

Research Paper

AN ANALYSIS OF THE MORPHOLOGICAL STRUCTURE OF KALYANI-A PLANNED CITY OF NADIA DISTRICT, WEST BENGAL

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ABSTRACT

Traditional urban centres had generally grown in an unplanned and spontaneous manner all over the world, triggering numerous problems in socio-economic and environmental dimensions. These problems are of common parlance world over but more acute in the third world countries like India. To overcome these problems, restructuring of old cities as well as establishment of new planned cities were noticed in India. Thus the urban geographers started to put their interest on it and analyze the negative and positive aspects of both planned and unplanned cities. The present paper takes an attempt to analyze the basic morphological characteristics of Kalyani, a modern planned new industrial township, built in 1960s in Nadia district.

West Bengal from the perspectives of physio-cultural fabric of the concerned area. Finally the future apprehensions and aspirations regarding the morphological structures of the town have been emphasized for urban sustainability.

Introduction

Urban morphology is the study of city as human habitat. Urban morphologists focus on the tangible results of the social and economic forces. They study the outcomes of ideas and intentions as they take shape on ground and mould our cities. Building, gardens, streets, parks and monuments are among the main elements of morphological analysis (Moudon, 1997).

Objectives

The major objectives of the current study are

1. To identify the existing morphological characteristics.
2. To explain the existing land use pattern based on physical as well as socio-economic characteristics.
3. To find out the pattern of growth on absolute and temporal space.
4. Advantages and disadvantages triggered by the existing land use.
5. To find out solutions for better urban life.

Database and Methodology

Both primary and secondary database has been used. Secondary data related to detailed land use, ward map, road map collected from the municipality; population related data from census of India; satellite image form Google earth and statistical information from statistical hand book. Primary data collected from detailed field survey to check land use zones, field measurement of road width, and area of household plots in different part of the town.

In generalized land use map six zones have been identified (Briggs, 1978). Residential areas are divided into two zones: upper class residence and lower class residence which includes basically colony and/or slums. In the zone of CBD main commercial areas, government offices, public and private offices, financial institutions etc. are included. The zone facilities and utilities includes all educational institutions like, University, schools and colleges, recreational parks, government utilities, hospitals and nursing homes, municipal service utilities etc. All the manufacturing industries are included in the zone industry. Urban agriculture, livestock farms and forest areas are included in the zone green Belts.

This is an empirical study based on secondary data and field level observations and measurements. Maps and diagrams are prepared on a computer environment using Mapinfo 7.0, Geomatica 9.1, Adobe Photoshop 7, Microsoft Office etc. and techniques used for analysis are bar and circle diagrams, chorochromatic mapping technique, detour index, network analysis based on shortest path, direct link matrix etc.

Study Area

Kalyani, a planned new industrial township established after the 2nd World War and is situated in Chakdah Block in the southern tip of Nadia District, West Bengal. The geographical extension of Kalyani is 88° 24' 44.64" E to 88° 28' 38" E and 22° 59' 36" N to 22° 57' 00" N and (fig. 1). There are 20 wards in the town of Kalyani with a municipality established

in 17th October 1995 covering an area of 29.14 sq. km (2010).

Historical background of Kalyani

Kalyani started to develop immediately after the 2nd World War in 1950 and completed in November 1965 (Census, 1961). One of the major objectives was to establish it as a counter magnet of Kolkata to hold considerable number of population and with this reducing the in migration of population from surrounding fringe area to Kolkata. Keeping this purpose in mind the then Chief Minister of West Bengal Dr Bidhan Chandra Roy plan to develop a completely new town with all modern amenities and facilities in the periphery of Greater Kolkata and He chosen the present location of Kalyani (the vast areas of the deserted Roosevelt City of the US military during the 2nd World War). To make Kalyani a modern planned town its land use was planned. The total area acquired for the Kalyani was 3836.42 hectares (38.3642 sk. km). The area was divided originally into six blocks: A, B, C, D, E and F together with areas reserved as green belt on the periphery of the same (Census, 1961). A little later blocks A, B, C, D was included in Kalyani and blocks F and F was included in Gayespur. The blocks with their corresponding areas are given below:

Table-1: Area of blocks at the time of town establishment

Blocks	Area (Acres)
A	1216
B	1098
C	640
D	720
Total	3674

Green belt covers an area of 1432 acres.

