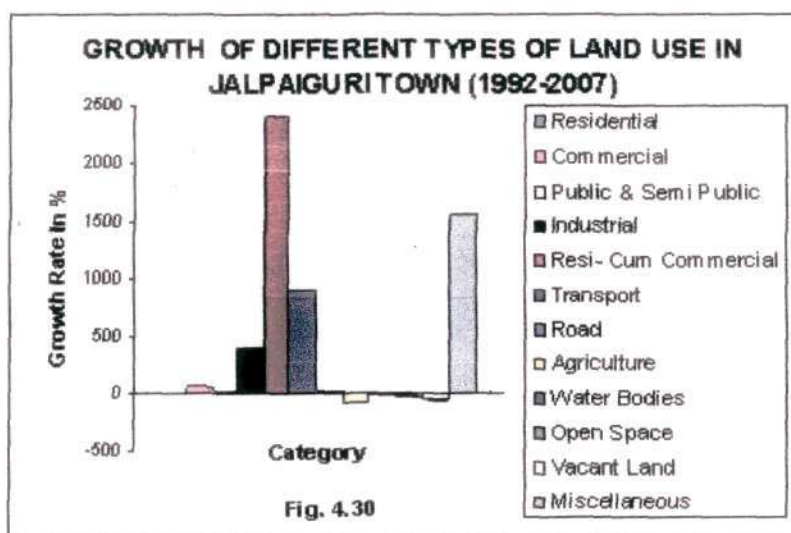


Fig- 4.29

#### 4.3.4 Changing Pattern Of Land Use

With the growth of time the use of land changes specially in order to meet the new demands of society. The economic, social and political pursuits of man bring about a remarkable change in urban land use pattern. The availability of land is limited, so the transformation of land is therefore, an important aspect of land use study. The vertical growth and horizontal expansion of the town are controlled by integration and disintegration activities caused by attraction and dispersion forces. The spatial differentiation of activities results into the spatial structure of the town. The area of the town increased from 10.08 km<sup>2</sup> to 12.975 km<sup>2</sup> due to the addition of an area of 2.895 km<sup>2</sup> of land incorporated since 1995. The previous built up area, which was included with in the municipal boundary after 1995, shows maximum growth due to functional movement towards the fringe. Fig.4.30 shows that, the main urban functions i.e. residential, commercial, resi-cum-commercial and miscellaneous uses have experienced positive changes, as the percentage of lands under these use has increased with the increase of total area of the town.



##### 4.3.4.i Residential Use

Residential use have increased by about +7.68% in the town and this is possible due to the availability of vacant land in the newly added area at the whole western part and south western part of the town. Main transfer of land from vacant to residential use has taken place in new six wards. About 25% of agricultural land of the town encroached by residential land use, and the maximum encroachment of agricultural land for residential purpose has taken place in present ward no 2. The demand for space has resulted fragmentation of land holding near C.B.D, and

the change of building types from single story to double storied become common in densely populated residential areas. Some multistoried residential flats added new color to the main business thorough- fares in the town.

#### **4.3.4.ii Commercial**

The growth of population in the town has also led to the expansion of commerce. Commercial use has increased by about 65% of the town. During last 15 years with the emergence of smaller marketing centre and new shopping ribbons, the total business area has considerably grown up. A narrow band of commercial development is found on both sides of the main arterials and extended in north western part along the Siliguri – Jalpaiguri Road and in southern part along the Haldibari Road in a ribbon form. Some isolated store clusters are developed with in the residential areas of the town. Residential-cum-commercial land use has also increased mainly near C.B.D.

#### **4.3.4.iii Public And Semi Public Use**

Land under public and semi public uses have also increased by 11.11% and mostly concentrate in the eastern part.

