

# **CHAPTER 1:**

## **INTRODUCTION**

### **1.1 Introduction**

India is witnessing a rapid growth of urban population as well as its share of urban population (17.29 % in 1951 to 31.16 in 2011) due to spread of urbanization, development in trade and commerce, transport, industrialization and allied activities. “Moreover, the growth of industrialization and development in trade and transport has given a new dimension to the pattern of urbanization. Thus, the cities are not only changing in their population and area but their influence on the neighbouring areas is also becoming more and more pronounced. Similarly, the areas surrounding the cities are also changing owing to the increased interaction between the city and its neighbouring areas. Moreover, city being a focal point of a wider region, the city and country have a 'symbiotic relationship' in which the city and country are parameters at large.” (Aahluwalia, 2004)

The function of rural area is related with agricultural land and villages mainly operate through primary activities whereas urban area accommodate within it with various industry, shops, offices, warehouses, public building etc. The natural link between this two is provided with development of transport and communication. So, the relationship between rural and urban areas are multidimensional incorporating trade and financial relations, agricultural relations, industrial relations, social and cultural relations, education and health relations, transport and communication relations and finally administrative and political relations (Jhunjhunwala, 1988). Here the urban area depends on its rural counterpart for its need of agricultural and allied materials and rural area depends on specialized function of exchange, manufacture and services on urban areas. Thus the rural-urban interaction is a two-way or mutual process involving social, economic as well as political consideration.

The distinction between urban and rural is not at all very sharp across the developing countries, there is still several rural features noticed in urban areas. The main reason behind this is a different process of development witnessed across the developing countries taking place in a totally different historical context compared to already developed world.

In pre-independent Bengal, towns flourished for trade and commerce. Even after 70 years of independence these two aspects are still very important for the growth and evolution of towns. It is assumed that initially when a centre of trade and transport forms, a huge inflow of people from surrounding region take place, which ultimately is the beginning of a growth of large urban centre. Urban centre as a socio-economic hub, disseminating cultural influence and

acting as a collection and distribution centres of regional produces on their surrounding area gradually flourish with the passage of time.

This interaction is a dynamic process. Over time these inflows such as human movement, goods, capital, information and above all resource are changing its direction, rate and speed between rural and urban area. Each of these flows has not only different component, but also different spatial and temporal linkages and effects (Laldinmawia, 2011). Over time it is altering not only the physical landscape but also the economic and social environment of urban and its surrounding area. As a result it would be interesting to investigate, examine and analyze the cumulative effect of rural-urban interaction manifested through various demographic, social and economic activities taking place across the space. In this work an attempt has been made to identify the pattern of rural-urban interaction between Siliguri Municipal Corporation and its surrounding rural areas of Siliguri sub-division.

## **1.2 Concept of rural-urban interaction**

Before venturing into the intricacies of the rural-urban interaction and its associated literatures, it is important to describe the term rural, urban, and interaction. The distinction between rural and urban areas is recognized across all countries of the world and data is generally presented separately for rural and urban area.

A rural area or countryside is a geographical area located outside of towns and cities. For statistical and administrative purposes, different countries have varying definitions of rural. The Health Resources and Services Administration of the U.S. Department of Health and Human Services defines the word 'rural' as encompassing "...all population, housing, and territory not included within an urban area. Whatever is not urban is considered rural". Small villages and a low population density characterize typical rural areas. Rural areas include both agricultural and other types of resources like forests.

According to the Census of India (1971) 'in the rural areas the smallest area of habitation, viz., the village generally follows the limits of a revenue village that is recognized by the normal district administration. The revenue village need not necessarily be a single agglomeration of the habitations. But the revenue village has a definite surveyed boundary and each village is a separate administrative unit with separate village accounts. It may have one or more hamlets. The entire revenue village is one unit. In un-surveyed area, like villages within forest areas, each habitation area with locally recognized boundaries within each forest officer's beat is treated as one unit'. From 2001, the Census of India gives a classification of total number of inhabited villages by seven broad population ranges viz., i) Less than 200, ii) 200-499, iii) 500-999, iv) 1,000-1,999, v) 2,000-4,999, vi) 5000-9999, vii) 10,000 and above.