Source: Census of India, 1961

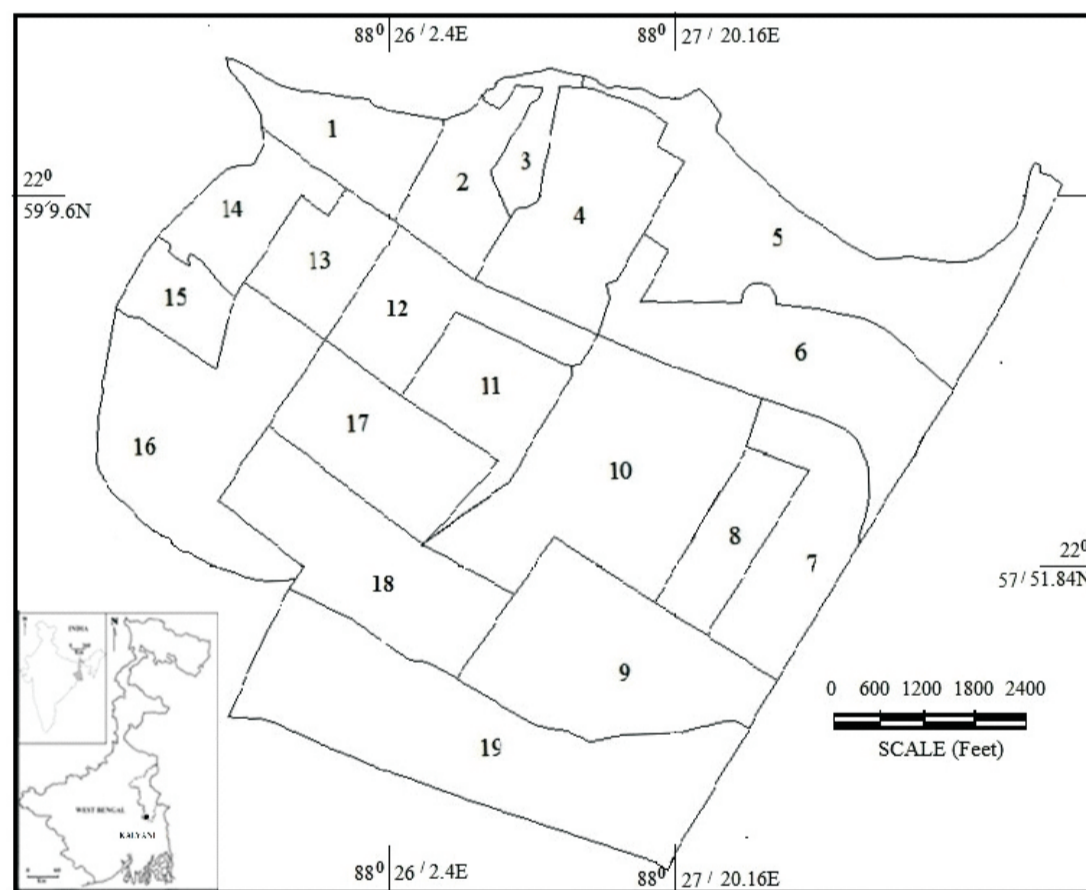


Fig.1: Study Area

Site and Situational Advantages

The site of the present Kalyani Municipality area was a deserted military camp used by US military during 2nd World War. This was a vast area awaited to be its potential use until 1950. Bhagirathi-Hooghly River flowing just on the western side of the area and two ox-bow lakes (previous parallel channel of the river Bhagirathi-Hooghly) are in the eastern part. Besides, this is an area surrounded by vast rural areas.

The situation of the town is also important. It is just 47 km. away from the Kolkata and The South-Eastern Railway

line pass through the eastern part of the town. It is directly connected with Kolkata by both road and rail (fig. 2).

