**INTRODUCTION**

With increasing population and demand for urban infrastructure services, the capacities of local governments in many developing and newly industrialised countries are overburdened. According to India’s Ministry of Urban Development, 20 percent of the country’s urban households are denied access to safe drinking water, 58 percent do not have safe sanitation, and more than 40 percent of garbage generated is left uncollected for want of proper waste management. Approximately 28 per cent of the municipalities provided less than 50 liters of water per capita per day, which is less than half of the norms recommended by the Zakaria Committee. Even supply between locations is also known to be highly skewed, being very little per head in slums. There is, thus, a major deficiency in the provision of urban infrastructure and services despite major efforts that have taken so far. The problems are not only of the shortage of services but also inequitable distribution of the services among the different sections of society. Thus, inadequacy of infrastructure restricts the mission of sustainability of town and cities; consequently experiences very low quality of life. There is a growing concern about how to make our cities safe and sustainable. Keeping these facts in mind an attempt has been made in this thesis entitled “Infrastructure Development of Towns in Murshidabad : An Assessment of Levels of Urbanization” to evaluate critically the existing status of infrastructure like water, sanitation and waste management, road and transportation, power supply, education and health facilities as well as financial management for infrastructure of the city and towns of Murshidabad district of West Bengal in particular as an epitome of Indian cities and towns. It also aims at exploring the relationship between urbanization and infrastructural development in the district. At the same time, models for planning of urban infrastructure and some suggestions for improvement of urban infrastructure in the district have also been made.

**SET OF HYPOTHESES**

In order to bring out the characteristic features of urbanization and infrastructure and their interrelationship in the study area a number of hypotheses have been formulated. These are tested through simple, appropriate statistical techniques. The various hypotheses are listed as follows:

- Urban population is growing more rapidly than its rural counterpart in the district.
- Growth rate of a town is related positively to its size.
• There exists high positive correlation between total population growth and urban population growth in the district.
• There is high degree of relationship between urbanization and infrastructural development in the district.
• There is a wide gap between urban population growth and urban infrastructural growth.
• There is positive relationship between growth of own source revenue of municipal towns and growth of urban population.

OBJECTIVES OF THE STUDY
The study aims at highlighting the trends and patterns of urban infrastructure development in relation to urbanization with following objectives.
1. To examine the circumstances causing spatial variations in the distribution of towns of Murshidabad as well as trends and patterns of urbanization.
2. To find out the existing infrastructure or service sector activities and urban dynamics.
3. To identify the gaps in infrastructure.
4. To examine the interrelationship between urbanization and infrastructure developments in the district.
5. To examine the manner by which the municipal governments and local governments are spending their resources i.e priority allocation between different kinds of services.
6. To highlight the financial management in the towns of Murshidabad.
7. To make an attempt for proper planning strategies for infrastructure development.

STUDY AREA
The study area includes all the towns of Murshidabad district. Murshidabad district is the northern most district of the Presidency Division in the state of West Bengal. The study area is bounded by 23° 4 3’ 30” N to 24° 50’ 20” N latitude and 87° 49’ E to 88° 46’ E longitude. It covers an area of 5,324 Sq. Km. It is bounded on the north by Ganga river, on the south by Barddhaman and Nadia district, on the east by Bangladesh and Nadia district and on west by Jharkhand and Birbhum district. The district resembles an isosceles triangle with the apex pointing the North West. The district is located centrally in the lower Ganga valley. River Bhagirathi flowing from north to south through the district divides it into almost equal halves. The tract in west of river locally known as Rarh, is characterized by high and undulating surface, some hillocks, soil is hard clay and climates is drier. East of the Bhagirathi is known as Bagri characterized by low lying alluvial surface with a humid climate and fertile soil. The river system is consists of the Ganges and its distributaries of which the most important are
Bhagirathi, Jalangi and Bhairab. According to 2001 census, there are 29 towns, which include 7 municipal towns and 22 census towns in the district (Map 1). These are as follows (Table 1).