The territory around a city is referred to as an urban area. Most people who live in cities work in non-agricultural sectors. Urban areas are highly developed, which means there is a high concentration of human constructions including homes, businesses, highways, bridges, and trains. Urban areas can include townships, cities, and suburbs. The city and its environs are both considered to be part of an urban area.

United States defines urban area as “Agglomerations of 2500 or more inhabitants, generally having population densities of 1000 persons per square mile or more”. There is two types of urban areas: urbanized areas of 50000 or more inhabitants and urban clusters of at least 2500 and less than 50000 inhabitants.

The Census of India (2011) defines an urban area as:

- a) All places with a Municipality, Corporation or Cantonment or Notified Town Area Committee, etc.
- b) All other places which satisfied the following criteria:
  - (i) A minimum population of 5,000;
  - (ii) At least 75% of the male main working population engaged in non-agricultural pursuits; and
  - (iii) A density of population of at least 400 persons per sq. km.

The interaction comes into existence when rural and urban areas mutually act and react, adapt and adjust in terms of a systematic relationship. Socio-economic disparities play an important role in shaping the pattern of rural-urban interaction. Through the provision of services, infrastructure, and markets for agricultural goods, the urban boosts the economy of rural areas. On the other hand, urban regions' better employment prospects, higher wages, and other amenities attract people from the rural. It is therefore apparent that urban and rural areas are interdependent and cannot be studied in isolation. Moreover, it is true that each of them have an independent location and functional structure. Through this mutual involvement of the interaction of the internal and external forces a traditional agrarian society changes to a more modern and urbanized form. The physical landscape as well as the economic and social environment of the surrounding communities are changing as a result of this continuous process. The urban centres affect both the character and structure of the households in rural settlements especially their occupational structure, social structure (like education, sex ratio), consumer behaviour patterns, shopping pattern, changing attitude towards rural way of life etc. Therefore, this study actually deals with examination and analysis of the cumulative effects of the rural-urban relationship in Siliguri sub-division.

### **1.3 Review of literature**

The research work regarding urban studies has been gaining its interest among scholars in the developing countries as it has a very close relationship with economic development, paradigm shift in technology and associated changes. Post the colonial era, the late 20<sup>th</sup> century witnessed the rise of different ways and processes of urbanization and associated changes in developing countries. This is due to high population density, increasing rate of literacy, unemployment, poverty and an aspiration towards a better standard of living. From 1970's onwards, huge amount of literature in the field of rural-urban relationship was overflowing studying various linkages and flows between town and countryside, processes of social and economic changes affected by this linkages and deeper structural transformations of the society. Only those literatures that are relevant for the present topic have been dealt with in this section. In order to make the literature survey a systematic one, the related literatures were grouped into different themes and then presented separately.

#### **1.3.1 Theories of rural-urban interaction**

Preston, D. (1975) first tried to formulate the relationship between different settlements with a hierarchical order. This study incorporates movement of people, goods and capital as a medium of social transaction and services.

Friedmann, J. & Douglas, M. (1978) explained agro-political development where the "primary objective is no longer economic growth but social development with focus on specific human needs." For them "development must be fitted to ecological constraints; priority attention (in agrarian economics) must be given to rural development; and planning for rural development must be decentralised, participatory, and deeply immersed in the particulars of local settings."

Stohr, W.B. & Taylor, D.R.F. (1981) (ed.) describe several parameters to balance development between urban and rural area. In a view of political scenario, he emphasized the need to build political infrastructure or atmosphere in rural areas to make rural areas self-reliant and to make decision-making appropriate. He emphasized the importance of agriculture and rural products for the economic harmonization of rural areas. He spoke of the importance of creating an ideal demand flow for all types of goods produced in the village. Finally, he referred to the modernization of the urban and rural transport system by restructuring it so that the proper flow of resources between the two regions is ensured smoothly.

