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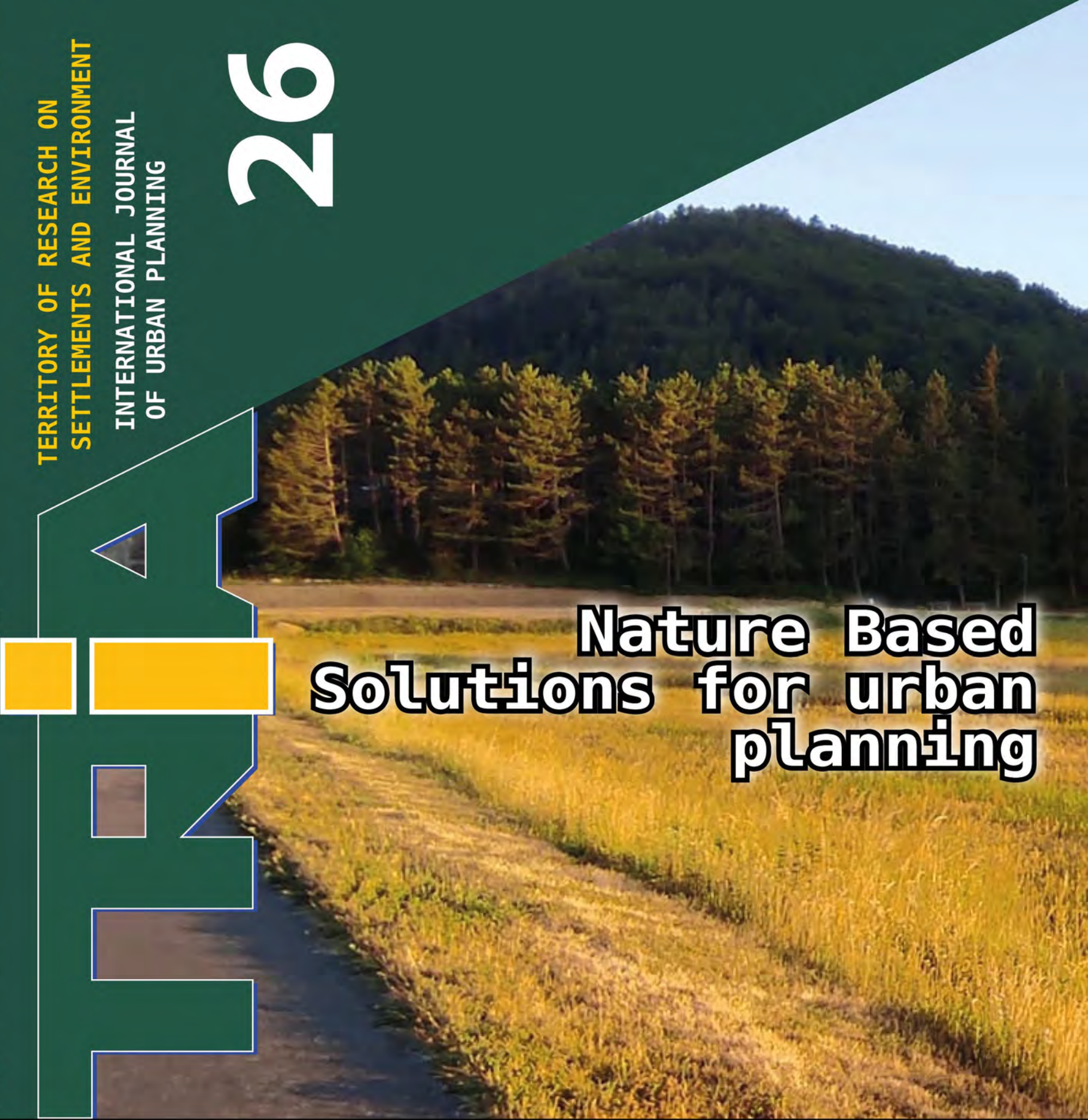

Nature Based Solutions for urban planning

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abstract

Transformation of Berhampore Municipal Surrounding Area from Concentric Zone to Multiple Nuclei Zones

Subham Kumar Roy, Subrata Biswas

Abstract

Urbanization is the process of population growth in urban areas. Urban out growth is a contiguous part of urban area such as statutory towns or census towns. Those towns are express as a local service center. Berhampore Municipality is an oldest municipality in Murshidabad district. Within a decade numbers of census towns are increased from 3 to 9 around Berhampore municipality. Through this paper we are trying to show the delimitation of urban growth with three indicators and identify the transformation of urban city center from concentric zone to multiple nuclei zone. After analysis of whole things with the help of quantitative statistic it is identified that – star like linear expansion of town along with N.H.34 and S.H.11 road due to their functionality

Keywords:
census town, delimitation, indices, urban out growth.

