



RESEARCH ARTICLE

Expansion or over growth of Municipal Area: A Case Study of Burdwan Municipality, Burdwan District, West Bengal, India

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ABSTRACT

Burdwan Municipality is one of the emerging urban centre in West Bengal and also running in the phase of land dynamics. This phenomenon, leads to large scale unplanned growth with uneven pattern of land use in the study area. The town has drastically increased its area and population size from 1970, this results development of Municipal area in the fringe regions as well as rural counterparts. This paper aims to analyze whether this development is an expansion or unplanned overgrowth. So, the author have used the Land use data, topographical map, satellite image with supervised classification of Maximum Likelihood Method to identify the temporal change of municipal area. Then a map also prepared to show the municipal boundary in different time periods by using Geographical Information System.

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INTRODUCTION

Land use is the human use of land. Land use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements. It has also been defined as "the arrangements, activities and inputs people undertake in a certain land cover type to produce, change or maintain it" (FAO, 1997a; FAO/UNEP, 1999). Land use also refers to the purpose to which the land is committed. It includes both physical features like, vegetation, water bodies and cultural artifacts like settlement, roads etc. During the last few years there has been a growing insight that towns and in general urbanized areas, have to be considered as cultural ecosystems. Towns and cities are the structured communities of various kinds of organisms (human, animals and plants) which have a certain structured set of relationships with the abiotic environmental factors: climate, soil, water and topography (Vink, 1983). In the present context, Burdwan Municipality emerged as a growing urban centres and leads to gradual development over the fringes. The basic objective is to find out

- The spatial pattern of Land use over the study area.
- To assess the temporal change of Burdwan municipal Boundary to analyse the answer of above question.

Several knowledge-based approaches were used by Anderson, 1971, Hutchinson, 1982, Jenssen *et al.*, 1992 for LULC classification by utilizing additional geographical data beside satellite images. In this work a LULC classification scheme of Burdwan municipality area is generated on the basis of United States Geological Survey (USGS) classification system, concerning the existing LULC features of that area i.e., evergreen vegetation is divided into two sub classes, "surrounding the forest area" and "along with residential area". Map is a graphic representation or scale model of spatial concepts. In this study the output of LULC classification of Burdwan municipality area is presented by the maps.

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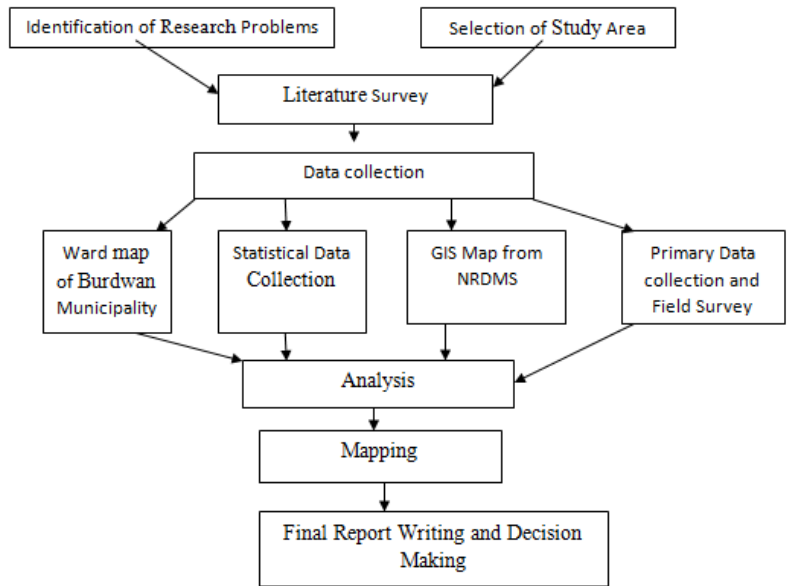
MATERIAL AND METHODS

The whole research is accomplished using the empirical observations and quantitative methods of geography. The purpose of this geographical analysis is to find out the answer of the question: is there any problem related to land use planning? If found then what is its spatial pattern over Burdwan? In the pre-field session, toposheets (73 M/15 and M/16) of Survey of India, Google Earth imagery, Ward map of municipality, GIS maps prepared by NRDMS, satellite images (LANDSAT and IRS) of different time periods, Indian census report, land use data and numerous literatures related to it are collected. Then that information is integrated in the great cartographic engine, i.e. Geographic Information System (GIS), creating an updated database. After creating a geo-referenced baseline ward map of Burdwan, all the spatial information is represented as thematic maps and charts. To verify the spatial information frequent rechecking, ground observations and surveys are done.