Wanmali, S.V. (1981) advocated that the unique feature of the Indian social system is the rural and urban interaction taking place at various levels and scales. He said small towns were the main obstacle in the way of evolution of rural India.

Gould, W. (1982) noted that people, goods, money and information technology are important factors in rural and urban interactions, although they vary from place to place, time to time and at various scales. He further explained that these flows are not only symptoms of the ‘development processes’ but are ‘in themselves active features in the transformation of rural-urban places’.

Rondinelli, D. (1983) shed light on various issues related to the growth and expansion of small and medium towns in developing countries. He suggested that for any kind of urban development to take place, it is imperative that the existing works in the region be properly completed and that a favourable natural and socio-economic environment is created to influence them. He also mentioned the importance of smooth flow of resource for growth in a city or towns, military bases, administrative functions and foreign investment infrastructure. He placed special emphasis on the linkage of villages and towns for the spatial development of a region and a framework has been developed in this regard. The structure emphasized on interconnection and interdependence between different linkages. Although this classification of connection or linkage creates conflicts between the elements in some cases, it is still the first planned form of explaining rural-urban interaction in sequential manner.

<b>Table No. 1.1 Classification of major linkages in spatial development</b>	
<b>Linkage type</b>	<b>Elements</b>
Physical linkages	Road networks. River and water transports networks. Railway networks. Ecological interdependencies.
Economic linkages	Market patterns. Raw materials and intermediate goods flow. Capital flows. Production linkages-backward, forward and lateral. Consumption and shopping patterns. Income flows, sectoral and interregional commodity flows. Cross linkages.
Population movement linkages	Migration-temporary and permanent. Journey to work.
Technological linkages	Technology interdependencies. Irrigation systems. Telecommunication systems.
Social interaction linkages	Visiting patterns. Kinship patterns. Rites, rituals, and religious activities. Social group interaction.
Service delivery linkages	Energy flow and networks. Credit and financial networks. Education, training and extension linkages. Health services. Delivery systems. Professional, commercial and technical service patterns. Transport service systems.
Political, administrative and organizational linkages	Structural relationship. Government budgetary flows. Organisational interdependencies. Authority -approval-supervision pattern. Inter- jurisdictional transaction patterns. Informal political decision chains.
Source: Rondinelli (1983)	

Morgan, W.B. (1985) in his study on tropical Africa tried to analyze the rural-urban interaction based on a range of socio-economic conditions and energy resources. According to him urban areas are not necessarily the chief centres of energy consumption in tropical Africa, but they do consume the greatest variety of different kinds of energy and provide the greatest concentration of demand. The flow of fuel and electricity create an urban-rural energy interface, especially marked between kerosene and wood as each penetrates the other's base.

Aniah, E.J. (1992) in his study on urban-rural interaction in the Cross River State Nigeria found that migrants' interaction with their home areas, through networks and linkages, is geared towards the preservation of rural opportunities and investment. Remittances are a major source of funds for the training of rural youth. By comparison, urban-based community development associations play a minor role in rural development. However, the ability of well-placed migrants to attract projects to their home areas is great.

Leeuwen, E.S.V. (2010) explained the interaction of the city and its surrounding areas with the rural areas. He tried to explain the inter-relationship between village and town in a combination of issues like local integration, farmless employment, economic situation in rural areas, etc.

Yansui, L. (2014) tried to explain development and transformation by going through various analytical process. Above all, they gave an idea of how the urbanization process, industrial structure and the small regional development affect the field of rural-urban interaction.

Aung, N. & Mar, T.T. (2019) advocated that areas in the middle of rural and urban parts connect and act as interface between villages and cities. They refer to this as the peri-urban area and suggested all the peri-urban areas near the city are very quickly transformed into cities. They also said that agricultural and allied products are supplied from village to town just as education, medical and ancillary services are provided from town to village.

