



ISSN: 0975-833X

RESEARCH ARTICLE

ANALYSIS OF POPULATION GROWTH DYNAMICS – SITUATION AND TREND : A STUDY ON  
BARDDHAMAN PLANNING AREA (BPA), WEST BENGAL, INDIA

\*Koyel Sam

The University of Burdwan, Burdwan: 713104, West Bengal, India

ARTICLE INFO

Article History:

Received 13<sup>th</sup> August, 2014  
Received in revised form  
23<sup>rd</sup> September, 2014  
Accepted 19<sup>th</sup> October, 2014  
Published online 30<sup>th</sup> November, 2014

Key words:

Population Growth,  
Rural-Urban Migration,  
Urban Sprawl,  
System Component Growth.

ABSTRACT

Today the cities and towns of developing countries are experiencing a rapid population growth, In India, currently 31.18% of population (census of India, 2011) lives in urban centers, while in the next 15 years it is projected around 35%, and this indicates the alarming rate of population growth of urban centers. One of the important features of population growth in in urban area in India is dualism - urban population growth at macro level is decelerating but in class I cities it is growing. The alarming rate of population growth of urban centers when proceeds towards saturation, a population engulf took place towards its adjoining areas. Due to huge influx of rural to urban migration, unorganized urban sprawl has occurred around the cities and towns. The Present study an attempt to focus on spatio-temporal dynamics of population growth in Barddhaman Planing Area (BPA), under which class-I growing urban center Barddhaman is delineated. To address the 80 year change of population both in absolute and relative terms, absolute growth rate and system component growth of population has been analyzed. Finally this work concludes with future trends of population growth with suggestions for sustainable planning.

Copyright © 2014 Koyel Sam. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

In India, after independence, population increase rapidly, but growth rate shows declining trend, specially for those region wherein city population precedes towards saturation level (Guchhait, Dasgupta, 2012). The space saturation with population of cities and towns, later on associated with spillover effects towards suburb and rurban area. An assessment of absolute and relative change of population growth helps to find out spatial extent of population concentration around the urban centers. In developing countries, large scale of population concentration has took place in urban area and its surroundings. Much of the growth is due to migration particularly from the countryside rural area and small towns. Rural-urban migration is caused by both push of the rural area as well as pull of the urban areas. In rural area appalling poverty, unbearable unemployment, low and uncertain wages, uneconomic land holding and poor facilities of education, recreation and other services work as push factors. By contrast, the pull of urban area may include better employment opportunities; regular and higher wages, fixed working hours, better amenities of living, facilities for education and socio-cultural activities (Chandna, 1992).

Study Area

Barddhaman Planning Area, as delineated by Barddhaman Development Authority in 2002, extended over 157.62sq.km, accommodating about 4.70 lakh populations. It is located in southern part of Burdwan district, 107km north-west of Kolkata Municipality Area (KMA). The area extends latitudinally from 23°10'15"N to 23°19'15"N and longitudinally from 87°48'E to 87°57'E. Barddhaman Planning Area consists of Barddhamn Municipality area and adjoining villages located in five gram panchyet in Burdwan-I CD Block and two gram panchyet in Burdwan-II CD Block. Bardhaman town being administrative center of the district to serves as the primate trading center of goods and services for surrounding hinterland (Fig: 1).

Salient feature of Population Density

The intensity of population concentration has recognized from population density. In 2001 census of India, defined urban area in terms of population density at least 400 persons per sq. km and it is continued in 2011 census of India. On the basis of population density regional and functional characteristic of an area is identified as urban or semi-urban, suburb, and rural. In 1951, only Barddhaman Municipality contained high population density (3003 persons/sq.km) and most of areas are recommended as Rural.

\*Corresponding author: Koyel Sam,

The University of Burdwan, Burdwan: 713104, West Bengal, India.