Trasformazione dell'area in prossimità di Berhampore: da zona concentrica a zone a nuclei multipli

L'urbanizzazione è il processo di crescita della popolazione nelle aree urbane. La crescita urbana avviene nelle zone contigue alle città di fondazione o alle città di recente impianto caratterizzate da un centro di servizi locale. Il Comune di Berhampore è il comune più antico del distretto di Murshidabad. In un decennio il numero di città censite al suo intorno è aumentato da 3 a 9. Attraverso questo articolo si cerca di mostrare la delimitazione della crescita urbana con tre indicatori ed identificare la trasformazione del centro urbano da zona concentrica a zona a più nuclei. Dopo un'analisi statistica di tipo quantitativa, si è identificato che l'espansione lineare della città va di pari passo allo sviluppo delle strade N.H.34 e S.H.11 particolamente funzionali.

Parole Chiave:
censimento città, delimitazione, indici, crescita urbana.

Transformation of Berhampore Municipal Surrounding Area from Concentric Zone to Multiple Nuclei Zones

Subham Kumar Roy, Subrata Biswas

1. Introduction

According to Clark (1982) Urbanization is aspatial and social process which refers to the changes of behavior and social relationships that occurring social dimensions as a result of people living in town and cities. It refers to the complex change of lifestyles which follow from the impact of cities on society. Urbanization it refers the physical growth of urban areas from rural areas as a result of population immigration to an existing urban areas. Rapid urbanization is responsible for many environmental, socio – cultural, economical changes (B.Bhatta, 2010). Transitional zone of rural – urban area are highly, affected by the process of rapid urbanization. Due to high rate of land in urban area migrated people for their better life they comes and take place surroundings of urban sector to get all facilities from their . Von Thunen (1826) who classified the concentric development of land use zones around urban center. Jonasson (1925) while studying the European cities revealed that land use in suburban area fulfills the need of town. Mackangie (1928) first of all expressed in 'The New Exploration'. Stanley Dodge (1932) use significant term 'umland' which means land around city. Richard Andrews (1942) classified fringe as urban fringe – closer to town and rural – urban fringe – closer to village. R.L.Singh (1955) studied about rural – urban fringe of Varanashi. Wissink (1961) pointed out difference between fringe, suburb, pseudo – suburb, satellite and pseudo satellite. Even if we are accept the rural – urban dichotomy it does not in itself provide us with an adequate frame of reference for defining and defying urban places. Multi –dimensional character of urban areas creates hindrance in giving precise definition for them. In general it is fall into five categories - demographic, economic, social, morphological and functional. Murshidabad district is the fourth most populous district in West Bengal and ninth most populous in India. In this district urbanization is not flourished uniformly most of areas are rural area but some special urbanized are also present (S. Sharma, 2012). There are 72 urban units and 7 municipalities' areas present (Census of India, 2011). Berhampore municipality is one of the oldest and most important urbanized points in this district. It is fall in class I town category due to rapid growth of their functionality. This is perhaps the only municipality in the state of W.B, which is the member of IHCN (Indian Heritage Cities Network), (S. Sharma, 2012). As per 2011 census decadal growth of Berhampore Municipality is relatively negative from previous census year but census town are increased from 3 to 9 around berhampore municipality. So, it is assumed that functional nucleus of town is shifted towards outer

portion of municipality area for site suitability of urban services. S. Sharma (2012) has studied about main causes of urbanization and urban expansion, urban population, area of influence, future urban trend and pattern and last of all urban problem & suggestion of Berhampore Municipality. G. Samanta (2013) highlighted about urban governance and basic services of Burdwan , Berhampore and Suri. N. Mandal & M.Rahaman (2019) have studied about socio – economic status, distribution,

problems and some measures of slum at Berhampore Municipality. S.K.Roy, S.Mandal & S.Dutta (2020) have described causes of urban population growth, positive and negative aspect of vertical residential development and technocentrism view to overcome this environmental degradation of Berhampore , Murshidabad. Although there have been several previous work on it no work has been one on the transformation of functionality over time. So, the main purpose is to present the direction

2. Objectives:

i. To show the delimitation of urban growth on three basic indicators Demographic, Occupational and Infrastructure.

ii. To evaluate some indices to identify the transformation of Berhampore Municipal surrounding area from concentric zone to multiple nucleic zone for select site suitability of urban service provider.

3. Database:

Secondary data: The secondary data sources include the following

a. District Census Handbook, Murshidabad 2001 & 2011.
b. Murshidabad District Gazetteers.
c. Murshidabad District Statistical Hand Book 2010.
d. D.L.L.R.O data Sadar Sub Division.

Primary data: Primary data has been collected from rigorous extensive field survey.

4. Methodology:

Tools: Collected data are quantified , analyzed and represented with the help of Microsoft Office Word 2007, Microsoft Office Excel 2007, SPSS, QGIS(2.14 Essen) and Adobe Photoshop 7.

Techniques: The basic statistical indices such as Degree of Urbanization, Speed of Urbanization, Projection of Population, Expansion of City , Functional Index (Ram & Sinha, 1972), Break Point Analysis ,Gravity Potential Models , Pearson's Product Moment Correlation Coefficient and Composite Z score analysis have been applied for explanation of urban outgrowth in different census town of Berhampore Municipality

surrounding. fiche sollecitazioni locali, ha individuato quindici progetti pilota – sperimentali.[15]

5. Assumption:

There are some number of prerequisites are selected to presenting the paper appropriately.