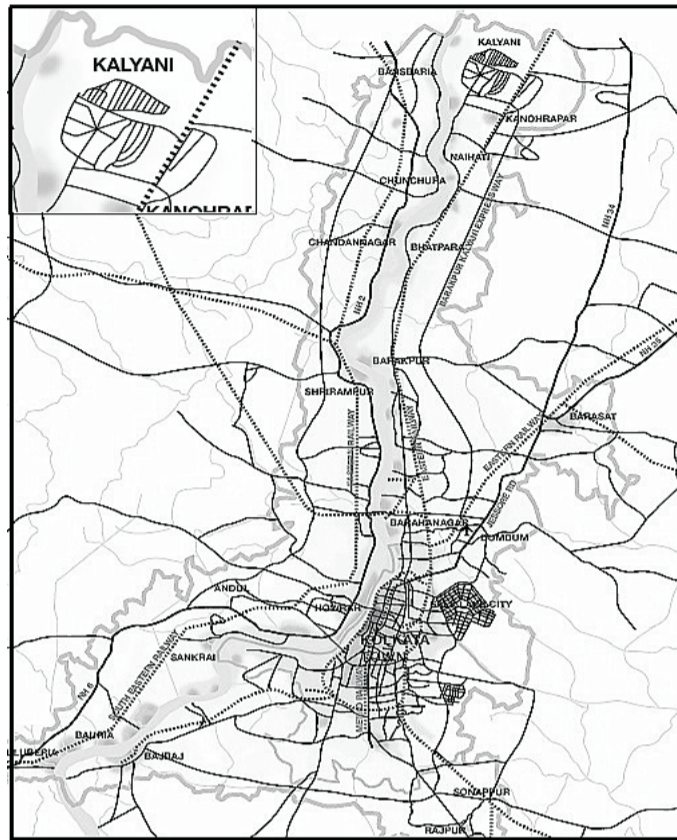


Fig. 2: Greater Kolkata Metropolitan District

Source: www.studio-basel.com/assets/files/files/13_atlas_web.pdf

Existing morphological characteristics

A) Urban Land uses

The net effect of the socio-spatial processes is revealed most clearly in the land-use structure of the city (Pacione, 2005).

The major land use zones, subdivided conveniently, are as follows:

1. Central Business district (CBD)

Central business functions are distributed in different parts of town and the commercial markets are distributed evenly in the residential blocks to reach to the residents. The principal central business district is in the central park area of block-B and it is the largest CBD of Kalyani and many of the commercial, financial and administrative institutions are located. The next important CBD of the town is in the central part of the town, i.e. the City Centre area where municipal office, sub-divisional, judicial and financial offices are located and it is basically administrative CBD. This is situated in between the two main residential blocks from where it is equally accessible. Another important Business District is situated in the east central part of the town, i.e. near the Kalyani main railway station of block-A where some financial, government and commercial institutions are located. Other important commercial hubs are located at the Simanta area in the eastern part of the town. All these are located in the most accessible zones of the town (fig. 3).