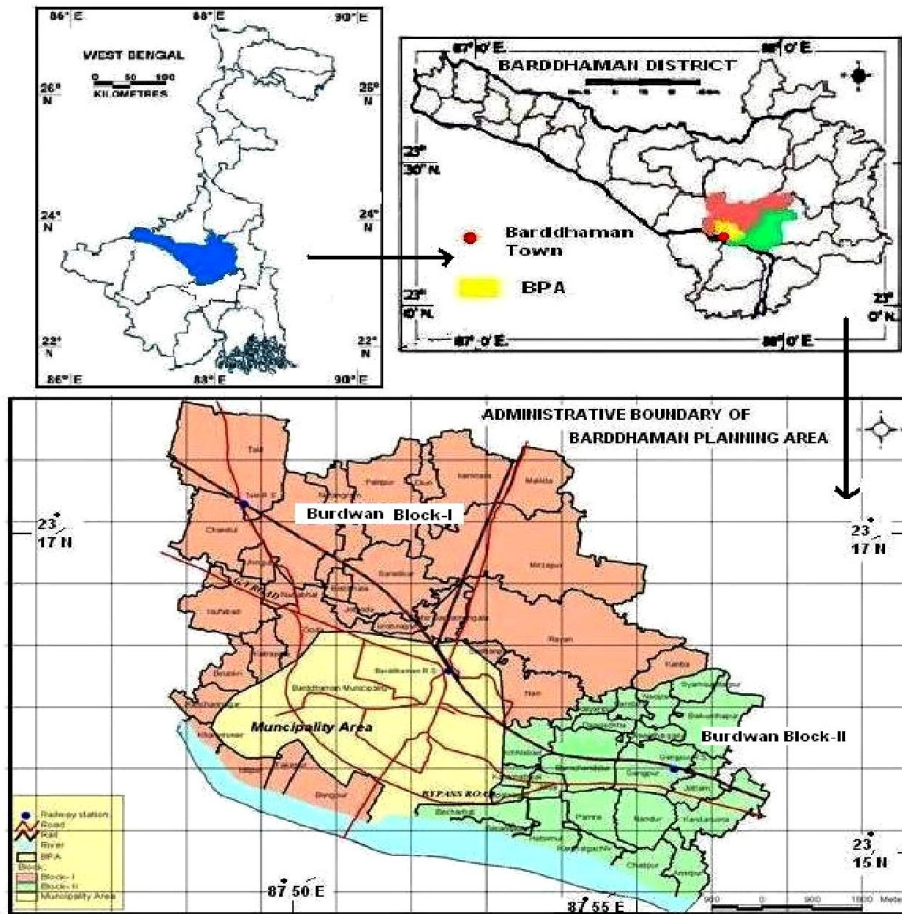


Fig.1. Spatial Extent of the Study Area

Table 1. Functional Characteristics of Demography

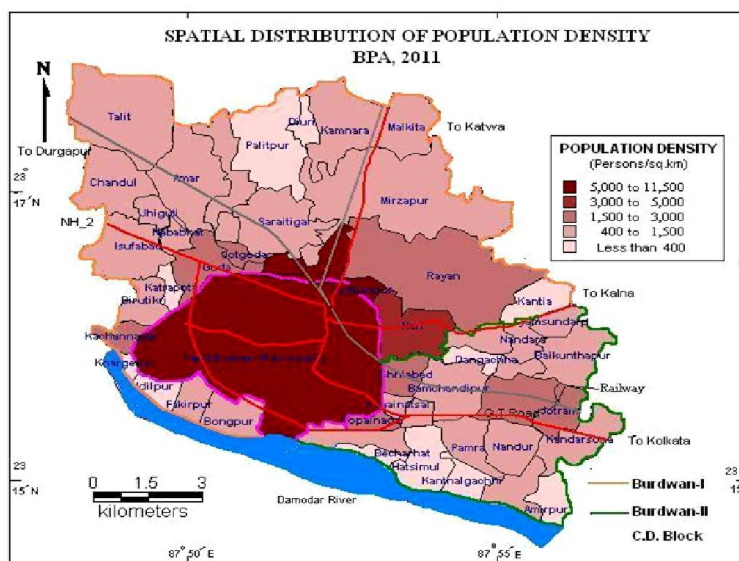
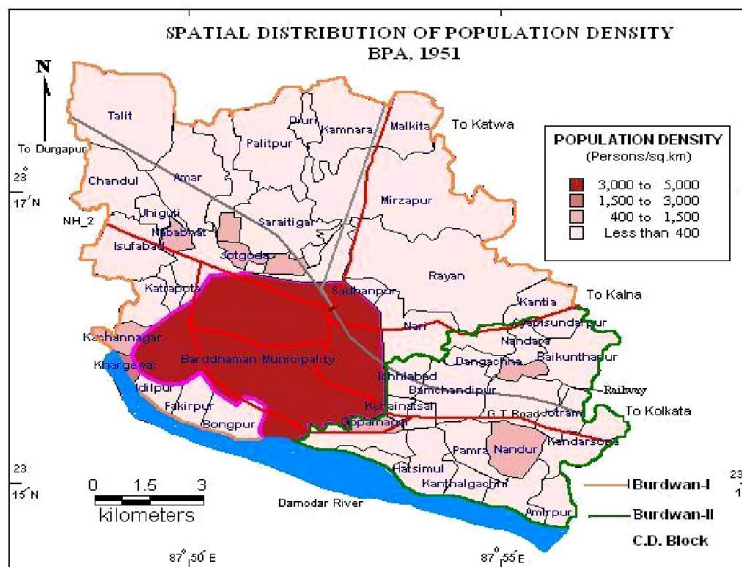
Population Density (persons/sq.km)	Functional or regional characteristics	Name of Towns and Villages	
		1951	2011
High (>3000)	Urban/Semi-urban	Bardhaman Municipality	Bardhaman Municipality, Bahirsarbamangala, Krishnapur, Nani, Sadhanpur
Medium (3000-400)	Rurban	Kanchannagar (P), Khargerswar, Krishnapur, Nababhat, Nandur, Jotgoda, Gopalnagar, Aswathagala, Bidchhla,	Alisa, Amar, Aswathagaria, Baikunthapur, Bamchandaipur, Bechabhat, Bidchhala, Birutikri, Bongpur, chaitpur, Chandul, Fakipur, Gangpur, Goda, Gopalnagar, Ichhlabad, Isufabad, Jhinguti, Jotgoda, Jotram, Kalyanpur, Kamara, Kanainatshal, kanchannagar, Kandarsona, Malkita, Mirzapur, Nabahat, Nandur, Nandara, Nutangram, Pamra, Rayan, saraitkar, Syamsundarpur, Talit
Low (<400)	Rural	Alisa, Amar, Amirpur, Bahir, Sarbamangala, Baikunthapur, Bamchandaipur, Bechabhat, Birutikri, Bongpur, Chaitpur, Chandul, Dangachha, Dinni, Fakipur, Gangpur, Gopalnagar, Goda, Hatsimul, Ichhlabad, Idilpur, Isufabad, Jhinguti, Jotram, Kalyanpur, Kamara, Kanthalgachhi, Kantia, Kotrapota, Malkita, Mirzapur, Nani, Natungram, Palitpur, Pamra, Rayan, Sadhanpur, Saraitkar, Shirampur, Syamsundarpur, Talit	Amirpur, Dangachha, Dinni, Hatsimul, Idilpur, Kanthalgachhi, Kantia, Katrapota, Khargerswar, Palitpur, Shirampur