- Girjia More has been chosen as the central point of Berhampore Municipality, Buffer zones are created from Girjia More & Land prices are maximum in the part of city center.
- The central location of each census town is identified by their functionality.
- Continuous flow of population growth in city and its contiguous area.
- Some functions have been shifted due to high fares of single piece of land or shop from the city center to other convenient locations.
- Similar Functions are located nearly in same place & there is no large industry available.

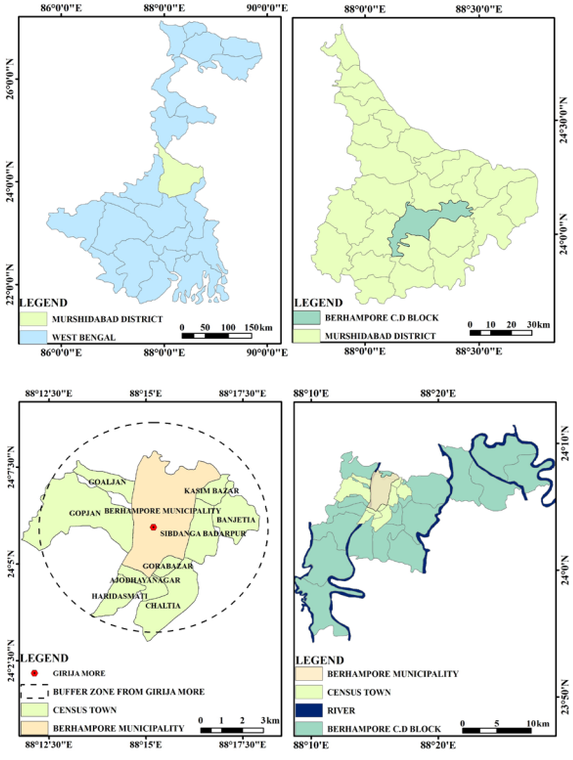

Fig. 1 – Location Map of Study Area

6. Selection of Study Area

Berhampore Municipality is one of the oldest municipalities in West Bengal. Berhampore municipality was established in 1876. A large number of British armed people stayed at Berhampore cantonment area after Sipoy Mutiny in 1857(G.Samanta, 2013). Now that municipality comprised with 25 wards and city government is run by Chairman from of Government. Berhampore town is a district head quarter of Murshidabad. It is a nodal town and it is also highly facilitated by their health, education, administrative, transport, recreational and market sectors.

7. History of Study Area:

In the latter half of Eighteenth century, for observing the *Nawabai* activity, a military camp was formed in *'Brahmapur mouza'*. Mr. Beveridge wrote about Brahmapur in his book Old places of Murshidabad (Calcutta Reviewed,1892). Due to pronunciation this Brahmapur was later renamed as Berhampore. After the battle of Palashi (1757) and the battle of Mir Qashim(1763), the construction of cantonment has started at Brahmapur mouza to keep an eye on Nawabi activities. According to Hunter, that cantonment was completed in 1767 and the chief architect was A.Campbell. The city of Berhampore was formed around this cantonment. As per State Paper Report 1858 by Sir Frederick James Haliday

(British Civil Servant & first Lieutenant Governor of Bengal) – states that the Sipoy revolt that started in 1857 across all over India started in Brahmapur Cantonment. After that the cantonment was demolished in 1870. King Thibaut of Burma was defeated and taken prisoner during the third Ingo – Burmese war. This old town was famous for silk production due to these factor Armenian merchants was come to this famous town nearly 1665. The French mansion was built in 1668. Nearly in 1788, due to Bhagharathi River course shifting that area remarked as a famous trading center and nodal point for business purposes. Berhampore Municipality was established in 1876 which had 16.19 sq.km occupied area. Electricity was first supplied to the town of Berhampore in 1932.

8. Delimitation of Contiguous area of Berhampore town:

Literally means of Delimitation is the act or process of fixing limits or boundaries of territorial constituencies in a country to represent changes in population. But it is quite difficult to establish a proper boundary between urban and rural area. As per 2011 census the contiguous part of rural is a transitional zone that zone converted into a census town. That town consist with minimum 5000 population, 75% of male main worker population should have been engaged with non agricultural activity and population density at list 400 per sq.km. That transitional zone are highly effected by migrate people. Three determinants have been selected to identify the delimitation of urban out growth.

1. Demographic Factor – a. Population Density.
2. Occupational Factor – a. Non – Agricultural Workers.
3. Infrastructural Factor – a. Urban Service (Administrative, Education, Health, Transport, Recreational, Market & Other sector).

8.1. Demographic Factor

It is the statistical study of population, and demographic structure plays a vital role to identify the periphery region of Berhampore town.