Thus from the above literatures related to theories of rural-urban interaction it is very clear that rural-urban interaction is a very complex process. It is a two-way movement where both the rural as well as urban areas are mutually dependent on one another. This interaction takes place at different levels which are controlled by numerous factors. Most importantly, it is the physical, economic, social, technological, transport and administrative factors which play a huge role in shaping up the rural-urban interaction in a particular region.

### 1.3.2 Studies on land use pattern

Jianyintin. J., Jie. Z., Hong'an'. W.U., Li. A., Hailong. Z., Li. Z. & Jun. X. U. (2005) used supervised classification and NDBI methods by observing satellite images of two different years to analyze the land use change of the city and its surrounding areas. They suggested the rapid growth of the city economy, the structural changes in transportation and the growth of market economy accelerated this change.

Park, S. & Choi, C. (2010) explains the relationship between urban growth and efficient urban planning. Land use change and its impact on the environment have been discussed by creating urban growth probability index through frequency ratio, analytical hierarchy process and logistic regression.

Bhatta, B. (2012) studied the urban growth and sprawl of Kolkata during 1980-2010 and analyzed the changes using several statistical methods. He found an increasing dispersed development of the city with the declining population growth rate. He also discussed the process of dynamic growth of the physical structure of the city and how civic patterns and processes can be explained from remote sensing data.

Li, Y. (2012) studied rural-urban inequality and the different ways in which rural-urban interactions occur. It is stated here that there is a profound relationship between the flow of resource and change in the environment. A city-rural interaction index has been computed indicating that traditional land characteristics have changed in areas where population density and economic activity have increased rapidly.

Ramachandra, T. V., Aithal, B. H. & Sowmyashree, M. V. (2014) explained the use of remote sensing data to create a 10 km buffer with the help of spatial metrics and gradients. Different types of quantitative techniques have been used to explain the overall change in land use in the city centre and the surrounding areas.

Hashem, N. & Balakrishnan, P. (2015) used remotely sensed data for monitoring, controlling, analyzing, evaluating, and measuring urban growth pattern and land use change. The Markov Chain model has been used to predict the future land use change.

Bhat, P.A., Shafiq, M.U., Mir, A.A. & Ahmed, P. (2017) said due to huge scope of employment, large number of people migrated from villages and small towns to large cities in search of a better standard of living. They used satellite images and topo sheets of two different periods to observe the massive damage to open spaces and reservoirs in the city due to huge increase in population.

Chakraborti, S., Das, D.N., Sannigrahi, S. & Banerjee, A. (2018) studied the multi-temporal satellite data to analyze the increase in built up structures in urban areas and

transformation of peri-urban areas. Different types of landscape metrics have been used to explain the configuration of urban landscapes.

Aburas, M.M., Ho, Y.M., Ramli, M.F. & Ash'aari, Z. H. (2018) used a number of mathematical and statistical methods to predict growth in urban areas like Shannon entropy approach which indicate a compact or dispersed growth and landscape matrix by using patchiness, aggregation, clumpedness, fragmentation, disaggregation, and physical connectedness.

Therefore, the landuse and landcover change in and around an urban centre has been a hot topic of research in recent times. Moreover, with the advancement of remote sensing and GIS as a sub discipline in geography, geographers across the world are continuously working to understand and estimate the landuse and landcover change taking place in the vicinity of large urban centres. With the spill-over effect of urban population being observed in large cities, the adjacent rural areas are increasingly becoming hotbeds of rapid population explosion. This ultimately results in huge population growth in the adjacent rural areas leading to a rapid change in landuse and landcover in these areas.

### **1.3.3 Studies on the transport structure**

Gupta, P., Jain, N., Sikdar, P. K. & Kumar, K. (2009) noted how GIS can be used to improve the decision making process with the help of population density, land use characteristics and travel behaviour. They also dealt with applicability of GIS management system for better traffic modelling, route planning and environment assessment of a particular area.