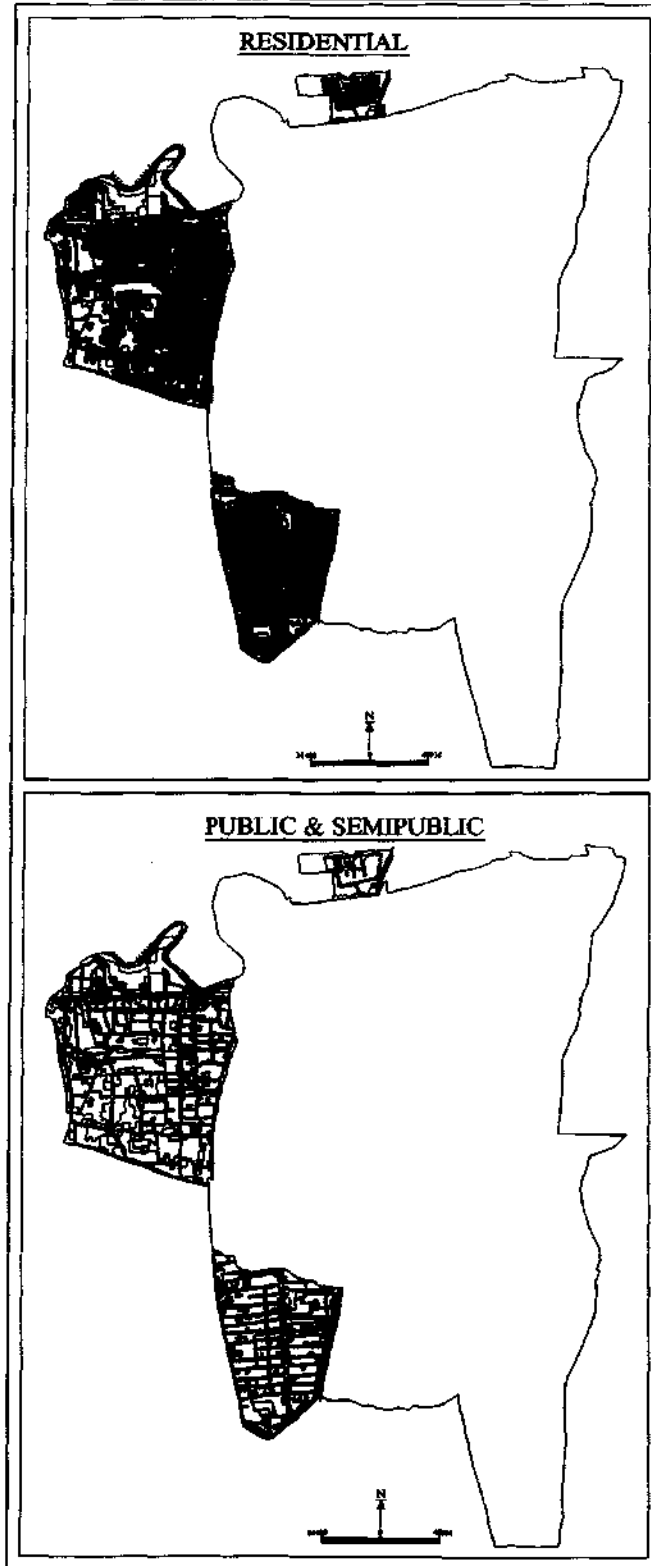
#### **4.3.4.iv Agricultural and Vacant Land And Water Bodies**

The remarkable decrease (~79.23%) is found in the amount of agricultural land. The encroachment of agricultural land for residential use is the main reason behind it. About 26.71% of previous agricultural land remain as same. About 48.29% lies as vacant land, which yet to be converted to their users in future. It is also found that vacant land has decreased by 47.5% because, vacant places has a tendency to decrease at a faster rate than any other urban use. Due to increasing land price and scarcity of land in the town, the water bodies are dwindling by 10%. Unauthorized encroachment and filling up are the main reasons behind this.

With the changing pattern of economic and cultural condition of the town a remarkable increase of miscellaneous land use is found in the town. The changes can be summrized –

- (a) The majority of vacant space with- in and around the town is transferred to residential use.
- (b) Multistoried buildings are increasing day by day
- (c) The commercial area become more congested due to the increase of both commercial and resi-cum-commercial land use. Hotels, restaurants, business flourished here.