Population Density: density of population is a better measure of understanding the variation in the distribution of population. It is expressed as number of persons per unit area. In other words it is the ratio of total population to the total area of country (D. Khullar, 2014). Population density of Berhampore Municipality is 6213 per sq.km. and mean population density of contiguous part of urban area is 4129 per sq. km. Under 9 census towns' highest population density found in Ajodhanagar 5643per sq. km. and lowest population density is recorded in Gopjan 2433 per sq.km. Population density is a index of the measurement of influence of the city (M.Arif,

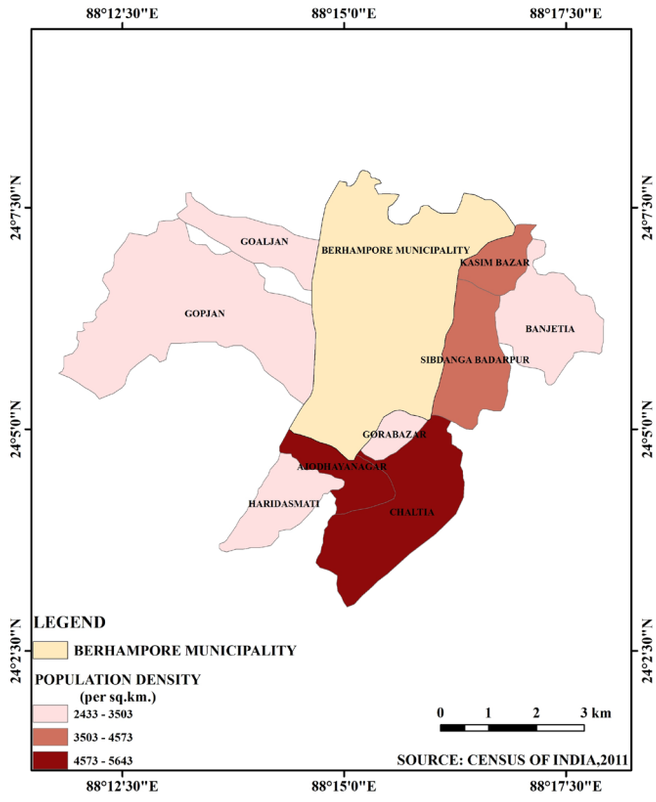

Fig. 2 – Population Density of Periphery region of Berhampore Town

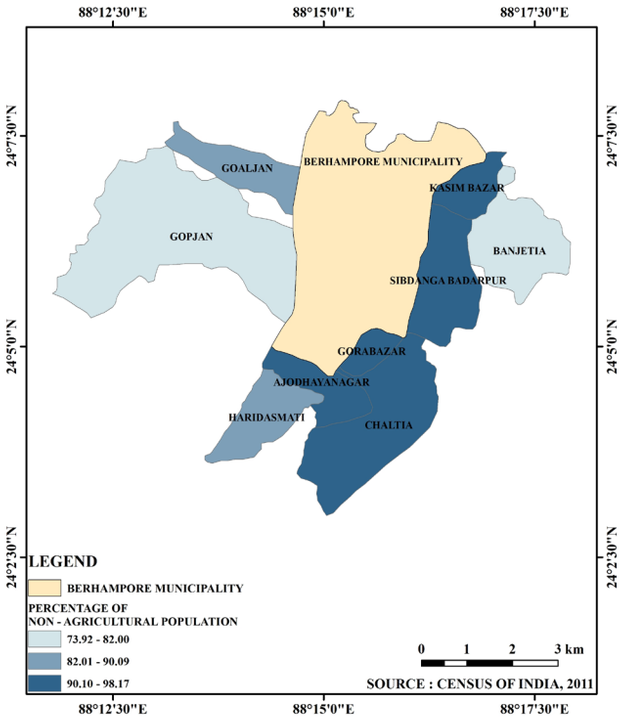

Fig. 3 – Percentage of Non – Agricultural Worker of Contiguous part of Berhampore town.

2018). Migrate people comes and settled down the periphery region of urban space but they access all service from urban sector.

We are classified the population density of contiguous part of Berhampore Municipality into three categories ,such as – 5 census towns comes under low population density zone ,these are Gopjan(2433), Goaljan(2539), Gorabazar(2905) , Banjetia (3084) and Haridasmati(3132) . 2 census towns comes under medium population density zone, these are Kasimbazar (4217) & Sibdanga – Badarpur(4558). 2 census towns comes under high population density zone, these are Chaltia (4939) & Ajodhanagar (5643).

8.2. Occupational Factor:

It is one's role in society often a regular activity performed for payment. It is one of the most important factors to demarcate the contiguous part of Berhampore town.

Non - Agricultural Workers: a person who has worked for major part of the reference period that is six months in any economically productive activity is term as main worker. Those entire workers other than cultivators or agricultural labours as household industry worker are 'other worker'. In urban territory 75% of male main workers should have been engaged with non agricultural activity. Percentage of non – agricultural workers in Berhampore municipality 96.06% and mean percentage of non – agricultural workers of contiguous part of urban area is 87.59%. . Under 9 census towns' highest non – agricultural workers was found in Gorabazar 98.17% and lowest non – agricultural workers was recorded in Gopjan 73.92%.

We are classified the percentage of non – agricultural worker of contiguous part of Berhampore Municipality into three categories ,such as – 2 census towns comes under low percentage of non – agricultural worker zone ,these are Gopjan (73.92%) and Banjetia (78.83%). 2 census towns comes under medium percentage of non – agricultural worker zone, these are Goaljan(83.64%) and Haridasmati(85.98%). 5 census towns comes under high percentage of non – agricultural worker zone, these are Ajodhanagar (90.93%), Chaltia (91.42%), Sibdanga – Badarpur(92.41%), Kasimbazar (93.02%) and Gorabazar(98.17%).