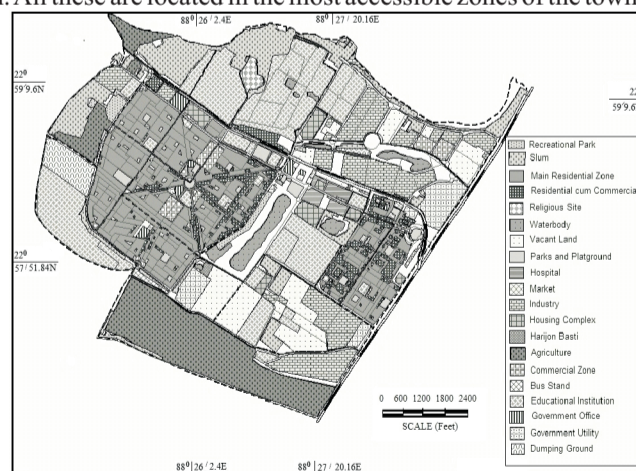


Fig. 3: Detailed land use map of Kalyani, 2010

Source: Kalyani

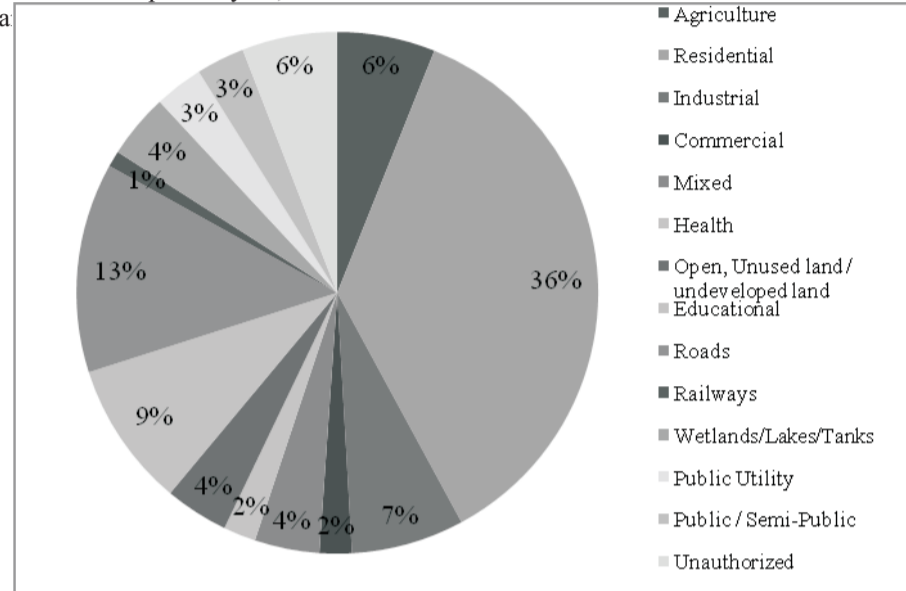


Fig. 4: Percentage area covered by different categories of land uses

Source: Kalyani Municipality, DDP, 2007-12

2.Upper Class Residence

The upper and upper middle class people reside exclusively in two distinct residential blocks namely block-A and block-B covering an area of 27% of the total area of the town (fig.3). In between these two residential blocks the main administrative CBD as well as main area of facilities and utilities are located.

3.Lower class residence

The most unplanned development of the planned town Kalyani is its uncontrolled growth of colonies or slums (52 in numbers) situated basically in the peripheral areas though some small colonies are scatteredly distributed in the upper middle class residential areas (figs. 5 and 6). These are the refugee inflow from the then East Pakistan. Most of inflow occurred after 1947 and 1971.

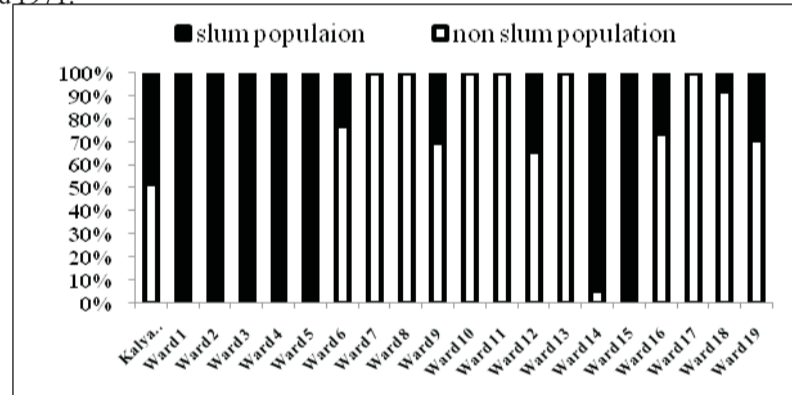


Fig.5: Ward wise distribution of slum population, 2001

Source: Census, 2001



Fig.6: Slum areas of Kalyani



Fig. 7: Green covered areas

Source: Kalyani Municipality, 2010

2.Facilities and Utilities

Various public, semi-public and municipal utilities are arranged in a planned way during the establishment of the town and different categories are located in different parts of the town. For example, the hospitals, medical college, are located in between the two main residential blocks for easy access from both the residential blocks. On the other hand Kalyani University covers the entire C block (fig. 3). All the categories of facilities and utilities together cover 15% of the total municipal area (fig. 4).

3.Industries

Kalyani is developed as new Industrial Township and for this purpose the entire D block has been left for various large and small scale industries to set up (fig. 3). Most important morphological feature is that industrial area is entirely separated from the residential areas and located in the north-eastern side of the town obeying the wind circulation in the area as most of the time wind blow southerly and south-westerly. The area covered by industries is 7% of the total municipal area (fig 4).

There were total 84 industrial units established in Kalyani out of which 5 large scale, 15 medium scale and 64 small scale industries. But the most frustrating incidence is the closing and sickness of many of the industrial units once established in Kalyani which is a question of another research. The numbers of industries with presently running industries are given below (table-2).