Fareeduddin, K. & Reddy M. A. (2015) stated that urban transportation system is multidimensional in nature and thus it should encompass human behaviour, safety, affordability, emission characteristics etc. They also highlighted how geospatial technology help in improving accurate transport system with proper dimensions.

Wang, L. & Duan, X. (2018) in their case study of Yangtze River Delta, China used a door-to-door approach to integrate intra and inter-city travel which was simulated in a GIS environment. They also used transport networks, landuse types, transport speeds and transport infrastructure for quantitative modelling which can be used as a base line of transport economics.

Wang, Z., Han, Q. & Vries, B. D. (2019) discussed the relationship between transport characteristics and land use/land cover types. This study deals with development of transport indicators and how they are related to change in land use/land cover of an area.



Jedlicka, J., Havlicek, M., Dostal, I., Huzlik, J. & Skokanova, H. (2019) studied the relationship between road construction and land use change. They stated that after the construction of road there was an increase in the intensity of land use change.

Ding, R. (2019) used multiple centrality assessment to find the interrelation between urban traffic network and surrounding land use change. He suggested that this stage by stage multilinear network analysis can be applied for identification of the relationship between urban traffic network growth and land use change.

Liu, Y., Cao, X., Xu, J. & Li, T. (2019) studied the influence of traffic accessibility on land use and socio-economic development of any particular area with the help of RS and GIS technique. They said traffic and transport infrastructure promotes conversion of water bodies and forested areas into constructed land.

Litman, T. (2019) in his study on evaluating transportation landuse impacts said transportation planning decisions can have many direct and indirect landuse impacts. These impacts are often significant and should be considered when evaluating a particular policy or project. He also stated that proper transportation planning leads to urban sprawl, development of urban fringe as well as the smart outgrowth of town.

Therefore, it is very much evident that transport network plays a huge role in shaping up the intensity of rural-urban interaction in a region. If the surrounding areas in the vicinity of a large urban centre is very well connected, then not only the rural-urban interaction increases but also the change in landuse and landcover is very rapid. This is because, a well-developed transport network helps the movement of people and goods and services very rapidly in a seamless manner.

### **1.3.4 Studies on the function of urban and rural area**

Potter, R. B. & Unwin, T. (1989) discussed the different aspects of rural-urban linkage, regional disparities and the rural migration to towns and cities etc. This study also deals with planning strategy of any particular region in a 'spatio-eco-political' context.

Kundu, A. (1992) noted that agricultural development is not the only major factor in establishing rural-urban linkages in our country. The other factors like physiographic, socio-cultural attribute of any region, infrastructural development, market policy, rural-urban settlement linkages in terms of transport development are also important for logical and dynamic rural-urban linkage.

Bagchi, B. (2007) in her study on rural-urban interaction across North Bengal opined the functions performed by an urban centre, represented primarily by the availability of urban

infrastructure, act as the services for its own population as well as for the population of its rural neighbours. The limit of extension of these services indicates the efficiency of the urban centres on one hand and the intensity of the urban-rural co-ordination on the other. She also found the pattern of interconnection between rural and urban area emphasizing the benefits of urban services in terms of medical hinterland and educational hinterland and for rural development.

Therefore, rural and urban areas can exist in a harmonious way only because of the unique functions they deliver. Urban centres are the providers of secondary and tertiary services along with certain specialized functions which attract the rural population from their surrounding hinterland towards them. On the other hand, rural areas are the producer and supplier of primary goods like grains, vegetables and dairy products which are highly demanded in their nearby urban centre. Since their functions are exclusive in nature so rural and urban areas are mutually dependent on one another leading to the creation of synergies for the overall development of the region.

### **1.3.5 Studies on rural-urban linkage**

Singh, R. L. (1955) used bus service and newspaper circulation as a parameter for delineating the area of influence of Banaras city. Similarly, the areas providing the city with milk, grains and vegetables were also taken into consideration for delineation of functional region.