On the other hand in 2011, other four surrounding rural, and rural areas with Barddhaman town (11378 persons/sq.km) are recorded more than 3000 population, rest of 60% of belongs to rural characteristics and small percentage of areas are still in rural character (Table:1). The huge transformation of population density from Rural to Urban/semi urban and rural has been seen around Barddhaman Town which indicates increasing population immigration towards urban center and urban fringe area.

2. To evaluate the relative concentration of population in past, present and future
3. To assess the Population influx towards Suburb and Urban fringe area of Barddhaman town and identify the major factor behind it.

**DATABASE AND METHODOLOGY**

The present study based on secondary data, collected from census of Barddhaman district for the years from 1951 to 2011. To articulate the nature and dynamics of population growth,



Source: Data from Census of Barddhaman District 1951, 2011 and prepared by Author

**Figure 2 & 3: Spatio- Temporal Change of Population Density**

**Objectives**

The major objectives of the present study are:

1. To articulate the spatio-temporal dynamics of population growth in Barddhaman Planning Area

data of individual rural and urban area has been framed in a equal time span, then the absolute change has measured by absolute growth rate of population. For understanding of relative change of population concentration, system component growth has been analyzed by using allometric equation;

$$Y = bX^a$$

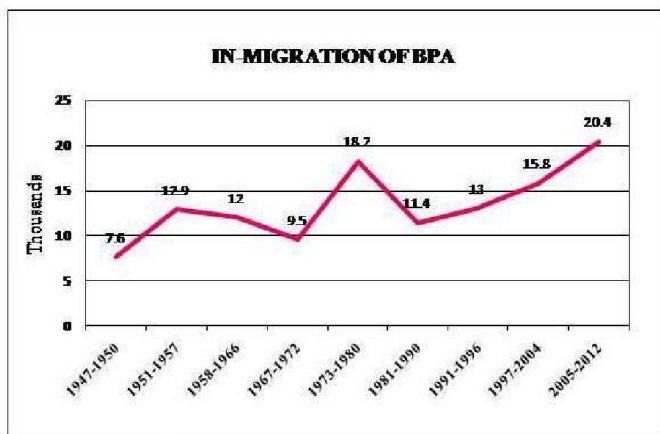
Where, Y= Component, X= System, a= Allometry, b= Threshold value in relative growth perspective.

