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SPATIO-TEMPORAL CHANGES OF SETTLEMENT ALONG THE URBAN CORRIDOR OF ASANSOL DURGAPUR REGION USING REMOTE SENSING AND G I S TECHNIQUES.

Krishnendu Gupta
Asst. Prof. of Dept of Geography; Visva-Bharati, Santiniketan.
West Bengal.

Short Profile

Krishnendu Gupta is working as an Assistant Professor at Department of Geography in Visva-Bharati, Santiniketan,West Bengal. He has completed Ph.D.(Geography).

Co-Author Details :

Soumen Chatterjee
Research Scholar; Dept of Geography; Visva-Bharati, Santiniketan. West Bengal.

ABSTRACT:

Urban corridors is a linear ribbon system of urban organization in which cities of various sizes linked through transportation and economic axes, often running between major cities. Present work, intends to measure the impact of corridor development on regional economy, has been carried out in Kolkata-Dhanbad urban corridor connected by NH2 and eastern railway which act as a major pivot for the development of the whole region and attributed to emergence and evolution of a distinct spatial pattern and urban morphologies. Different sets of data like SOI topographical sheet, GP maps, cadastral map, satellite imageries and demographic attribute has been use to prepare corridor typology. Different corridor segments has been classified on the basis of their land use, density, and transit characteristics and case studies representative of different corridor environments were undertaken. The results shows total population and density of population has been changed rapidly along the corridor in comparison to its hinterland. Growth rate of population also found to be high on those areas. The pace of urbanization is much faster along the corridors as villages are being incorporated in the urban body. So, non agricultural land use attracted more along the corridor and non-agricultural occupation has been dominates thereby.

KEYWORDS
Spatio-temporal , linear ribbon system ,urban organization , economic axes.

INTRODUCTION

Urban corridors include many of the major roadways that pass through urban areas. It can be defined as a linear 'ribbon' system of urban organization in which cities of various sizes linked through transportation and economic axes, often running between major cities. In fact, the relation between transport and urbanization are not mutually exclusive rather proliferation of later depends on the previous and vice versa. The role of transport route is well recognized not only in increasing the freight and passenger movement along different nodes but have an important role to play in emergence and evolution of a distinct spatial pattern and urban morphologies. According to Nath urban corridors are the areas in which there is a succession of cities and towns with intervening villages becoming rapidly urbanized. So they are the "in-between" spaces of the city that connect centers with sub centers, and the later with one another, in any multi-centered urban area. A variety and complex pattern of land use, thus, discernable in this zone. They range from the ubiquitous commercial strap areas to newer arterials which are lined with a mixture of retail establishments, office buildings, automobile dealerships, parking lots, some occasional residential buildings, and often vacant space (Sideris 1993).

A distinguishing features of the evolving twenty first century metropolis is the emergence of peripheral epicenters located at the convergence of an outer beltway and axial superhighway and providing a range of services (Pacione 2007). They spark business and change the nature and function of individual towns and cities, promoting regional economic growth. Examples include the industrial corridor developing between Mumbai and Delhi in India; the manufacturing and service industry corridor running from Kuala Lumpur, Malaysia, to the port city of Klang; and the regional economic axis forming the greater Ibadan-Lagos-Accra urban corridor in West Africa.

Until recently most of the study on urban geography focuses on the development of urban centre, sub centre and suburbs with little or no focuses on the importance of numerous corridors connecting them (Sideris 1993). Sometime corridors are treated as fragmented pieces with the context of metropolitan development while planning and management policies are adopted. That results in uncoordinated, haphazard, unsightly, even unsafe development patterns of the corridors and often reinforcing urban primacy and unbalanced regional development that are too often characteristics of many urban areas of India.

Emergence of urban corridor

The mega project of Golden Quadrilateral of 1998 to connect all the 4 major urban centers of India and subsequently North-South and East-West corridors comprising national highways connecting four extreme points of the country by road network believe to accelerate the pace of corridor formation along different part of the country. But, prior to this some urban area owing to its greater accessibility, availability of resources and geographical location had some sort of advantages to form urban corridor. Government different time stress on various urban units to plan urbanization and economic growth. For instance, in 1988, the National Commission on Urbanisation had identified 329 urban centres all over the country as generators of economic momentum (GEMs) where development activities should converge. The Commission also identified 49 Spatial Priority Urban Regions (SPURs). A SPUR was not merely a confirmation of the observed trends of growth but was based on the Commission's assessment of growth potential and optimising investments and opportunities already in that particular region (sivaramakrisnan). A subsequent study titled "INDIA-URBAN CORRIDORS' based on 1991 Census by National Atlas and Thematic Mapping Organisation (NATMO) identified a set of 25 urban corridors at the country level. This was a diagnostic and descriptive delineation and was, therefore, different from