8.3. Infrastructure Factor:

Infrastructural development is the major threshold area on which developments depends upon in an area (M.Arif, 2018). It is one of the most significant pull factor for the migrate people. Here urban services taken as consideration for identify of periphery area of Berhampore town.

Urban Service : urbanization has a degree of predictability over time. The phenomenon of urbanization therefore occurs on an area and involves links and nodes to create

a total system (S.Sharma, 2012). We are classified urban service basic on their functionality in to six categories.

- Administrative Sector: Berhampore is an administrative town of Murshidabad. District based all Governmental head offices are situated at Berhampore. On the other hand most of private sector and corporate sector divisional based head offices or service center are setup for controlling the district service and administration (S.K.Roy et.al.2020).
- Educational Sector: The study area has become an educational hub of Murshidabad. Education is the process of acquisition of knowledge, skills, value, belief and habits. Some factors that determine the rate of education are socio-economic status, number of school and Colleges in this area. Berhampore has both Government and Private education facilities (S.K.Roy et.al.2020).
- Health Sector: That area is already well developed in terms of its medical facilities. Murshidabad Medical College is a Government run medical college located in Berhampore. It was established in 2012, and it serves the people from the districts of Murshidabad, Birbhum and northern part of Nadia district. Another Government hospital is Matri Sadan (S.K.Roy et.al.2020). Also there have many more private nurshinghome, pathology center and medicine shops are available.
- Transport Sector: Berhampore town is a nodal town or heart of Murshidabad district. Transport system of the most important sector to development of society as well as their economy.
- Railway: Lalgola Sealdah Division (Eastern Railway) Berhampore Court and Cossimbazar Railway station comes under it. Azimganj – Howrah Division (Eastern Railway) Khagraghat Road Railway station come under it.
- Road: N.H.34, S.H.11, Municipal roads, P.W.D roads is available in this area. S.B.S.T.C., N.B.S.T.C. and numerous public service sector such as (Bus, Car) are also highly perform to make ensure comfort communication purpose.
- Waterway: Berhampore town comes under N.W.1 (Haldia – Allahabad). Regular ferry service and occasional luxurious boat services are also available.
- Market Sector: It is true that urbanization development and the economic are intimately associated associated (S.Sharma, 2012). Berhampore town is a heart of economical activity such as quality full market of foods, grains, vegetables, fishes, technological goods, dresses, medicines, automobile goods which mitigate our daily needs and special occasional demand (S.K.Roy et.al.2020).
- Recreational Sector: Recreation is an activity of leisure. It is essential for human biological and psychological condition. Recreation activities are often done for enjoyment, amusement or pleasure and are considered to be fun. Berhampore is a historical place. So, numerous historical evidences are found at surrounding locality. Berhampore serves another essential recreation places such as Multiplex, Shopping malls, Parks, Hotels, Restaurants, Stadiums, Cultural auditoriums, Library etc (S.K.Roy et.al.2020).

9. Transformation of Berhampore Municipal surrounding area from concentric zone to multiple nucleic zones:

Transformation is the process of changing completely the character or appearance of something in order to improve. The theories of models in urban studies attempt to explain and describe the growth and development of a city and the evolution of functional zones within the city. The hypothetical pattern of urban growth was first propounded in 1923 by E.W.Burgess and urban sociologist, in this study of the city of Chicago. Through this model Burgess stated that the development of a city place outwards from its central commercial core in a series of concentric circles. Another hypothetical pattern of land use was postulated by Meckenzi in 1933 and developed by Harris and Ullman in 1945. They suggested that land use patterns of a city do not develop around a single center. But on the contrary they developed around several discrete locations. This concentration of land use patterns around various nuclei gives the city a cellular structure. This concept is particularly helpful in explaining the structure of Indian cities which are marked by definite periods of growth and often combine both new and old sections of the city for development (R.B, Mandal, 2000).

9.1. Degree of Urbanization

The degree of urbanization generally refers to the relative or absolute number of people who live in places defined as urban (T.Kundu, 2013). It is the percentage of total population living in urban areas (R.B.Mandal, 1981).

$$\text{Degree of Urbanization} = (\text{Urban Population} / \text{Total Population}) * 100$$
$$= (195223 / 446887) * 100$$
$$= 43.68$$

9.2. Speed of Urbanization:

It is a simple arithmetic growth of degree of urbanization between two or more census (R.B.Mandal, 1981). This index shows the annual rate of change in the number of population in the town (T.Kundu, 2013).

Speed of Urbanization

$$= \{(X2 - X1)/X1\} * 100$$
$$= \{(195223-160143)/160143\} * 100$$
$$= 21.90$$

[where, X2 = Present Census year Population
X1 = Previous Census year Population]

9.3. Population Projection:

It is an estimate of a future population. It is fraught with uncertainties as there is no fixed law of population increment and various techniques of projections are to give a generalized result (R.B.Mandal, 2000). It is a sign of economic development and cultural advancement of an urban center.

Population Projection:

2011 census = 195223, 2001 census = 160143

r = (195223 – 160143) = 35080

P.2021 = 2011 + (r 10)*

= 546023

P.2031 = 896823

P.2041 = 1052400

9.4. Urban Expansion:

As the process of expansion of horizontal is a degree of changes through time (Sk.M.Haque, 2011).