Finally co-efficient of variation (CV) has been calculated to understand the present as well as future inter-regional growth rate variation of population.

## RESULTS AND DISCUSSION

### Trends of Immigration

The trends of in-migration towards Urban center of area under BPA has increased tremendously in a two Phases, in 1973-1980 and in 2005-2012(Fig: 4). Many Geophysical and Socio-economical pull and push factors contribute present increasing population concentration in fringe area. Geospatial advantage, reliable climate, availability of water resource and large extent agricultural land in fringe area, low price of land value, education and institutional facilities are act as a pull factors. Lack of availability of suitable land and location, scarcity of drinking water, poor health and educational facilities push people towards Barddhaman Town from surrounding districts of West Bengal.



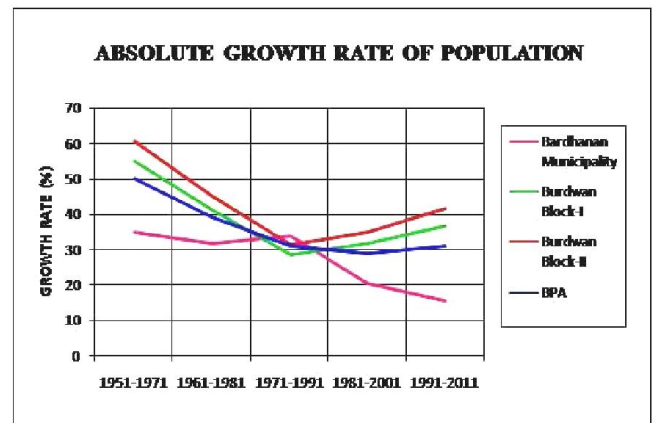
Source: Data from Barddhaman Development Authority, 2012 and prepared by Author

Fig. 4.

### Population Growth in Absolute Term

To detect the absolute population growth of BPA, percentage of growth rate has been calculated at a time period of successive twenty years interval, like 1951-1971, 1961-1981, 1971-1991, 1981-2001, 1991-2011. It is interesting to note that town and villages with highest growth at initial stage (1951-1971), in case of Barddhaman town after increase in 1971-1991, then the growth rate decline successively up to 2011.

On the other hand, population in rural area under Burdwan-I Block and Burdwan-II Block is experienced progressive growth from 1981 to 2011, the reason behind this not difficult to perceive. Ultimately, as a whole absolute population growth of BPA is moderately decline but increasing trend has observed in 1991-2011(Fig: 5).



Source: Data from several period of Census of Barddhaman District (1951-2011) and prepared by Author

Fig. 5.

### Population Growth in Relative Term

The allometric relationship may be viewed as an expression of relative competition within a given system where each component taking its share of the available resources of the total system as expressed by component. The allometric relative 'b' value indicates the nature and level of population concentration, unity or isometry (here considered (0.96-1.1) means balance growth. Allometric value more than one (here > 1.1) implies gaining growth and less than one (here < 0.96) indicates losing growth with respect to system.

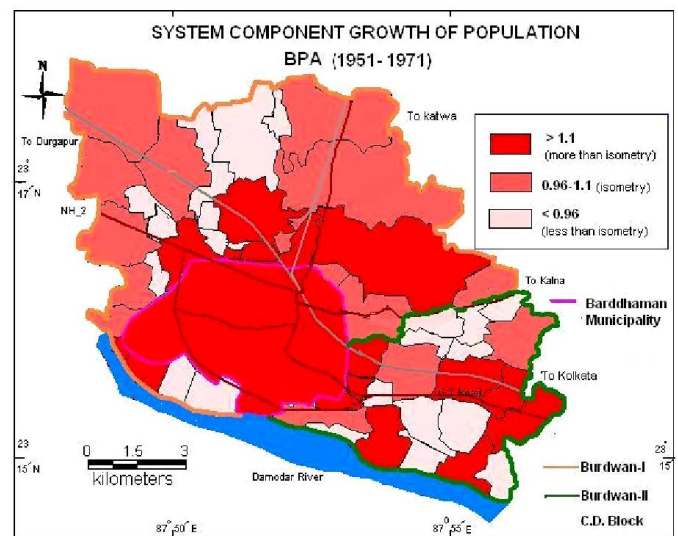


Fig. 6.