the SPURs. The Centre for Policy Research (CPR) has identified several corridor in north, east and northeast India. sivaramakrisnan in his study mentioned several corridors in the states of Maharashtra, Gujarat, Tamil Nadu, Karnataka and Andhra Pradesh. V nath classified all the corridor into developed and emerged and class three corridor namely, 1. Coastal Gujarat- Western Maharastra corridor, 2.The Punjab- Haryana-delhi-Western U.P. corridor and 3. The bihar west Bengal corridor. And finally emerged corridor as Bangaluru mysore.

The liberalisation of economic policies have tended to favour major cities and their peripheries as location for investment in manufacturing and infrastructure that results in strengthen the older corridor and in some cases spectacular growth along the newer corridors.

Study Area Details

The present study was undertaken in the corridor extends from the coal mining city of Dhanbad in Jharkhand through Asansol-Durgapur in West Bengal to Kolkata Metropolitan district, one of the oldest and leading industrial centre, connected by NH2 and eastern railway. In contrast to the corridors discussed above this corridor based on the existence of local availability of mineral and agricultural resources, industrialization and have a long history of urbanization since Colonial time.

The highway running from Kolkata to Dhanbad are almost 250 km in length and the entire stretch are of four lengths that planned to transform into six from Dhanbad to Panagarh in near future. The four–lane West Bengal portion of NH 2 stretches from Barakar to Dankuni and connected to a number of important National highways like NH34, NH117, NH and state highway like Panagarh-Moregram Highway. According to the NHAI's statistical record, in 2008 everyday about 850,000 to 900,000 vehicles plied between Barakar and Dankuni. The gross toll collection amounted to Rs 2,500,000 per day (Wikimapia.org).

Major urban centres connected through this corridor are barakar, kulti, asansol, Raniganj, Durgapur, Bardhaman and Kolkata in West Bengal and Dhanbad in Jharkhand. However, the pattern of urbanization is not the same everywhere; compact development found along Durgapur, Asansol, Neamatpur, Kulti and Barakar in West Bengal and Chirkunda and Kumardhubi in Jharkhand. Beyond that from Panagarh to Dankuni the urbanization pattern is sparse and discontinuous.

Special emphasis has been given on the stretches between panagarh to raniganj with centre from the steel town of Durgapur. Since wit the inception of the city there has been a phenomenal change in the land use pattern of this area with a number of major projects like aerotropolis, industrial park, software Technology Park, educational hub etc. Besides each CD block has its own picularities and are mutually exclusive in comparisons to each others in terms of economic development. To elaborate Andal has supremacy on mining activities, Durgapur on industrial and Kanksa on the other hand has predominately agricultural population and land use. There locations are also of worth mentioning as it situated between the agricultural belt of Barddhaman and mining-industrial belt of Asansol region.

Objectives

Keeping with the view of the infill development that is the accommodation of new growth in corridors areas between centers and sub-centers are common by virtue of its easy access the land use patterns are changes radically and develop complexity over time. So, how corridors function, change, and develop over time and how physical design and land use changes spatially away from the corridor are the main objective of the present study.

As economic development directly influences on the level of urbanization how major economic

sector i.e. agricultural, industrial and mining etc. responds to the urbanization along the corridor are also of special interest.

Data Used

Different sets of data have been processed to obtain the target information. Firstly, SOI topographical sheet bearing the number of 73 M/2, 6 and 7 of 1:50000 scale has been used to prepare base map of the study area. 15 GP map covering the study area of Andal, Durgapur_faridpur and Kanksa has been collected and mosaic to prepare the study area map. The map has been geo referenced using topographical sheet. Demographic data has been collected from census table of different year.

Field survey has been made to collect land use information f the study are which are plotted to prepare different sets of LULC map. Finally, opinion survey has been carried out to gather information about various economic and travel character of the said area.

Methodology

For the purposes of this study a corridor typology was constructed, where different corridor segments were classified on the basis of their land use, density, and transit characteristics. Three case studies representative of different corridor environments were then selected and studied. This involved extensive field work, an analysis of the physical characteristics, social composition, and travel characteristics of each corridor, and the administration of a survey to selected households and businesses along the corridor. While the field work gathered data on the land use, transportation, and design characteristics of each corridor, the survey focused on the residents' perception and level of satisfaction with elements of the corridor, their utilization of public transit, and their opinions regarding corridor retrofit strategies.