Chatterjee, L. (1973) used bus frequencies for differentiation of overlapping and truncated hinterlands developed around a 'close urban mesh'. She also said in West Bengal, except the Calcutta/Howrah metropolitan area the urban hierarchy is simple with small market towns, sub divisional towns and district towns.

Nangia, S. (1976) in her study of delineation of functional region of Delhi said settlement structure and the population size of any region plays a very important role in controlling the rural-urban interaction across space.

Kundu, A. (1980) said India's urbanization after independence took a new turn and a harmonious rural-urban interaction was replaced by export-import oriented commodity flows. For balancing the colonially implanted urban system there was a great horizontal redistribution of population for which the core-periphery relationship was ruptured altogether.

Therefore, rural-urban linkage has been mostly studied by movement of commodity and services as well as population between the urban centre and its surrounding rural areas. Transport infrastructure plays a huge role in this respect. Thus frequency of bus service or sub-urban train service has been widely used to quantify the linkage that exists.

#### 1.4 Statement of problem

Rural-urban interaction is a unique topic in urban geographical study. It is possible to establish a functional relationship between urban and surrounding rural area from this type of research. In reality, there exists a 'give and take' relationship between a town and its surrounding rural area which actually increase the growth potential of any urban area. In the process of interaction, the impulse of urbanization spreads around the city and ultimately turns the surrounding area into an urbanized periphery. On one hand the country side provides various first order materials whereas on the other hand the finished products are offered by the city to the surrounding area. Urban area must have a complementary region, depending on its size. As the urban area expands, its complementary region also grows in size. There is a strong interconnection between land use and landcover change with development of transport facility in the surrounding rural area of an urban centre.

Siliguri with its surrounding region is the centre of trade and commerce and also enjoy the status of being 'the gate way to the North East India'. Infact the 20 km wide 'Siliguri Corridor' connects the north east India with the main land. Historically, the establishment and extension of the tea industry in this region lead to agricultural transformation and create a huge demand for skilled and un-skilled labour which boosts the urbanization process. Due to the increasing importance of Siliguri as an economic hub of the North Bengal, not only the city's population but also the population of its surrounding rural areas increased at an alarming rate during the last two decades. An increase in economic activity because of its strategic location is ultimately going to affect the growth of urban centre of this region in future. (Basak, 2018). Siliguri acts as a transit point for air, rail and road, connecting the neighboring countries like Nepal (Kakarvitta border, about 27.8 km from Siliguri Municipal Corporation), Bhutan (Jaigoan border, about 150 km from Siliguri Municipal Corporation) and Bangladesh (Fulbari border, about 15 km from Siliguri Municipal Corporation). The strategic location of this area makes it a base for essential supplies to whole of North Bengal as well as the neighboring states. The four 'T's - Tea, Timber, Tourism and Transport - are the main businesses of this region.

Siliguri is surrounded by a large hinterland of rural population. Moreover, Siliguri is the only municipal corporation in the study area; therefore, the rural population of Siliguri sub-division is heavily dependent on Siliguri Municipal Corporation to avail various good and services. They are also dependent on Siliguri Municipal Corporation for better employment opportunities to earn their livelihood. This study will analyze the rural-urban interaction taking

place within Siliguri sub-division which will give an idea of how much the rural population of Siliguri sub-division is dependent on Siliguri Municipal Corporation.

### **1.5 Location of the study area**

Siliguri sub-division has been chosen as the study area which is located at the base of Himalaya Mountain in the plain of the Darjeeling district. The latitudinal and longitudinal extension of the study area is 26°26'50" N to 26°58'00" N and 88°06'13" E to 88°31'03" E respectively. The geographical area is 819.61 sq. km consisting 4 Community Development Blocks, 22 Gram Panchayats, 14 Census Towns, 353 Villages and 1 Municipal Corporation under its administrative jurisdiction. This sub-division is bounded on the north by Kurseong sub-division and Kalimpong district, on south by Bihar, Uttar Dinajpur and Bangladesh, on east by Jalpaiguri district and on west by Nepal. According to 2011 census, the total population of this region is 1189838 consisting 654617 urban population and 535221 rural populations. The distribution between male and female is 609169 and 580669. The climate of this region is typical Terai Monsoonal type, temperature varies between 26°C to 34°C in summer and 12°C to 24°C in winter with an average annual rainfall of 323 cm. Although Siliguri is not a very old city compared to the neighboring towns of Cooch Behar and Jalpaiguri, but due to its locational advantages it has seen waves of massive immigration over the years.