In the present study, system component growth has measured in a four successive years to determined spatio-temporal change of population concentration. At the initial stage (1951-1971) relative high growth (>1.1) is found both in Rural and urban area, due to natural increase of population growth i.e. high birth rate, with the passage of time population concentration has taken place along the transport line around urban center, because of better access to urban facilities, less price of land. It is quite interesting that the population concentration in Barddhaman town transformed from more

than isometry (> 1.1) to less than isometry (< 0.96), due to population saturation and urban congestion. On the other hand, in the surrounding rural and rural area system component growth has transformed from less than isometry and isometry to more than isometry, because of increasing population agglomeration by immigration. In future, it is estimated that 90% of area under BPA will be agglomerated with huge population.

concentration of population in BPA (Table: 10). High value of CV indicates inconsistency of population distribution and a lower value of CV shows higher consistency or uniformity of population distribution. After slight increase of CV value in 1961-1981, its trends towards decline that indicates the diffusion of relative growth makes the whole dynamics towards uniformity, as like a uniform train, because around 80% of area in BAP gaining growth more than isometry (Fig.9).

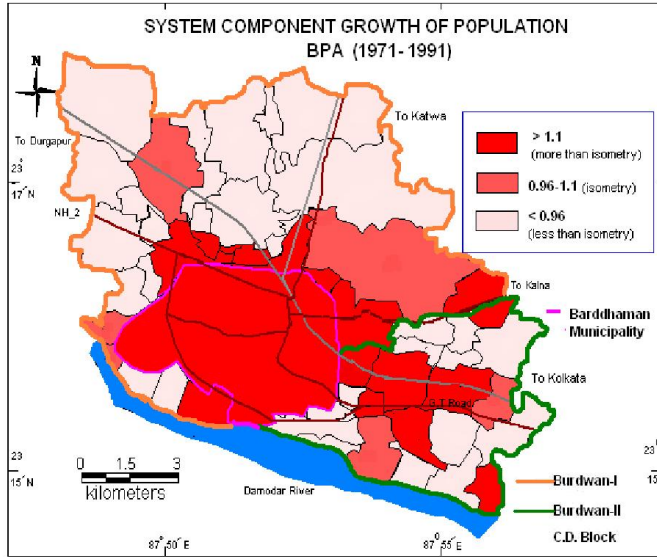
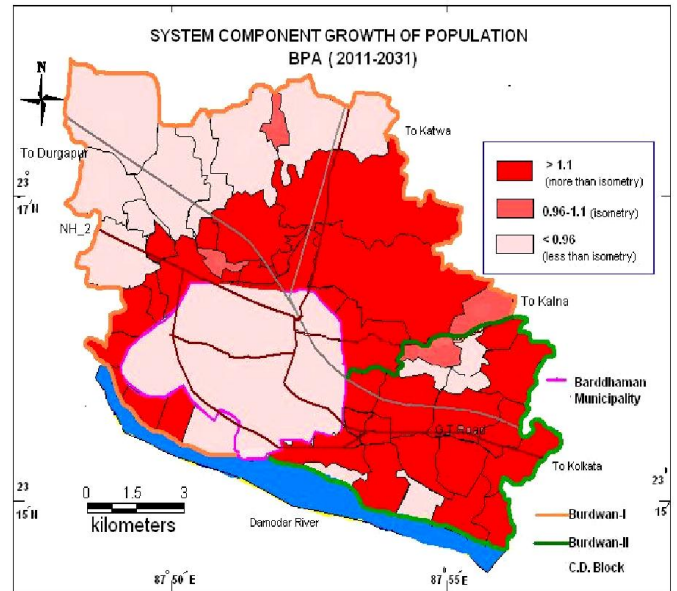


Fig. 7.