Once the data has been collected the data has been processed in GIS environment to prepare various charts and maps which gives a vivid picture of the evolution process of present urban corridor and its resultant consequences on land use changes.
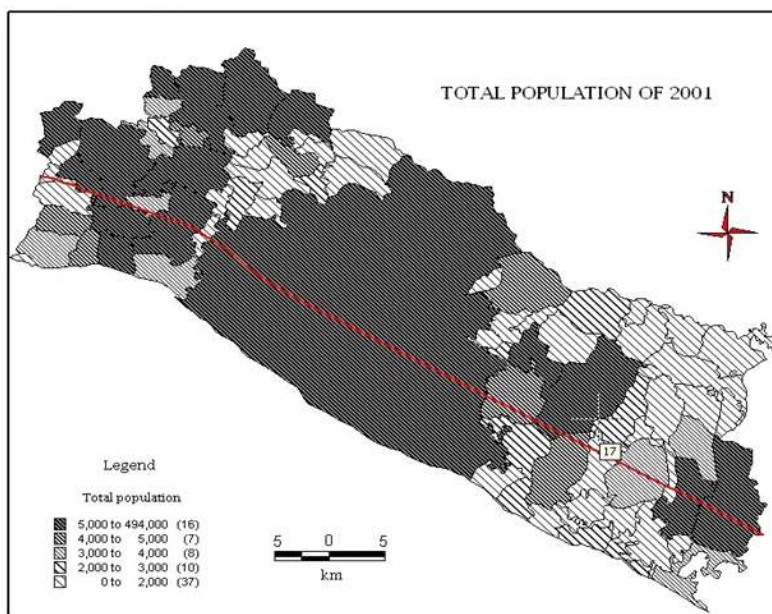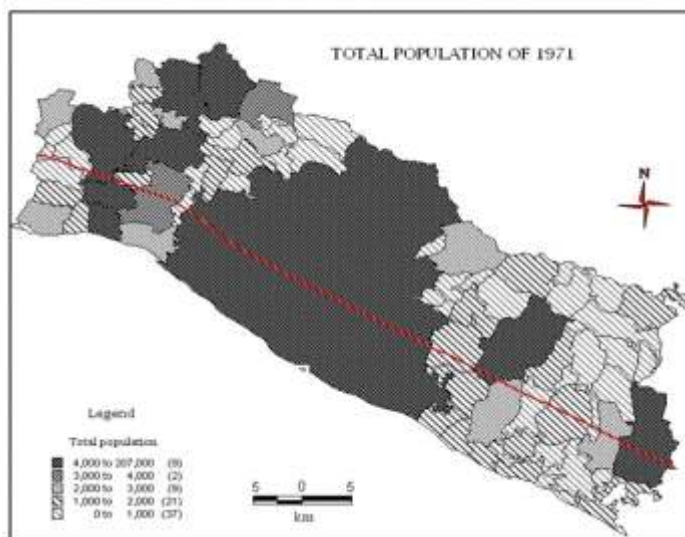
Results and discussion

Spatiality of population and its growth

To start with, the region comprises of three CD block namely Andal, Faridpur-Durgapur and Kanksa which composes of 15 gram panchyet that can be further segmented into 78 villages. To elaborate Andal have 8 GP composed of 25 villages, Kanksa with 5 GP composed of 36 villages, remaining 2 GP situated in Faridpur block with 17 villages. Besides, there is Durgapur Municipal Corporation.

Now have a look at the demographic structure of the region and its spatial variation over the past 4 decades. Considering the volume of population, naturally the urban or overgrown rural centers like Andal, Ukhra, kajora in the west part and Gopal pur and Kanksa for the eastern part was the most populas centres during 1971. Except Ukhra all the centres has a proximal location to NH2 and Eastern Railway. The scenario of 2001 was not much different since there are 16 out of 78 villages that have been emerged as populas with more than 5000 persons. There has been a separate cluster developed away from the corridor that includes sarpi, ukhra, siduli, khandra. Rest of the 12 centres namely harispur, dignala, kajora, dhandardihi, anda, dakshinkhanda, kanksa, bamunnara, jemua, gopalpur, panagar,