CHANGES OF LAND USE (1992-2007)



CHANGES OF LAND USE (1992-2007)

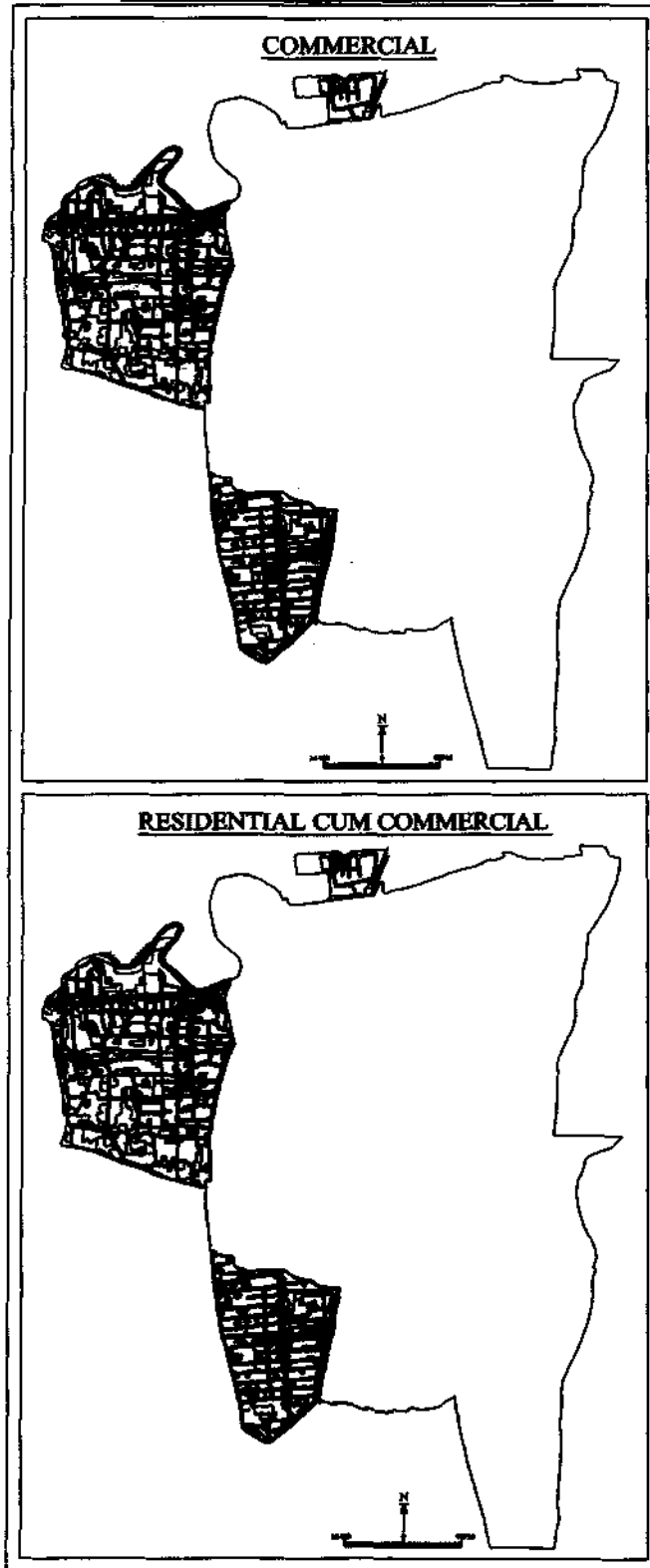


Fig - 4.32

CHANGES OF LAND USE (1992-2007)