Source: Data from Census of Bardhaman District and prepared by Author

Fig.9. Future Trend of Relative Concentration of Population

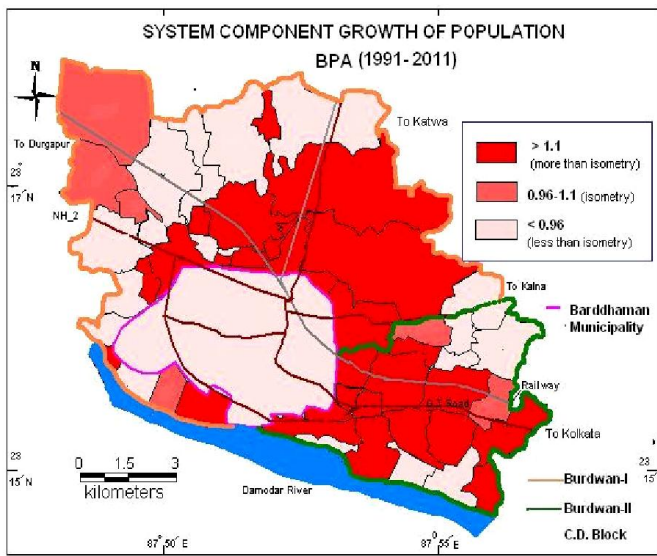
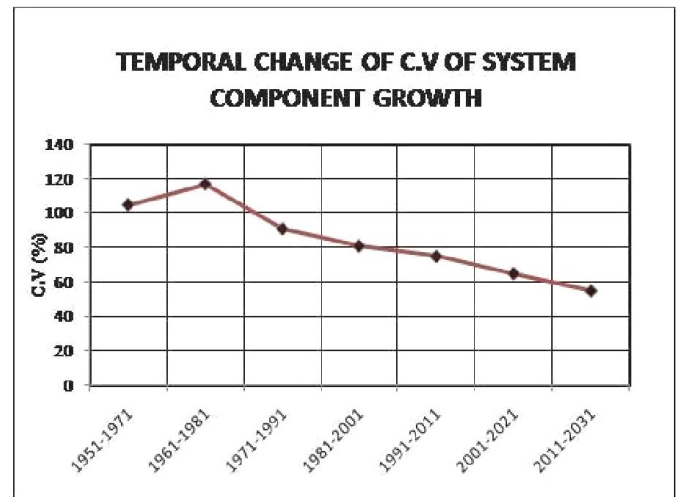


Fig. 8.



Source: Data from several period of Census of Bardhaman District (1951-2011) and prepared by Author

Fig. 10.

Fig. 6, 7 & 8. Spatio-Temporal Change of Relative Population Concentration

Table 2. Temporal Change of Relative Growth (Existing and Projected)

Period	EXISTING					PROJECTED	
	1951-1971	1961-1981	1971-1991	1981-2001	1991-2011	2001-2021	2011-2031
C.V	105	117	91	81	75	65	55

Future trend of population growth

Spatio-temporal distribution of relative growth in Bardhaman town is quite different from its surrounding. As a whole population trend of BPA reach towards uniformity in terms of relative population growth. To address the uniformity of relative growth, CV is calculated as a mean value of relative

## Conclusion

A significant social transformation is occurred with the modernization and modern way of living causes increased concentration of population towards urban surroundings. In such situation it is very difficult to control the immigration of people towards towns and cities because it is a natural process. But the flow of population should to be checked at regular phase that help in sustainable urban planning and management. On the other hand, the extension of urban amenities in the rural area can reduced urban craze of people and population pressure towards urban fringe.

## REFERENCES

- Chandna, R. C. 2008. Geography of Population: Concept, Determinants and Patterns, Kalyani Publishers, New Delhi., 138-414.
- Clarke. J. I. 1972. Population Geography, Pergamon Press, U.K., 30-64, 130-145.
- Demography-Burdwan District, Department of Architecture and Regional Planning, IIT, Kharagpur. Perspective Plan for Barddhaman Planning Area – Vision 2025, Available from: [bardhaman.gov.in/bda/demo.ppt](http://bardhaman.gov.in/bda/demo.ppt)
- Dutt, G. K. 1985. Population Mapping, (ed.) NATMO, Kolkata, 50-53, 85-93, 162-163.
- Guchhait, S. K. and Dasgupta, A. 2012. Spatio-Temporal Dynamics of Population Growth of Howrah District in India: An Experience in 20<sup>th</sup> Century, *IOSR Journal of Humanities and Social Science (JHSS)*, 3(4): 25-33.
- Khullar, D.R. 2008. India: A Comprehensive Geography, Kalyani Publishers, New Delhi, 327-357, 406-413.
- Mahmood, A. 1998. Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi. 13-22.
- Punia. M. and Singh. L. 2011. Entropy Approach for Assessment of Urban Growth: A Case Study of Jaipur, India., *Indian Society of Remote Sensing, Springer*, 40(2): 231-244.
- Sam, K. 2014. Changing land use and land cover in fringe area using GIS: A case study of Barddhaman town, West Bengal, *International Journal of Geomatics and Geosciences*, 5(2): 243-352.

\*\*\*\*\*