### **1.6 Objectives**

5. To study the growth of rural and urban settlements within study area.
6. To study the various factors governing rural-urban interaction and delineate the zone of interaction in the study area.
7. To study the transport network and analyze the land use and land cover change within study area.
8. To study the pattern of rural-urban interaction within study area.

### **1.7 Hypothesis**

5. With an increase in distance from Siliguri Municipal Corporation the population growth in rural settlements decrease.
6. Road density decrease with an increase in distance from Siliguri Municipal Corporation.
7. There is a negative relationship between distance from the Siliguri Municipal Corporation and land use and land cover change in the study area.

8. Rural-urban interaction decrease with an increase in distance from Siliguri Municipal Corporation.

### **1.8 Database**

Both primary and secondary sources of data have been used for the present study. Keeping in mind the objectives, the relevant necessary primary data was collected through prepared questionnaire related to economic, agricultural, educational, health, entertainment and administrative / organizational linkages.

The secondary data like demographic characteristics, growth of rural and urban settlements and economic activities was collected from District Census Handbook, Town and Village Directory, West Bengal Administrative Atlas, Government Reports, Occasional Papers and other reports of Census of India. Satellite imagery data will be collected for 1991, 2005 and 2020 to analyze the change in land use and land cover. The analysis will take into consideration the three consecutive census years of 1991, 2001 and 2011. Data related to origin and evolution of the city and surrounding area will be collected from historical records, published monograms, gazetteers and old maps.

### **1.9 Methodology**

To fulfill the first objective i.e. to study the growth of rural and urban settlements within study area decadal population growth rate for the rural and urban settlements will be analyzed from 1991 onwards and the change will be taken into account. The villages of the study area will also be classified according to their size-class classification. Other demographic and socio-economic parameters like literacy rate, sex-ratio and worker's category will also be analyzed based on secondary data for the rural and urban settlements of the study area.

To fulfill the second objective, various factors governing rural-urban interaction in the study area will be analyzed. The various factors which govern the rural-urban interaction in a region are population size, transport and communication, number and size of settlements, trade and commerce, agricultural activities and socio-economic condition. For delineation of zones of interaction, Siliguri sub-division will be divided into three zones. The first zone (Zone I) within 10 km. from the outer boundary of the Siliguri Municipal Corporation. The second zone (Zone II) lying between 10 to 20 km. from the outer boundary of the Siliguri Municipal Corporation. The third zone (Zone III) lying beyond 20 km. from the outer boundary of the Siliguri Municipal Corporation. This will give an idea of the C.D. Block and the constituent rural settlements within each zone.

To fulfill the third objective i.e. to study the transport network and analyze the land use and land cover change within Siliguri sub-division, road connectivity and land use of entire region will be taken into consideration. The transport network map of the study area will be prepared for three time periods to analyze the change in transport network. Google earth platform will be used to collect information about road network in the study area. Road density will be calculated both c.d. block wise as well as zone wise for the said time periods. Information on land use and land cover will also be collected from the year 1991 to 2021 to analyze the change. Again, land use and land cover change will be analyzed both c.d. block wise as well as zone wise in the study area. Moreover, how transport network development affected the land use and land cover of the study area will also be analyzed. This will be done by creating a 1 km. wide buffer along both sides of the main transport lines viz. SAARC road, National Highways and State Highways within the study area. All this information will be spatially portrayed using GIS software along with extensive GPS survey.