About the Study Area

Burdwan town has developed in the left bank of the river Damodar. This town belongs to Bardhaman – II C.D. Block and Bardhaman Sadar (North) Subdivision. It is 106 km away from Asansol in West and 95 km from Kolkata in South-east. Burdwan urban agglomeration is located in the toposheets 72 M/15 and M/16 of Survey of India. Latitudinal extension varies from 23<sup>o</sup>13'N to 23<sup>o</sup>16'N and longitudinal extension varies from 87<sup>o</sup>49'E to 87<sup>o</sup>53'E. According to Census of India (2001) Burdwan municipality has an administrative area coverage of 23.04 km<sup>2</sup> but now the town is expanded further (>27.00 km<sup>2</sup>). During 1961 the municipal area was 22.62 km<sup>2</sup>; it is increased to 22.74 km<sup>2</sup> in 1981, 23.04 km<sup>2</sup> in 2001 and 26.54 km<sup>2</sup> in 2008. This town has the Burdwan Railway Station which is well connected by eastern railway (main and chord line) and G.T. Road with its hinterland. This kind of location is helpful for large scale population accumulation and centralization of industries as a result urban area is increasing in an unprecedented manner. So, the area needs some kind of planning for the use of land. (Fig 1)

The steps followed in the study can be organized in the following manner



Flow Chart of Methodology adapted to this Study

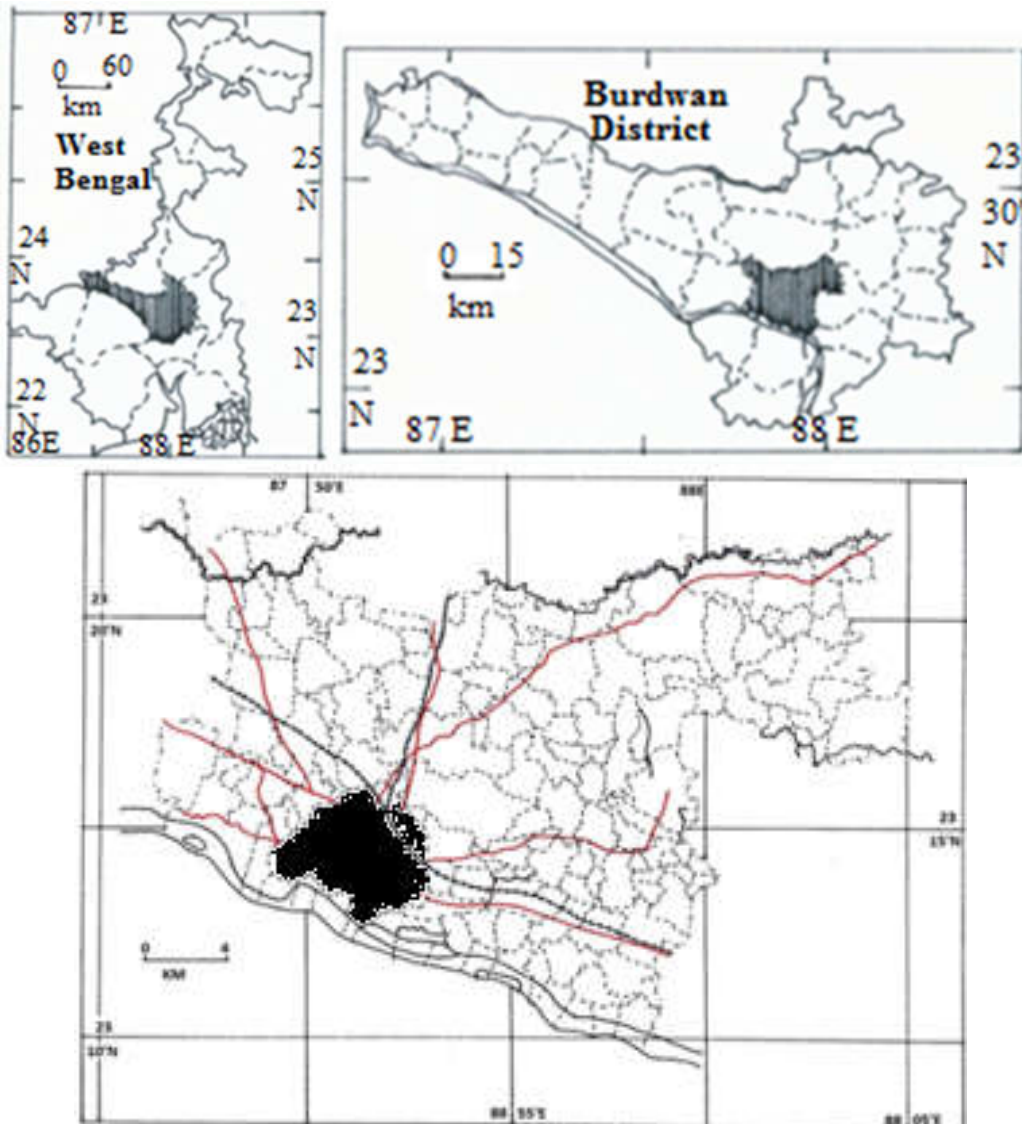


Fig. 1. Location of the Study Area

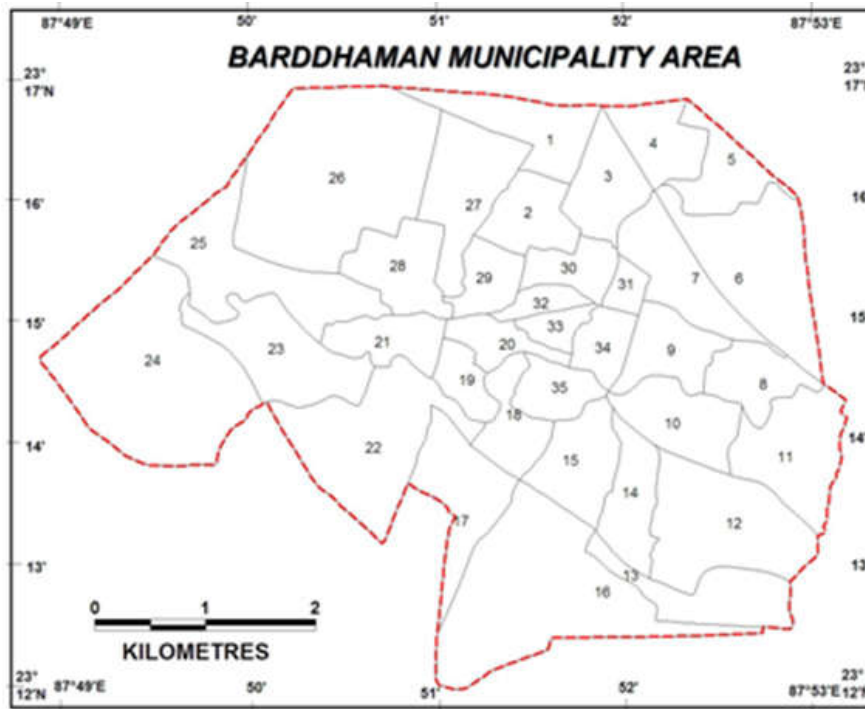


Fig. 1. Location of the Study Area