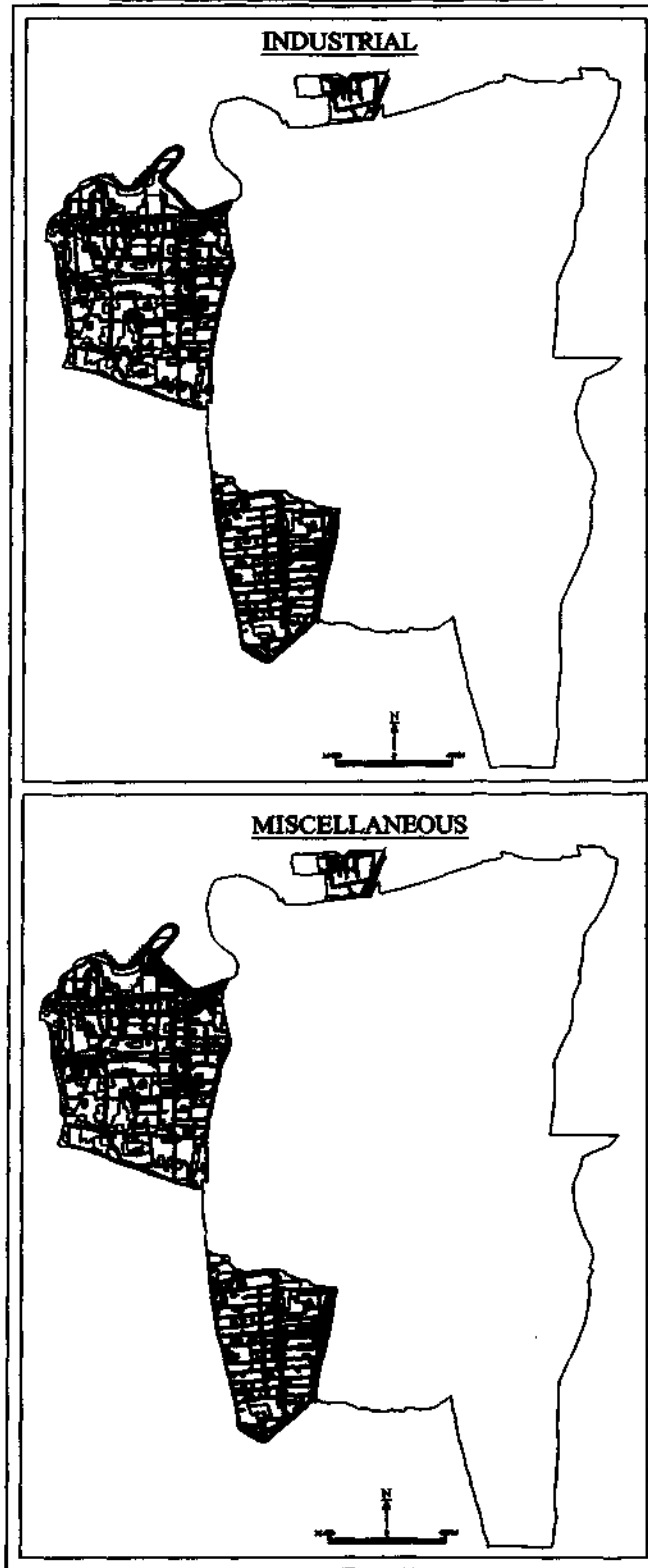


Fig-433

- (d) Many slums have occupied the vacant lands within the town, and along the embankment of river Tista.
- (e) Public and semi Public uses of lands are concentrated within a specific area, whereas scattered distributed in the past.
- (f) More roads and lanes are coming out in the newly added area
- (g) The percentage of miscellaneous use of land has increased in the town.

#### **4.3.5 Direction Of Change**

In all round development is found in the town (Fig-4.31 to 4.33), specially in south and north west directions. Among the different uses residential uses are expanding towards the western part of the municipality, whereas commercial land use is expanding towards north western fringe along Siliguri – Jalpaiguri Road, towards south along Haldibari- Jalpaiguri Road, and towards northern fringe along Jalpaiguri – Maynaguri Road forming a narrow band. The embankment of River Tista, and River Karala restricted the growth in the eastern and south-eastern part of the town. It can be said that the direction of growth of residential land use is not confined horizontally throughout the town, but also vertical growth is found in a form of multistoried buildings.