*RExp. = {(At - Ao)/ T}*100 [where, RExp. = Rate of Expansion, At = Area in present time (Municipality with 9 census towns, 2011), Ao = Area in previous time (Municipality with 3 census towns, 2001), T = Duration]*

*RExp. = {(At - Ao)/ T}*100*

*= {(62.51 – 37.9)/10}*100 = 246.1*

10. Breakpoint Analysis:

The market area around that center with reference to the other central places in the neighborhood, laws of retail gravitational developed by Reilly (1931). Breakpoint equation of retail gravitation the trade area boundary between two centers (R.B.Mandal, 1981). It is can be used to define the sphere of influence between competing centers.

Breakpoint Analysis = Distance between A and B/ 1+√Size A/ Size B

Name Of Center	Linear Distance (in km)	Non Agricultural Workers	Breakpoint Value (km)
BERHAMPORE	-	70265	-
GOALJAN	2.87	1590	2.47
KASIMBAZER	3.14	3822	2.96
BANJETIA	3.58	3072	3.31
SIBDANGA BADARPUR	2.13	4378	2
GOPJAN	3.23	58911	3.10
GORABAZAR	1.94	1712	1.68
AJODHYANAGAR	2.68	3039	2.48
CHALTIA	3.53	7855	3.42
HARIDASMATI	3.64	2407	3.27

Tab.1 – Calculation table for Breakpoint Analysis
Source: Computed by Authors

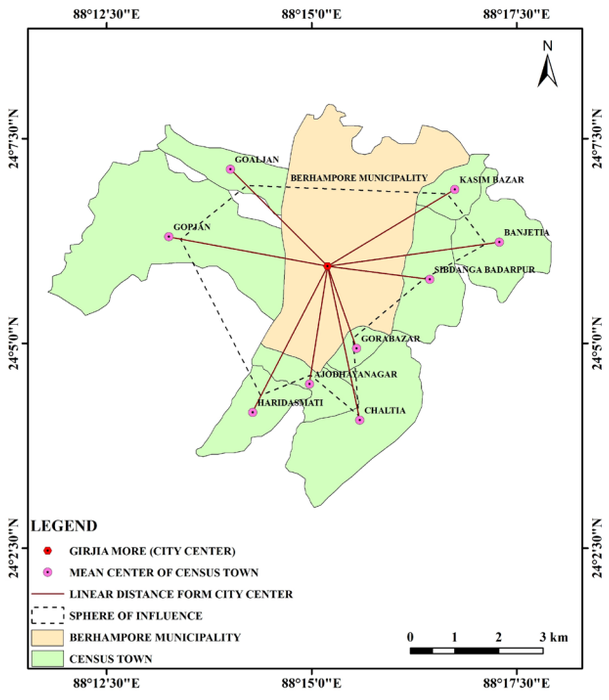

Fig. 4 – Sphere Of Influence of Berhampore Municipality

Sphere of influence is the region which surrounds the city and maintenance inflow outflow relationship with city. Every urban sphere shows the relationship between the size of the population and nature of function. If functionality increases then influence area are also larger. Daily comminuting functional services considers as a key factors to delineate sphere of influence. That sphere area is also highly relevant in socio – economic pattern distribution of city and its surroundings.

11. Gravity Potential Modelsis:

The earlier gravity potential models were based in primitive notions of 'population' as well as 'distance'. The former was measured in terms of absolute number while the later in terms of geodetic distance (R.B.Mandal, 1981). There have inversely proportional relationship between population & distance.

Ai = Pi/ Dij (Where, Ai = Attractive power of town, Pi = Population of town, Dij = Distance of town i from j) .

Name Of Center	Distance (in km)	Population of Main town	Attractive Power of town
BERHAMPORE	-	195223	
GOALJAN	2.87		68021.95
KASIMBAZER	3.14		62172.92
BANJETIA	3.58		54531.56
SIBDANGA BADARPUR	2.13		91653.99
GOPJAN	3.23		60440.55
GORABAZAR	1.94		100630.41
AJODHYANAGAR	2.68		72844.40
CHALTIA	3.53		55303.96
HARIDASMATI	3.64		53632.69

Tab.2 – Calculation table for Gravity Potential Model
Source: Computed by Authors

12. Functional Index:

In functional classification of towns L.N.Ram & V.N.P.Sinha (1972) have solved the problem of predominance of major towns over smaller towns. Some of the urban centers due to certain economical and cultural growth over shadow the neighboring towns. To eliminate this difficulty the local significance of trade function has been weighted by the consideration of town's regional significance because hierarchy of an urban center not only depends on its local specialization but also on its regional importance. This index find out the inter town and intra town significance of trade functions.