### The General Land use of the Study Area

The general land-use pattern of the study area includes the following categories. The total area of Burdwan Municipality is 26.54sq km, in which 14.15sq km are residential area, 0.58sq km used as agricultural land, 0.39sq km area served for institutional purpose, rail and road networks covered the area of 1.48sq km, vegetative cover are 2.26 sq km and swampy land having 1.08 sq km. This is the whole picture of land use in the study area. (Table 1)

Table 1. Land use and land cover of Burdwan Municipality

Land use & Land cover	Area in Sq km
Residential Area	14.15
Industrial Area	0.58
Institution and Govt/Semi/Public land	0.39
Vegetation cover/Public park/Playground	2.26
Agricultural land	1.08
Water bodies and wet swampy land	3.67
Railway and Roads	1.48
others	2.93
Total	26.54

### LULC Classification of Land use in the study area

At first the whole town was subdivided into five wards in 1865 (the year of establishment of municipality) and in 1957 five wards turned into 25 wards. Now the number is increased in 35. The spatial pattern of land dynamics is mainly followed by the population pressure of the study area. Side by side there is more concentration of slum population also. This burden of huge population has created an aggravating negative effect on urban land use pattern. The growth of industrial sector and urban centre of all scale and categories have made drastic changes in LULC all over the Burdwan Municipality area. The cultivated land has been converted into settlement areas and many ponds are being filled up for the purpose of multistoreyed apartments in Burdwan Municipality area. Whether it is industrialization or urbanization, the face of the land is altered. Based on the ground information collected and LULC classification scheme, LULC scenario of total Burdwan Municipality are represented in tables and figures. (Table 2) (Fig 2)