arra, flourished at the proximity of the corridor or on the corridor itself. That means 75% of the growth is confined within the corridor which directly or indirectly attracts the population, economics by virtue of its easy transit. Contrary to this there are 58 (74%) such villages having population below 2000 and mostly of them find a distal location from the corridor. 2001 census data reveals another fact that 49% of the centers having population below 3000 and 21% centers supports 5000 and above population. While considering the density the trend is rather fuzzy indicating no clear view, but the overall density is gradually increasing. For instance, there are 54% centres in 1971 that having a density of 300persons/sq km which decreases to 41% in 2001. The panchyet wise pattern shows a clearer view of the trend.
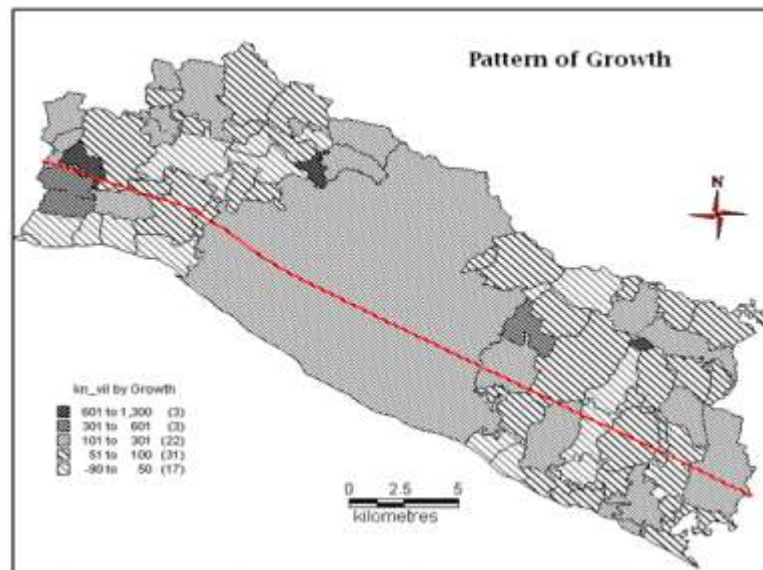

So far as the growth is concern the average growth rate of the area is 120 though there are strong regional variations. There are few pockets which experiences extraordinary growth rate during the last 3 decades these are Harispur, babuisol palasbon and arra located on the corridor and another are sadhumara and bansol village which were almost depopulated during 1971 but recently growing at a faster pace. There are another 22 such centres which are also growing at a considerable rate of more than 100% during past 30 years. Rest of the 48 centers experiencing moderate to slow growth rate. If we considers the centres falling within 2 km from the NH2 the results reveals that out of 15 villages 6
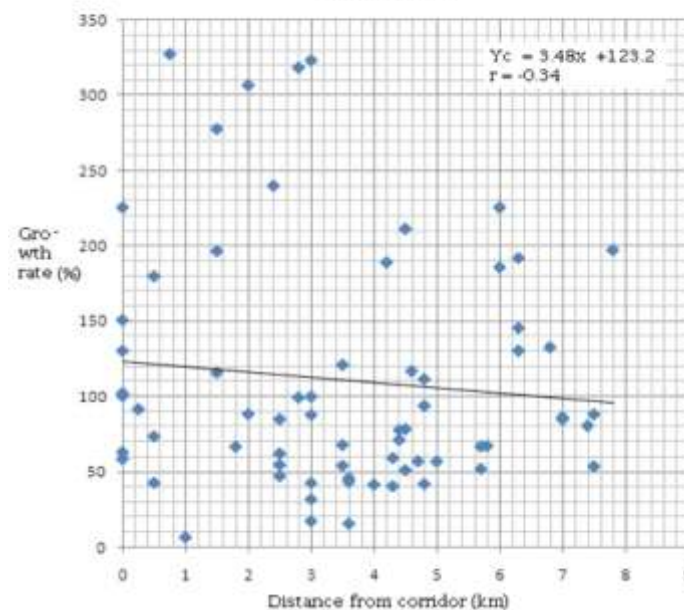
centres shows more than 150% growth 4 villages have more than 100% growth rate and 4 centres experiencing more than 50% growth.

From the growth pattern following cluster may be identified: Kanksa-panagar, harispur-babuisol, Arra-Bamunara and Icchapur-Sarpi. First two of them are directly results from the corridor itself but the development of next two seems to have some relation of with urban sprawling along with the impat of corridor.