Functional Index = √ {(NW*100)/TW}*{(NW*100)/TN}

[Where, NW = Number of workers in trade and commerce of a town, TW = Total Workers of that centers, TN = Total number of workers in trade commerce for all towns of the region]

Name Of Center	Total Main Worker	Total Non Agricultural Worker	Functional Index
GOALJAN	1907	1590	36.76
KASIMBAZER	4109	3822	93.35
BANJETIA	3897	3072	69.07
SIBDANGA BADARPUR	4733	4378	106.65
GOPJAN	7969	5891	128.27
GORABAZAR	1744	1712	42.89
AJODHYANAGAR	3342	3029	73.01
CHALTIA	9136	7855	184.51
HARIDASMATI	2633	2407	58.22

Tab.3 – Calculation table for Functional Index
Source: Computed by Authors

That map represents the city center changes from girjia more to mean center, within a decade it is a transitional zone between three contiguous part census towns. According to central feature identification Gorabazer is a central feature of census towns. As per hot spot analysis Chaltia census town represent as 95% of significance for site suitability for the trade and commerce. To avoid trafficking and car parking problem at the city center that mean center shifted from there. Highly facilitated with N.H 34 and S.H.11 numerous small industries, light and heavy vehicles showroom, automobile service, hotels, currier service, Bhagirathi milk service, newspaper service, shopping market, retailer market and vertical residential project are available.

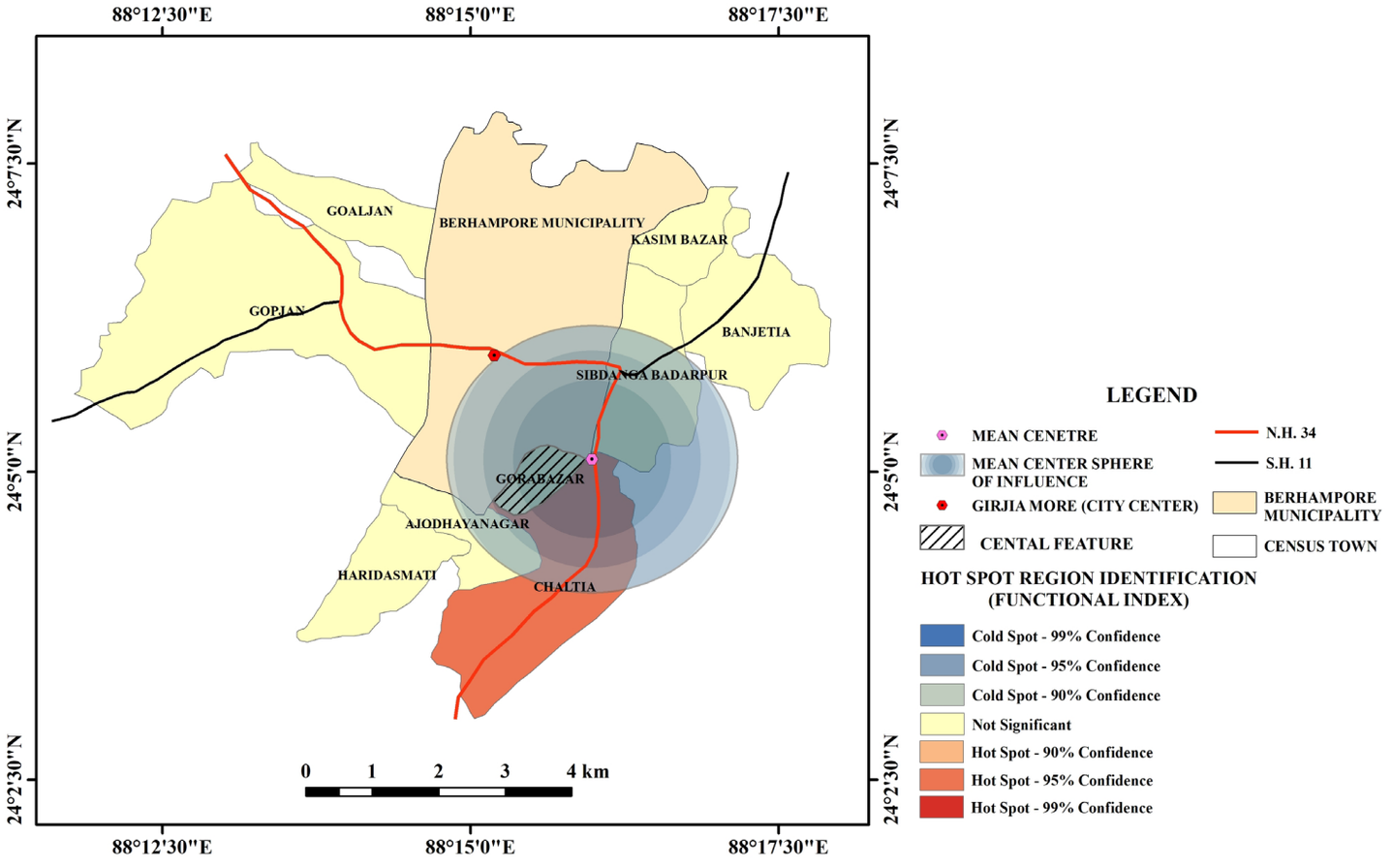

Fig. 5 – Transformation of Mean Center from City Center and Site Suitability for Trade and Commerce

13. Correlation Analysis:

According to Ya Lu Chou , " Correlation analysis attempts to determine the degree of relationship between two variables"(Pillai , Bagavathi,2003). Karl Pearson developed a formula which is called Pearson's Product Moment Correlation Coefficient. It is a parametric measure of the relationship between variables for quantitative measurement. In this study correlation has been done to identify the relationship between sphere of influence and various determinate such as – functional index and gravity potentiality.