Table 2. Table showing LULC scenario of Burdwan Municipality area

LULC classes	LULC scenario of Burdwan Municipality (%)
Evergreen vegetation surrounding the forest area	2.00
Spar vegetation along with Residential area	11.83
Crop land	8.35
Residential area	36.88
Commercial area	2.95
Mixed urban with commercial area	2.7
Ephemeral ponds	0.25
Barren land	1.97

### Population Growth

The population growth scenario is one of the basic factors of the temporal change of urban extension. Because heavy traffic in municipal area causes deconcentration of population over the fringe areas for searching open space and pollution free environment. The basic figure is at the time of establishment (1865) the population was 39,618 and now the population is 2, 85,602 (2001). (Table-3)

Table 3: Population Growth of the Study Area

Year	1981	1991	2001	2011
Population	168000	245000	286000	314638

### Spatio- Temporal change of Municipal Boundary

In general explanation, Burdwan town is rural in character. But in recent years the development in economic and service sectors leads to high level growth of the town. As a result, the town spatially changes its area with specified border in particular time interval. This phenomenon can be analysed through the following maps, *i.e.* topographical map, IRS LISS-3 image with maximum likelihood method Google maps and lastly by preparing GIS map showing temporal change of municipal boundary. (Fig 3 and 4)

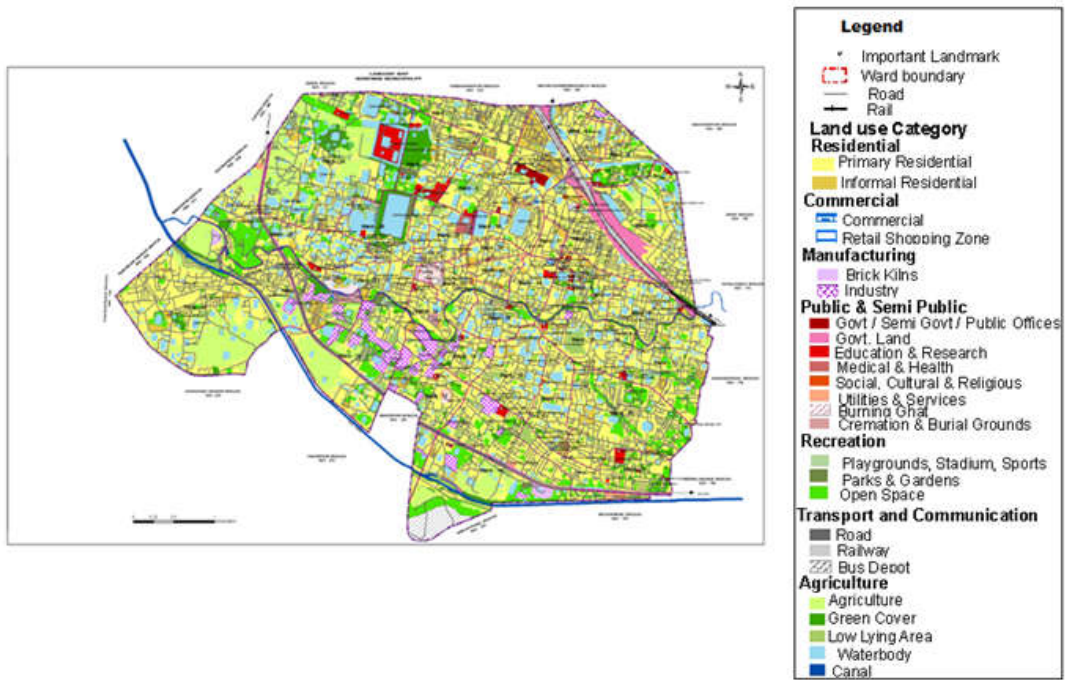


Fig 2: Land use and Land cover of the study area

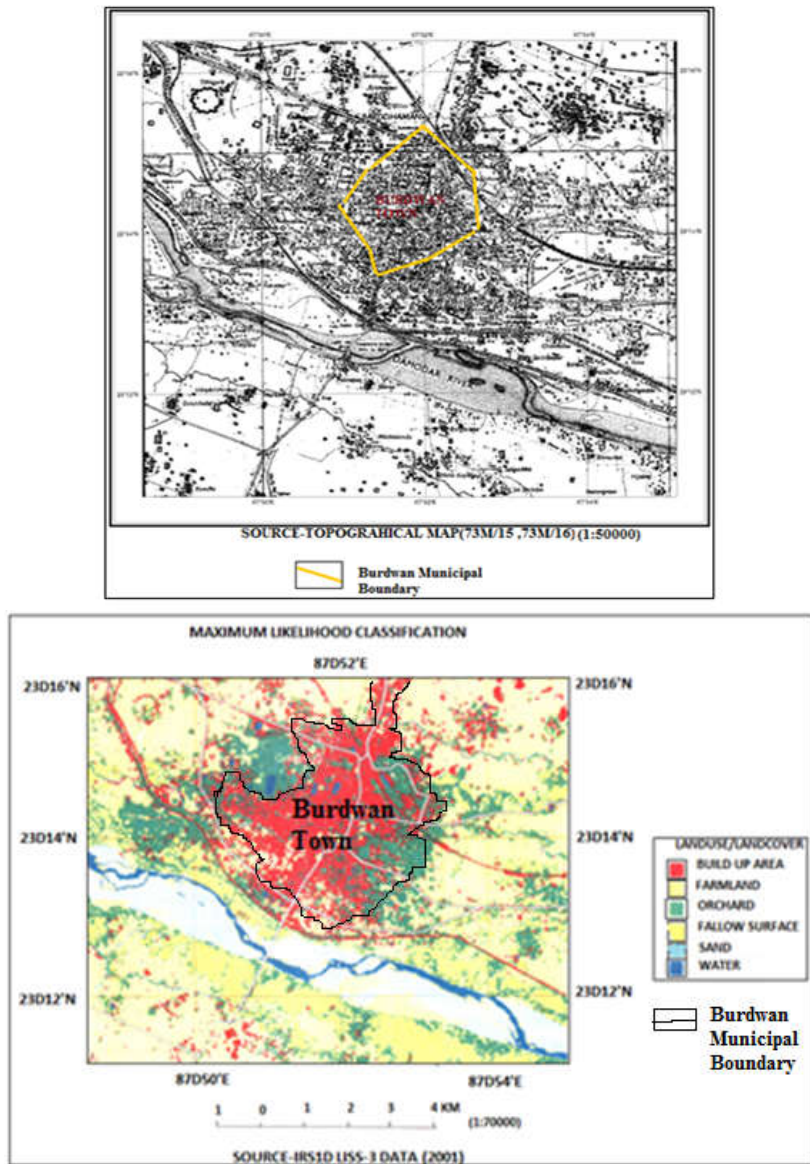


Fig. 3. Assessing Burdwan Municipal Boundary by analysing Topographical Map and IRS LISS-3 Image classification

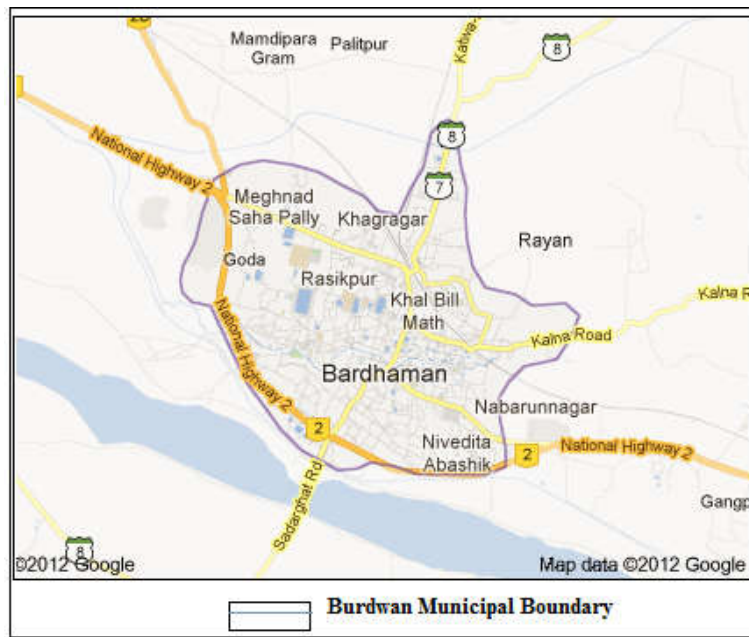


Fig. 4. Analysing Burdwan Municipal Boundary by using Google GIS Map and Satellite Map