Table-2: Status of industries in Kalyani

Sector	Nos. of Industries	Status	Person Employed
Formal			
Large Scale Industry	5	2 operational	1463
Medium Scale Industry	15	5 operational	2668
Small Scale Industry	64	56 operational	1048

Source: Kalyani Municipality DDP, 2007-12

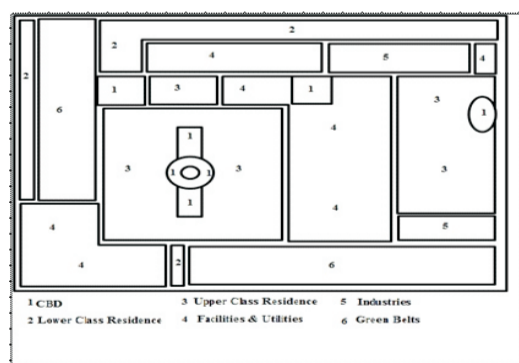


Fig. 8: Generalised land use map of Kalyani

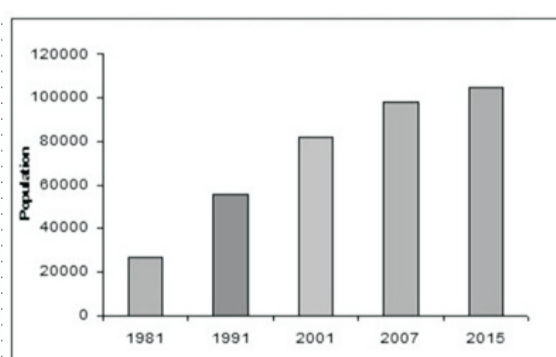


Fig. 13: Growth of population in Kalyani

Source: Kalyani Municipality, DDP, 2007-12

2.Green Belt

During the planning of Kalyani the area of green belt has been determined and kept in the peripheral belt of the six blocks. Presently this green belt includes the State Live stock Farm, Seed Farm Area of Bidhan Chandra Krishi Bishwavidyalaya, Picnic Garden Area etc. covering about 6% of the municipal area. Not only the green belt but also there are green covers in the town which includes parks (tables 3 and 4), road side and road middle plantation etc. which also contributing to the green covers of the town (fig. 7).

Table.3: Shapes of Parks

shapes	Number	%
Quadrilateral	33	38
Circular	13	15
Triangular	30	35
Other	10	12

Table.4: Park location

Types	Number	%
Within settlement	57	66
Park and picnic spot	2	3
At route junction	27	31

Source: Computed from map by authors

B. Internal structure of the town

1. Street pattern

In the time of planning and development maximum possible number of roads are constructed and all the roads are straight except some peripheral roads and roads are meet with each other diagonally or perpendicularly (fig. 9). Roads are enough wide (7 m-24 m) and width of the roads varies according to the importance of roads. In the upper class residential areas the roads are 6 m to 24 m wide. Major roads are 24 m wide. Internal roads are 6 m wide. A complete circuit is formed by the roads and networks are well connected (alpha index= 0.4, gamma index= 0.61). Grid pattern road alignment is observed.

Table.5: Types of roads' meeting points

Type of road connection	Number	
	non slum area	slum area
1. Perpendicular	447 (74%)	122 (71%)
2. Diagonal	160 (26%)	26 (15%)
3. Irregular	0 (0%)	24 (14%)
Total	607	172

Source: computed from map by authors

There are enough spaces beside the roads (2.5 m- 6 m) as well as in between lanes for plantation and further widening of road (plate-1).