However, feeding the data set into a normal equation of the type $Y_c = a + bx$, the data shows that negative relation lies between growth rate and distance from corridor. That means regions having low growth values are situated away from the corridor albeit the relation is much feeble ($r = -0.34$).
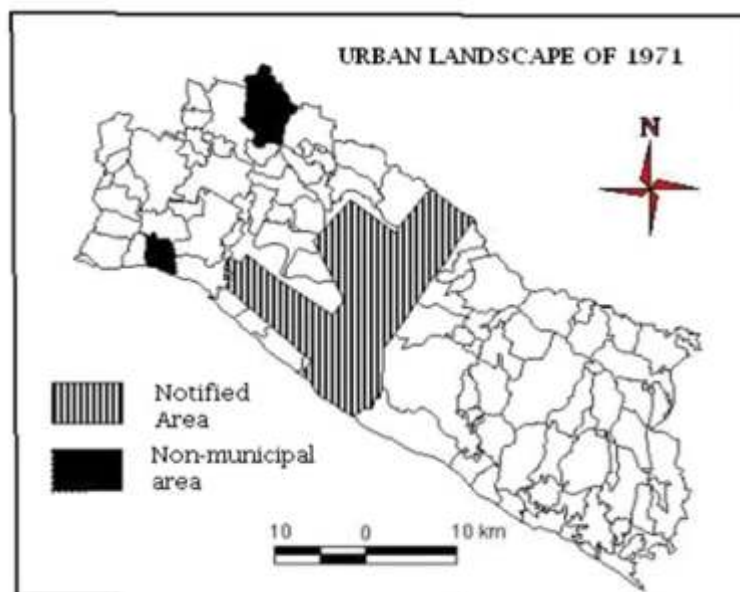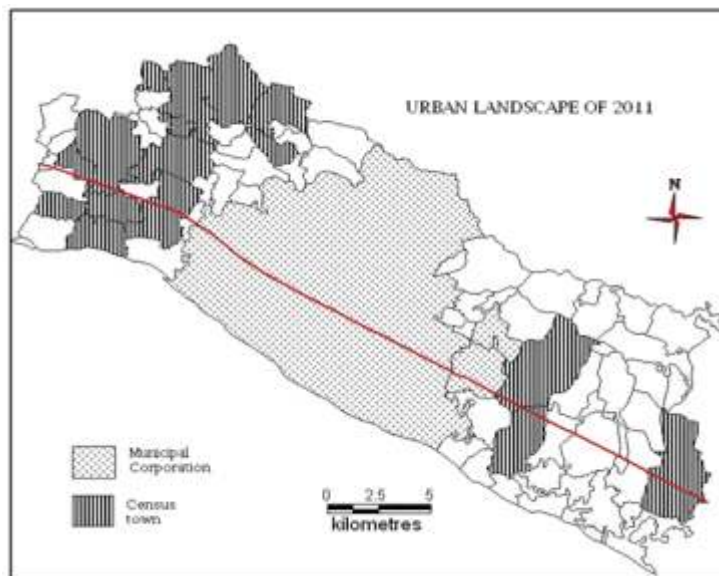

RELATION BETWEEN GROWTH RATE AND DISTANCE FROM CORRIDOR

Urbanization

Urbanization is a historically obtained process of spatial nucleation of population and non

agricultural activities. In a sense urbanization is a process and way of becoming urban of people and place (chatterjee 2011). As we know mining-industrialization often led to urbanization. Indeed, greater and ease of mode accessibility not only act as a pivotal role for industries to come up but also help the urban area to flourish. While considering the population, this fact is clear from the density pattern of the area. In 1971 the overall population density of the region has been 851/sq km that increases to 1870 in 2001. During the same time (2001) West Bengal has a density of 903 and Bardhaman has 982 respectively. If we break up the study into block level the result shows that 1971 Kanksa hardly have any urban area Andal have also low proportion of urban population with 26% to its total population. Lastly, Durgapur, primarily designed to be an urban area have the highest value of 98%. In 2001 Durgapur became fully urbanized followed by Andal where more than three quarter of its population constituted urban population to the total population. Kanksa have registered a growth of 20% urban population of its total population.

During this period what is more conspicuous is the increasing in the number of urban area. In 1971 C D block Andal has only two urban units namely Ukhra and Andal which has been classified as non

municipal (NM) area. The 2011 census shows 13 centres has been acquire the status of census town (CT). Kanksa has been largely a rural unit and none of its settlement has been classified as urban but 5 settlements acquire the status of census town in 2011. Finally, the then Durgapur Notified Area has also been metamorphosed when it forms the Municipal Corporation by engulfing several neighbouring rural mouzas.

CONCLUSION

Urban corridors spark business and change the nature and function of individual towns and cities, promoting regional economic growth but also often reinforcing urban primacy and unbalanced regional development. In the study area concerned emergence of the corridor and metamorphosis of settlements are interlinked and depends on each other. Though, the development of mining and industrial belt sometime helps to form a cluster away from the corridor. But, it should be kept in mind that flourishing of those activities also depends on the development of corridor. In future the growth and extension of corridor from Panagarh to Barakar and beyond the jurisdiction of West Bengal to Dhanbad can be comparable with the formation of a megalopolis that is not far beyond.

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