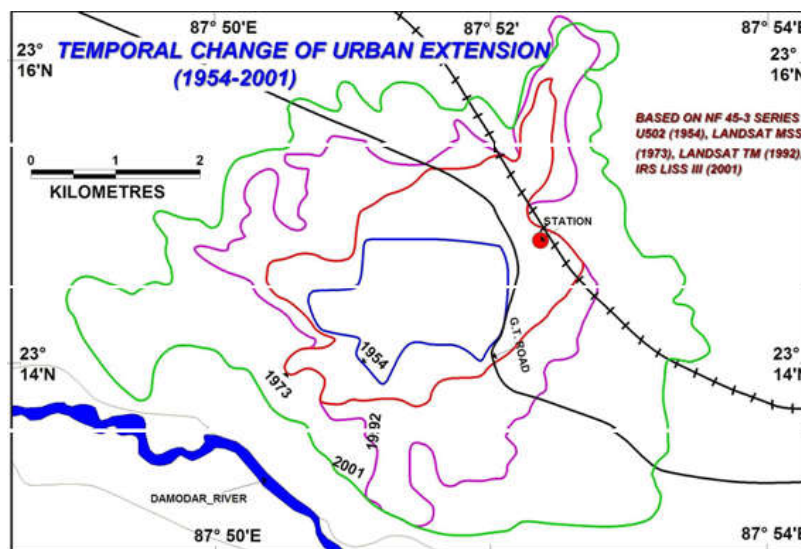


Fig. 5. Temporal change of boundary of Burdwan Municipal Area

Table 4. Change of municipal area in different years

Years	Area of Burdwan Municipality in Sq km.	Change of municipal area in %
1961	22.62	-
1981	22.74	+0.53
2001	23.04	+1.32
2008	26.54	+15.19

## DISCUSSION

By analyzing above maps it is clear that the municipal areas gradually change their municipal boundaries and acquire the mouzas having rural character. From the field survey it is also cleared that some mouzas represents dual character. It means that in certain extent of mouza (specified by some landmark) is rural and beyond it, there is municipal area. *e.g.* .Sadhanpur, Nari, Krishnapur, Goda *etc.* (Table 4) (Fig. 5) The temporal change of municipal boundary can be understood by number of wards of municipal area in different time and it shows that the result is increasing gradually. *i.e.* At first, the whole town was subdivided into five wards in 1865 (the year of establishment of municipality) and in 1957, five wards turned into 25 wards and now it is 35.

## RESULTS

Now the question arises whether this change of Burdwan municipal boundary over time is the case of expansion or overgrowth?

From the gradual change and large scale development it may be viewed that it is the case of expansion. But from the field observation the author comes to the decision that it is an overgrowth because of following consequences:-

1. Unplanned growth of households due to expansion of settled area leads to improper drainage system, huge garbage accumulation, and unplanned road network development etc.
2. As the higher class people shifted from town towards peripheral mouzas, the number of vehicles both two and four wheelers is increasing day by day to maintain the quick and fast connection with town. This results the increasing frequency of air and sound pollution in rural environment.
3. Traffic congestion is the daily phenomena during peak hours (10 a.m. and 5 p.m.) as well as normal hours in the linking zone of municipal area and the rural mouzas having partially urban character, *e.g.* The over bridge area connecting link between Nari mouza and Burdwan Municipality show the problem due to increasing number of population.
4. The expansion of settled land leads to increase in land prices rapidly year after year. In recent times the land value is 3 to 3.5 laces per katha. This can also effects the inherited rural people. They sale their land to some Dalals and go into the phase of identity crisis.
5. The development of slum population along the municipal boundary also the result of overgrowth of municipal area.

## Conclusion

With the through analytical study of the area and different sources of information (Books, Journals, Gazetteers, and Website) a brief conclusion may be drawn with the following points. It is the natural feature that the urban area leads to change. But to avoid overgrowth it needs planning and proper management of the study area. It includes:

1. Development of land use plan in the fringe zone and it give some legal status to avoid Dalals.
2. Development of drainage and sewage condition in municipal area as well as fringe zone.
3. Increase the status of connectivity by construction and management of road networks.
4. Local Government body such as Burdwan Development Authority have to formulate some basic plan and legal rules while expanding the municipal area to check the overgrowth.

These are the basic measures to check the problems. For future the author tries to formulate the proper planning to solve this kind of problem.

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