### TABLE 1: TOWNS AND CITIES OF MUSHIDABAD DISTRICT, 2001

<table>
<thead>
<tr>
<th>SL. No.</th>
<th>Name of Towns</th>
<th>Status</th>
<th>Category</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Berhampore</td>
<td>M</td>
<td>I</td>
<td>1,60,13</td>
</tr>
<tr>
<td>2.</td>
<td>Jangipur</td>
<td>M</td>
<td>II</td>
<td>74,468</td>
</tr>
<tr>
<td>3.</td>
<td>Dhulain</td>
<td>M</td>
<td>II</td>
<td>72,850</td>
</tr>
<tr>
<td>4.</td>
<td>Kandi</td>
<td>M</td>
<td>II</td>
<td>50,349</td>
</tr>
<tr>
<td>5.</td>
<td>Jiaganj – Azimganj</td>
<td>M</td>
<td>III</td>
<td>47,212</td>
</tr>
<tr>
<td>6.</td>
<td>Murshidabad</td>
<td>M</td>
<td>III</td>
<td>36,947</td>
</tr>
<tr>
<td>7.</td>
<td>Beldanga</td>
<td>M</td>
<td>III</td>
<td>25,361</td>
</tr>
<tr>
<td>8.</td>
<td>Farrakka Barage</td>
<td>CT</td>
<td>III</td>
<td>22,060</td>
</tr>
<tr>
<td>9.</td>
<td>Anupanagar</td>
<td>CT</td>
<td>V</td>
<td>9,964</td>
</tr>
<tr>
<td>10.</td>
<td>Dhusaripara</td>
<td>CT</td>
<td>IV</td>
<td>12,112</td>
</tr>
<tr>
<td>11.</td>
<td>Uttar Mahammadpur</td>
<td>CT</td>
<td>V</td>
<td>6,192</td>
</tr>
<tr>
<td>12.</td>
<td>Kanuria</td>
<td>CT</td>
<td>III</td>
<td>27,513</td>
</tr>
<tr>
<td>13.</td>
<td>Chachanda</td>
<td>CT</td>
<td>IV</td>
<td>10,300</td>
</tr>
<tr>
<td>14.</td>
<td>Serpur</td>
<td>CT</td>
<td>V</td>
<td>7,228</td>
</tr>
<tr>
<td>15.</td>
<td>Fatellapur</td>
<td>CT</td>
<td>V</td>
<td>5,579</td>
</tr>
<tr>
<td>16.</td>
<td>Jagtaj</td>
<td>CT</td>
<td>V</td>
<td>9,409</td>
</tr>
<tr>
<td>17.</td>
<td>Aurangabad</td>
<td>CT</td>
<td>III</td>
<td>32,148</td>
</tr>
<tr>
<td>18.</td>
<td>Dafahat</td>
<td>CT</td>
<td>IV</td>
<td>11,326</td>
</tr>
<tr>
<td>19.</td>
<td>Paschim Punropara</td>
<td>CT</td>
<td>III</td>
<td>31,198</td>
</tr>
<tr>
<td>20.</td>
<td>Ghorsala</td>
<td>CT</td>
<td>V</td>
<td>6,255</td>
</tr>
<tr>
<td>21.</td>
<td>Charra</td>
<td>CT</td>
<td>V</td>
<td>5,879</td>
</tr>
<tr>
<td>22.</td>
<td>Srikantabati</td>
<td>CT</td>
<td>V</td>
<td>9,897</td>
</tr>
<tr>
<td>23.</td>
<td>Jot Kamal</td>
<td>CT</td>
<td>V</td>
<td>6,194</td>
</tr>
<tr>
<td>24.</td>
<td>Sahajadpur</td>
<td>CT</td>
<td>IV</td>
<td>15,713</td>
</tr>
<tr>
<td>25.</td>
<td>Khodarampur</td>
<td>CT</td>
<td>V</td>
<td>5,109</td>
</tr>
<tr>
<td>26.</td>
<td>Harthoria Chak</td>
<td>CT</td>
<td>V</td>
<td>8,436</td>
</tr>
<tr>
<td>27.</td>
<td>Kasim Bazar</td>
<td>CT</td>
<td>IV</td>
<td>10,179</td>
</tr>
<tr>
<td>28.</td>
<td>Goaljan</td>
<td>CT</td>
<td>V</td>
<td>5,002</td>
</tr>
<tr>
<td>29.</td>
<td>Gorabazar</td>
<td>CT</td>
<td>V</td>
<td>7,721</td>
</tr>
</tbody>
</table>

*Source: Census of India, 2001*

M = Municipal Towns  CT = Census Towns

**DATA BASE AND METHODOLOGY**

The study is based on primary and secondary sources of data. Secondary information needed for study are procured from the various Census Publications, Topo- Sheets, Survey of India, Municipal Records of the District, Block Development Offices, Murshidabad, Zilla Parisad Office, Murshidabad, Municipal Statistics of West Bengal, Publication of Bureau of Applied Economics and Statistics i.e. District Statistical Hand Book, National Sample Survey Organization, various World Bank Reports, Various Reports of United Nations, Various Reports of Asian Development Bank, Central Bureau of Health Intelligence, Various Reports of Ministry of Human Resource Development, National Council for Educational Research and Training, WHO reports, Economic Survey, Ministry of Urban Development (India), Ministry of Urban Development (West Bengal), Planning Commission India. Primary information is collected from field survey through personal observation, interviewing people at the household level, and also from service providers etc.
A literature and case study review followed by identification of the parameter to assess urban infrastructure have been done. Evaluation of the present situation of infrastructure has been made through secondary sources of information and regular interactions with various stakeholders.
with the help of different schedule questionnaire and statistical tools. Presentation of data is made through various cartographic techniques and maps using GIS software like Mapinfo, ArcGis. Then, the key findings have been worked out and finally some suggestions are recommended to make city and towns more livable and sustainable.