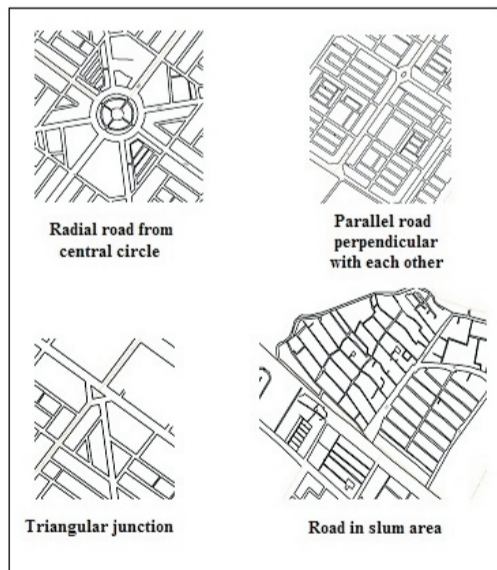


Fig. 9: Street pattern of Kalyani

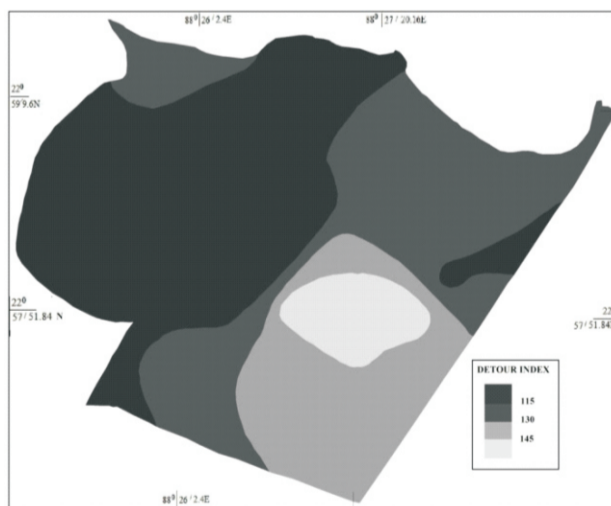


Fig. 10: Detour Index showing accessibility

1. Building pattern

Most of the residential buildings are two storied and few number of three storied are found. Along the main roads and in commercial CBD areas mixed uses are noticed e.g. ground floor in commercial uses and top floors are in residential uses.

Residential buildings are distributed in two specific clusters of A and B blocks (figs. 3 and 8). Administrative buildings are situated in the CBD areas of city centre and central park area. Govt. housing complexes are situated in the CBD area of city centre as well as in the industrial belt and most of two to four storied. Residential apartment buildings are rapidly growing in number and most of these are four storied.

All the residential plots in Kalyani are owned by the government and plots are leased to the private owners for 99 years. Plots are started from 2 -6 m away from roads (plate-1 and plate-2). Residential plots are also varying sizes (4 kotta to 9.5 kotta) with 50 % space for open and unused space. There is also vertical limit for all buildings and which is 49 feet. Most of the buildings are pucca, and kutcha and sei-pucca building are found along the brown belt of slum dwellers. Although in slum areas such restrictions are not noticed and the plot sizes are small with average size 1.71 kotta (household survey, 2011) Most of the buildings are faced towards the roads and no particular direction is found.

2. Drainage (sewerage) pattern

Kalyani has underground sewerage system except in peripheral colony area (fig. 11). The total length is 200 km. In colony areas they have septic tanks. 60 % families (mostly upper class residents) connected with underground sewerage.

There is also surface drainage with length 370 km which is totally open and pucca.

As in the peripheral colony areas no underground sewerage line is there and all are surface drainage which are also narrow and insufficient for draining water during rainy season and thus face water logging problems (fig. 12).



Fig. 11: Underground sewerage line
Source: Kalyani Municipality, 2010



Fig. 12: Area affected by water logging



Plate. 1: Road side plantation, Kalyani



Plate.2: Linear arrangement of buildings

Problems and future prospects

With regard to land use, the main problem facing Kalyani is that the municipality has no authority over the land of Municipal area, the land is under the control of State manager's office of Government of West Bengal and the function of Municipality is maintenance of land and people dwelling on the land. Moreover lands are allotted on "lease hold" basis resulting in restriction of transfer of land. Due to this system many plots remain vacant encouraging illegal settlement and

garbage dumping (Kalyani Municipality DDP, 2007-12).

The status of Kalyani as Industrial Township is losing because of closing as well as sickness of many industries (table-2). Problem of water logging in the peripheral colony areas (fig. 12) is another matter of concern. Unauthorized settlement and their handling is a major problem.

It is to be mentioned that Kalyani conceived as satellite to Calcutta (Miluer, 1968) which presents a case of both success and failure as a satellite, success as a self contained new town and failure as a satellite to Kolkata Metro; even this failure as a satellite can be considered temporary as the necessary external inputs for making Kalyani a successful satellite has not been materialized so far (Mondal, 2000).

In spite of the above problems it is also found that there is a rapid rate of residential apartments' growth in Kalyani for last few years which indicates the growth of in migrants from surrounding urban and rural areas towards Kalyani, notwithstanding from Kolkata because the infrastructural and the development growth rate of Kalyani is less than that of the Kolkata Metropolitan Area. In his connection it should be mentioned that in developing countries like, India infrastructural development basically occur in a polarized manner around the greater metropolises. So in future major activities will be found in Kalyani is the handling of this huge influx of population with the provision of necessary urban basic services.

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