### **CONCLUSION**

During the last 50 years, the town has developed by functions and growth of built up areas within and outside the municipal limits. Jalpaiguri is unplanned residential town, where the land use transformation is basically the outcome of competition among various land use classes. Though there is a planning authority (S.J.D.A), but the town developed haphazardly with time, and the central part of the town has become more congested, while on the other hand the town has expanded outward in a haphazard manner and swallowed the agricultural land in the fringe area which is less congested in nature. In Jalpaiguri a large number of functional units may have no fixed location or structure, which use the street side or public places unauthorized. The vendors or the bicycle repairers use temporarily any piece of land in the open air. In the so-called commercial core, people live side by side the shops or at the back or upper stores of shops. The spatial expansion of the town takes place mainly along the transportation arterials, which change the growth pattern from circular to linear. According to Misra (1978) every thing of basic

necessity are available in walking distance in this 'pedestrian town', which also encourages the compactness of the town. Various urban functions are so widely dispersed in the town, that predominantly residential areas also have retail shops, workshops etc. Some public or semipublic offices are also exist in residential areas with in the walking distance.

Jalpaiguri is predominating a residential town, which has least developed with its functions like commerce and trade, industry and others. The residential areas share the major area of the town. During the last 15years, 75% (2.174 km<sup>2</sup>) of the newly added area of 2.895 km<sup>2</sup> is occupied by residential purpose, which shows the positive growth of 7.68% under this use. Natural growth along with continuous emigration of rural people in search of jobs increase the population pressure in the town, which increase the demand of land for residential purpose. The location of administrative headquarters along with all other infrastructural facilities those are more attractive than the surrounding rural areas are responsible for the continuous increase of residential areas in the town. Fragmentation of land holdings helps to increase the intensity of land use for residential purpose near the C.B.D, and in the main residential area at the central part of the town. Morphology of Jalpaiguri town is also concern with the ground building and skyline of the houses vertical development of structure is formed in the town of multistoried buildings. Due to high cost of land in core area old one storied buildings are converted to multistoried building to cope up the demand. An increasing trend of multistoried building gives a new look to the vertical growth of residential use in the town. Some vacant lands of the town are occupied by slums for residential purpose. The slum areas a unique land use of Jalpaiguri town as well as in India. The slum area crops up with in a short period any where in the town in vacant or pen space.

As any other Indian town, in Jalpaiguri the streets are narrow and irregular. The town does not afford to have wide roads wasting valuable space for pedestrian, which is the reason of congestion in the core area. A considerable percentage is devoted to roads and streets (7%), which is quite natural for this town. Remote places are well connected by *pucca* roads with the main commercial center of the town. Five transport & Communication centres are developed in different places. This is due to lack of wide space for accommodated enough busses and trucks in one place.

In the municipality, the 3<sup>rd</sup> most important land use is commercial (6.6%). The demand for goods both for residents and daily commuters of the town, help to flourish the commercial activities, which shows the increasing trend of commercial use along the major business thoroughfare of the town. Isolated stores are scatteredly developed within the residential area to meet the daily needs of the residents. This also helps to increase the percentage of resi-cum-commercial use of land in the town. As the administration is most important in the town, the public, semi public offices are accommodated in different places besides having isolated pockets in the town. Many public and private use of lands such as educational institutions, nursing homes, libraries etc. are unevenly distributed, and show an increasing trend. During the last 15 years land under miscellaneous use has experienced the highest growth (+1550%) rate than other land uses. This is an evidence of growth both in area, and infrastructural condition of Jalpaiguri town. On the other hand, areas under agricultural land (-79.23%) open space (-20%) and vacant land (-47.5%) have been reduced due to pressure of population for accommodation and other purposes. Another peculiar feature of the urban land use in India is historical wastage – is the area set aside for the former British residence, which is also found in the town. It can be said that land under individual use such as residential use, public use are separated by other land use, due to lack of proper planning and implementation of standard land use practice in the town.

The morphology of town depends on human response to certain stimuli, which are not necessarily apparent everywhere (Ghosh. Sumita 1998). But the morphology of the town does not necessarily depend on its relationship with the C.B.D. only as set out in the classical models, various other linkages also exist. The availability of several amenities such as electricity, water, road-transport, education and mainly job opportunities encourage continuous immigration which further led to shortage of land around C.B.D and allowed buildings to grow vertically. So, it can be said that the morphology of the town has been changed with a fast increase in the aerial extent as well as the vertical growth of the town. Aerial photography mapping technique, addition of new dimensions and intensive field survey become the useful tool to the planners for identifying the existing morphology of the town and for the implementation of future developmental plans.