JUSTIFICATION BEHIND THE STUDY AND STUDY AREA

India’s cities are growing at a rate much faster than the rest of the world including China. In 1971, about 109 million people lived in the urban areas; by 2001, this number had increased to over 285 million, registering an increase over 161 percent within a period of just three decades. As per 2001 census, 27 percent of India’s population (285 million) live in urban areas, making India’s urban system the second largest in the world.

Phenomenal growth in population made it difficult for the institution to maintain pace, expand and augment the supply of utility infrastructure such as water supply, sewage and solid waste management, street lighting, roads and transportation etc. and also social infrastructure like education, heath, recreational facilities and housing facilities. For example, in India, municipal authorities collect only 60 percent of the garbage. Till now, 21 percent of urban population lives in squatter settlement. Condition of roads and streets is deplorable. The shortage of infrastructure or intermittent failures in its delivery can cause heavy economic losses. Congestion is one of the notable examples of infrastructure failure. Congested city streets decelerate the movement of goods and services and traffic congestion compels people to allocate time for unproductive waiting and at the same time results in an inefficient use of fuel and worsening of air pollution.

Urban population in West Bengal should be viewed against the all India picture to set West Bengal in proper perspective. The urban population as a percentage of total population of India records a figure 27.8 percent; whereas, in case of West Bengal it is 27.97 percent. The percentages of urban population in West Bengal have consistently been of an order higher than the all India rates from 1901 to 2001. But, the decadal growth of urban population in the state is lower than the all India rate. Total urban population in West Bengal has been increased by ten times during last hundred years.

If we examine the distribution of urban population of West Bengal, it is clear that the contribution of Kolkata, to the total urban population of the state has recorded decreasing tendencies after 1951. The contribution of North 24 Parganas surpassed Kolkata (20.39 percent) by registering a figure of 21.63 percent in 2001. This means urbanization is decentralizing out of Kolkata. Kolkata, Twenty Four Parganas, Howrah, Hugli and Bardhaman form the core of urbanization-cum urban growth foci in South Bengal accounting 75.35 percent of total urban population of West Bengal.
The western part of West Bengal consisting of roughly the districts of Puruliya, Bankura, part of Midnapur and Birbhum has improved just above datum of marginality and urbanization is not so impressive. The rest of two districts in south Bengal namely Murshidabad and Nadia have experienced medium pace urbanization during the period. They account 7.64 percent of total urban population of West Bengal. Murshidabad covers an area of 5324 sq. km. i.e 6.08 percent of the total area of West Bengal and accounts for 7.31 percent (58,66,569) of the total population of West Bengal. In terms of total population, Murshidabad ranks 5th among the states of West Bengal. The rural population (51,33,835) of Murshidabad as a percentage of total population records a figure of 87.51 percent; whereas, urban population (7,32,734) records a figure of 12.49 percent of total population of Murshidabad in 2001.

The urban population of Murshidabad in 2001 is 73,27,34 as against 75,908 in 1901; registered an increase over 865 percent in 100 years. This figure in case of West Bengal is 985. *In 1971, the total urban population of Murshidabad was 2,48,425, which became 7,32,734 in 2001; registered an increase over 194 percent in the last three decades. Whereas, this figure in case of state is over 104 percent; less than the district and thus, the phenomenon is important from point of view of our study*. If we consider the decadal growth of population, then it will be clear that the decadal growth rate of Murshidabad was below the state decadal growth rate during the period 1901 to 1971. But, important aspect is the steady increase of decadal growth from 39.28 in 1971 to 48.22 percent in 2001. It is far above the growth rate recorded by West Bengal. If this rate is continued then the urban population of Murshidabad will be doubled in next 25 years. *If we consider the growth rate of urban population among the districts in West Bengal, then Murshidabad (+48.22 percent) takes first place in the state in 2001. This trend of urbanization no doubt put pressure on infrastructure of urban areas. So, the time has come to reexamine the urban infrastructure in relation to newly emerging situation of urbanization in the district.*

As per 1991 census, there are 18 towns (7 municipal towns and 11 non municipal towns). But, in 2001, the figure is 29 which include 7 municipalities and 22 census towns. This increase in the number of towns indicates that altogether 11 villages have been transformed into census town in a decade (1991-2001); registering an increase over 60 percent. From the above analysis, it is clear that the number of municipalities is almost stagnant though their population is increasing steadily. At the same time, the numbers of census towns have increased in the last decade and hence the urban population of district.