To fulfill the fourth objective i.e. to analyze the rural-urban interaction in the study area, the interaction of various rural settlements with Siliguri Municipal Corporation will be studied. The study area has been divided into three zones based on distance from the outer boundary of Siliguri Municipal Corporation. According to 2011 census there are 313 inhabited villages within the study area. Out of the total number of inhabited 96 villages fall under Zone I i.e. within a radius of 10 km from the outer boundary of Siliguri Municipal Corporation. 123 villages fall under Zone II i.e. within a radius of 10 to 20 km from the outer boundary of Siliguri Municipal Corporation. The rest of the villages i.e. 94 falls under Zone III lying beyond 20 km from the outer boundary of Siliguri Municipal Corporation. In this process of assigning a village to any particular zone there was problem with some villages whose boundary comes under more than one zone. To reduce ambiguity, those villages are assigned to the zone where more than 50% area of the village falls.

The Census of India classifies the rural settlements based on their population size into seven categories which are:

1. Less than 200,
2. 200-499,
3. 500-999,
4. 1000-1999,
5. 2000-4999,
6. 5000-9999,
7. More than 10000.

In the study area according to 2011 census the total number of inhabited villages is 313 which are classified as follows:

Zone	Size-class category of villages							Total
	<200	200-499	500-999	1000-1999	2000-4999	5000-9999	>10000	
I	11	12	12	21	31	9	0	96
II	11	17	35	40	17	2	1	123
III	4	16	25	24	18	6	1	94
Total	26	45	72	85	66	17	2	313

Source: Census of India, 2011. Compiled by the Researcher.

To analyze the rural-urban interaction in the study area, 3 villages from each size-class category of every zone will be taken up randomly. However, there is no village in Zone 1 with more than 10000 populations and there is only one village in Zone II and III with more than 10000 populations. Moreover, there is only 2 villages with population between 5000-9999 in Zone II. Therefore, the total number of villages considered for primary survey will be:

Zone I - $(3*6) = 18$
Zone II - $(3*5) + 2 + 1 = 18$
Zone III - $(3*6) + 1 = 19$
Total = 55

Out of the selected 55 villages, 10 % households were surveyed randomly for collection of primary data. However, for smaller size-class of villages with very less population, 60 to 70% households were surveyed. The total number of households surveyed from the study area for the present research is 2586.

The rural-urban interaction will be studied according to the following themes:

1. Economic interaction - This will study the interaction related to financial purpose, employment purpose, trade and commerce purpose and daily shopping purpose.
2. Agricultural interaction - This will study the interaction related to agricultural commodities, fruits, vegetables, dairy products and agricultural inputs.
3. Educational interaction - This will study the interaction related to primary education, secondary education, higher secondary education, higher education, technical education and private tuition and coaching purpose.
4. Health interaction - This will study the interaction related to OPD service, diagnostics service, hospitalization, vaccination and medicine service.
5. Interaction for entertainment - This will study interaction related to shopping, eating out, movies, hangouts, festivals, fairs and shopping for luxury and high value goods.
6. Administration and organizational interaction - This will study the interaction related to office visit, court visit etc.

Interaction for all these types will be measured for the surveyed household by the frequency of visit to Siliguri Municipal Corporation to avail the goods and services. An effort will be made to find out the relationship between the income of the household and their level of interaction with Siliguri Municipal Corporation and average literacy rate of any village and their level of interaction with Siliguri Municipal Corporation.

### **1.10 Organisation of the study**

This Ph.D. thesis comprises of seven chapters.

**Chapter - 1** Introduction

**Chapter – 2** Background of the study area.

**Chapter – 3** Growth of rural and urban settlement within the study area.

**Chapter – 4** Factors affecting rural-urban interaction and delineation of zones of interaction.

**Chapter – 5** Development of transport network and associated land use and land cover change.

**Chapter – 6** Rural-urban interaction in the study area.

**Chapter – 7** Conclusion.



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