SL.NO.	VARIABLES		CORRELATION VALUE (r)
1	Sphere of Influence (X)	Functional Index (Y)	0.32
2	Sphere of Influence (X)	Gravity Potentiality(Y)	-0.98

Tab.4 – Values of Correlation of Various Determinate
Source: Computed by Authors

Correlation between Sphere of Influence and Functionality is r= 0.32. It represents positively relationship between them. So, it represent that is almost corresponding increase of sphere of influence with increasing functionality.

Another Correlation between Sphere of Influence and Gravity potentiality is r = -0.98. It represents negatively high relationship between them. So, it represents inverse relationship. When sphere of influence is increasing then gravity potentiality is decreasing and it's vice versa.

CENSUS TOWN	POPULATION DENSITY	Z SCORE (X - MEAN)/ S.D	NON AGRICULTURAL WORKER	Z SCORE (X - MEAN)/ S.D	LITERACY RATE	Z SCORE (X - MEAN)/ S.D	FUNCTIONAL INDEX VALUE	Z SCORE (X - MEAN)/ S.D	COMPOSITE INDEX
GOALJAN	2539	-1.08	83.64	-0.52	86.03	0.2	36.76	-1.16	-2.56
KASIMBAZAR	4217	0.46	93.02	0.71	91.89	1.09	93.35	0.11	2.37
BANJETIA	3084	-0.58	78.83	-1.15	74.84	-1.49	69.07	-0.43	-3.65
SIBDANGA BADARPUR	4558	0.77	92.41	0.63	86.37	0.25	106.65	0.42	2.07
GOPJAN	2433	-1.18	73.92	-1.8	77.04	-1.16	128.27	0.91	-3.23
GORABAZAR	2905	-0.74	98.17	1.44	97.26	1.9	42.89	-1.02	1.58
CHALTIA	4939	1.12	91.42	0.52	85.71	0.15	184.51	2.19	3.98
HARIDASMATI	3132	-0.53	85.98	-0.22	82.36	-0.35	58.22	-0.67	-1.77
AJODHYANAGAR	5643	1.77	90.93	0.45	80.36	-0.58	73.01	-0.34	1.3

Tab.5 – Composite Index of Various Determinate
Source: Computed by Authors

14. Conclusion:

The census town beyond the limits of a rapid growing Berhampore town undergoes a process of changing in physical and socio – economical characteristics. Population density, Non – Agricultural worker, Literacy rate and functionality those indicators are plotted on the map by analyzing composite index. Composite index a grouping of equities , indexes or other factors combined in a standardized way providing a useful statistical measures of overall sector performance in presence of time also known as simply as a composite. Composite Index usually has a larger numbers of factors which are average together to form a product representative of an overall market as sector. Delimited on the basis of above indicator, nine census towns with in an area of 31.09 sq.km. are represent as peri urban of Berhampore town. Mean center of those nine census town comes under with 5km radius from city center. As per composite index value outgrowth of town are classified into two categories – inner part and outer part. Gorabazar , Ajodhyanagar, Chaltia, Sidbanga Badarpur and Kasimbazar census town comes under inner part and rest of this Haridasmati,

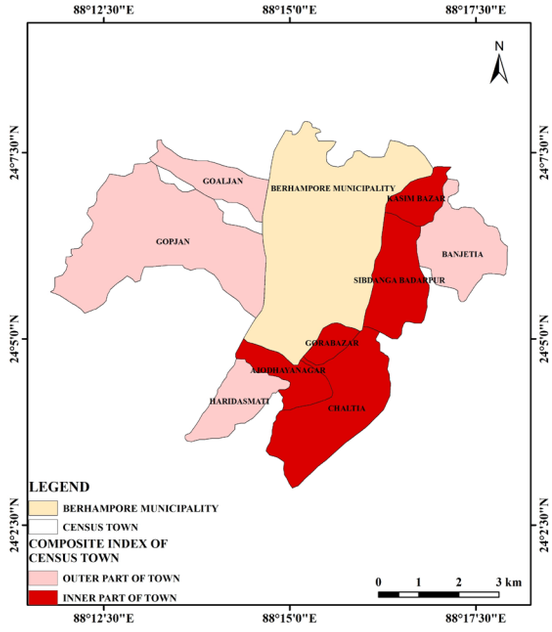

Fig. 6 – Identification of Inner part and Outer part of Berhampore town

Banjetia, Goaljan and Gopjan census town comes under outer part of town. Inner part is intimately connected to the city so rapid unplanned growth through the settlement area. On the other hand outer part area is less developed in comparison to inner part. Mean center is shifted from city center to transitional zone of three census town (Gorabazar, Sibdanga Badarpur and Chaltia). As per hotspot analysis Chaltia census town are 95% significant to develop their functionality and highest composite index value 3.98 shows the current overall development of that area. So, it is clearly understand that functional main point of town shifted towards Chaltia to avoid traffic, and their site suitability that region is very fertile to use all urban services very easily.

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