There is a size-class disparity among the towns on the availability of amenities and services. The percentage of households covered by each of three amenities viz drinking water, toilet, and electricity increased systematically with the size class of urban centers except for class six towns. It is indeed very unfortunate that the percentage of households not covered by
toilet, electricity and drinking water facilities are absolutely very low in case of class V and class IV category towns. So, one would therefore argue that small and medium towns should be major concern of the scholars in the context of provision of basic amenities. Under this situation, as a researcher of geography, it is the time to reexamine the infrastructural condition of towns of Murshidabad. Such study cannot of course determine policy. It can however help to eliminate fatuous and wasteful measure and to suggest new alternatives.

CHAPTERIZATION
The thesis has been divided into following chapters:
1. Geographical Personality of The Study Area
2. Review of Literature
3. History of Urbanization.
4. Structure and Patterns of Urbanization.
5. Conceptual Background.
6. Infrastructure: An assessment of the existing status.
7. Urbanization, Urban development and Infrastructure - Problems and Prospects.
10. Findings, Suggestions and Recommendations, Conclusion.

In the very first chapter, an attempt has been made to explore the geographical personality of the study area like location, geology, climate, drainage, vegetation, transportation etc.

In the subsequent chapter II, a review of literature on urban infrastructure and its relation with urbanization has been made.

Chapter III deals with the history and processes of urbanization in the district. An attempt has been made in the same chapter to periodize the history of urbanization of the district.

Chapter IV has been devoted to present and analyze the major issues of the overall scenario of urbanization in the district. The study reviews the trends in urbanization and analyse the patterns of urbanization in the district as a whole with cross verification with the state as well as nation. The study covers 100 years span from 1901 to 2001. It also aims at formulating a composite index based on selected indicators in order to assess the variation of urbanization among the towns of the district. The levels of urbanization have

**FIG. 1: FLOW CHART SHOWING MAJOR WORKS OF THE RESEARCH**

Sets of indicators
a) Physical sets
b) Economic sets
c) Administrative sets
d) Social sets

Levels of urbanization

Assessment of the inter town variation in the Levels of urbanization

Search out of patterns

Identification of the nature of correlation between urbanization and infrastructural development

Search out of problems

Identification of gaps in the demand of infrastructure

People’s perception on infrastructure

Review of existing infrastructure facilities

Generalization of the problems on urban infrastructure in the district

Planning of infrastructure

Sustainability of towns and cities

*Source: Compiled by researcher*
In Chapter V, the concept and definition of infrastructure have been dwelt upon. In Chapter VI, an attempt has been made to evaluate the existing status of infrastructure like water, sanitation and waste management, road and transportation, power supply, education and health facilities of the city and towns of Murshidabad district of West Bengal. Assessment of the status of infrastructure has been made on the basis of selected indicators. This chapter also aims at formulating composite infrastructure index (CII) for the cities and towns of the district which has then meaningfully been applied to unravel the variations in the level of infrastructural facilities among the towns of Murshidabad.

Chapter VII deals with the complex relationship between urbanization, economic growth and infrastructure. Hypothesis on correlation between development of infrastructure and development of urbanization in the study area has been tested in this chapter.

In Chapter VIII, an attempt has been made to ascertain the current fiscal performance (2004-05) of urban local bodies (ULB) of the study area as well as to understand the composition of financial mix and trends of the past finances from 1981 to 2001 of Murshidabad. It also aims to identify the major problems and prospects for better financial control and management by the ULB’s.

In Chapter IX, the study has endeavoured to analyse the cognitive patterns of stakeholders on infrastructural facilities like water supply, sanitation, road and transportation, power, education and health of municipal towns of Murshidabad district of West Bengal. Chi-square ($\chi^2$) statistic has also been justifiably applied to examine the variations.

The final Chapter X presents the major findings and recommendations with some suggestions to improve the urban infrastructure of the study area followed by conclusion.

**LIMITATION OF THE STUDY**

I have tried to unravel the existing status of infrastructure of towns and cities of Murshidabad district covering six sectors of infrastructure with an aim to find out the existing gap in infrastructure. I have taken inter town variations in this regard. I have also tried to explore the financial conditions of municipal towns of Murshidabad district. But, there are so many areas of focus on urban infrastructure like intra town variation of urban infrastructure, study of a particular town on urban infrastructure that need to be researched. It is not possible for a single researcher to touch every areas of focus due to availability of time and space. So hope these areas of focus will be undertaken by other researcher subsequently.