

Urban Population Growth and Associated Land use and Land Cover Change: A study of Alipurduar district, West Bengal

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ABSTRACT

Urbanization is accelerating at an exponential rate in developing countries and it has now become the modern trend of today's globalized world which is making a very rapid progress with the support of everyday innovative technology. The massive influx of migrants towards the urban areas also resulted in accelerated growth of urban centres. This influx of migrants will have some positive and negative impact on the urban area. Such changes in the urban areas have a huge effect on the environment and land use pattern. Our present study incorporates the urban centres of the Alipurduar district to show its land use and land cover change with respect to growth of urban population. To complete the present study we used the Town Directory book, Census of India (2001) and District Census Handbook of Jalpaiguri (2011) for demographic data and analyzed the Satellite images of last few decades with the help of GIS to visualize the changes in land use and land cover. Concluding remarks are delineated through some suggestive measures which will help towards sustainable development of the urban centres in the Alipurduar district.

Keywords:

Introduction

The growth of urban centres are common phenomenon with respect to present global context. The temporal variation in the internal structure of urban centres and its effect on urban land use has become an important area of study for urban geographers. Alipurduar district as a newly formed district of West Bengal, experienced the growth of urban centres since the historical time given its unique geographical location in the heartland of diversified floral and faunal assemblage. With respect to the environmental conditions of the district the growth of urban centres maintain the sequential stages and it is also affected to the natural ecosystem of the region. The region has a good prospect in future.

Objectives

The main objectives of the study are

- i. To show the growth of population and urbanization in different urban centres of Alipurduar district.
- ii. To examine the changes in land use and land cover pattern in different years and find out the related issues associated with population growth.

Database

Basic information has been collected from different publications and reports, journals and published and unpublished sources. For showing the population growth in different urban centres, Data collected from the Town Directory book, Census of India, 2001 and District Census Hand Book of Jalpaiguri W.B., 2011 have been used.

For LULC mapping, two Landsat images for the year 1999 and 2016 were downloaded from USGS Earth Explorer.

Imageries Attributes

Acquisition Date	Sensor	Path/ Row	Landsat	No of Bands
15/11/1999	ETM+ SLC	138/42	Landsat- 7	8
12/11/2016	OLI- TIRS	138/42	Landsat- 8	11

Methodology

Methods include Compilation, Calculation and Presentation of Collected Data to show the population growth in different urban centres.

For Land Use Land Cover Classification, Supervised Classification method has been done in GIS software Environment. Ground Verification has been also done by extensive GPS based Survey and Google Earth to make the confirmation of result obtained for different Land Use Characteristics.

Location of the Study Area

Alipurduar is a newly formed district of West Bengal known as Queen of Dooars. It becomes 20th district of West Bengal created on 25th June, 2014. The late colonel Hedayet Ali Khan was the first assistant commissioner of Alipurduar and it was named after him 'ALIPUR' and 'DUAR' came from the word 'DOOR' (door to Bhutan).The district headquarter town Alipurduar is located at the south central part of the district on the east bank of Kaljani river. Average Elevation of this district is 93 m (305ft). Alipurduar district covers the geographical area of 2783.7 Sq. Km. and the total population is 1501983persons (2011 census).

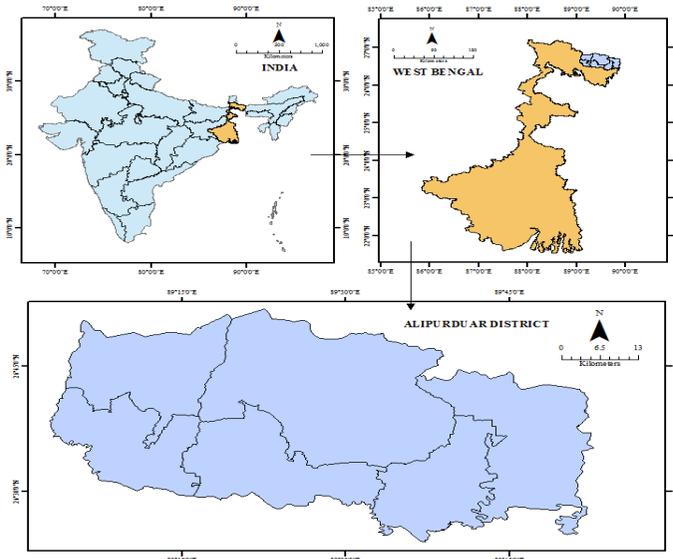
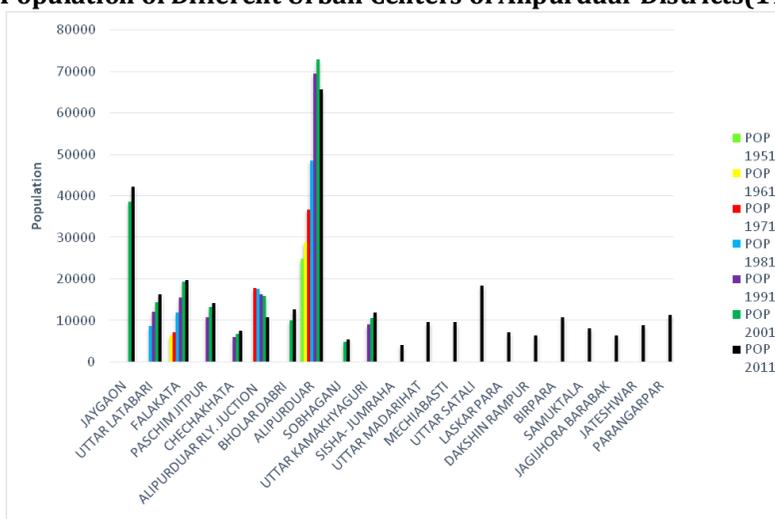


Fig: Location Map of the Study Area

Census Year Wise Population of Different Urban Centers of Alipurduar Districts(1951-2011)



Source: District Census hand book of Jalpaiguri, Town Directory, POP= Population. Decadal Growth (1951-2011) of Population in Different Urban Centers of Alipurduar District

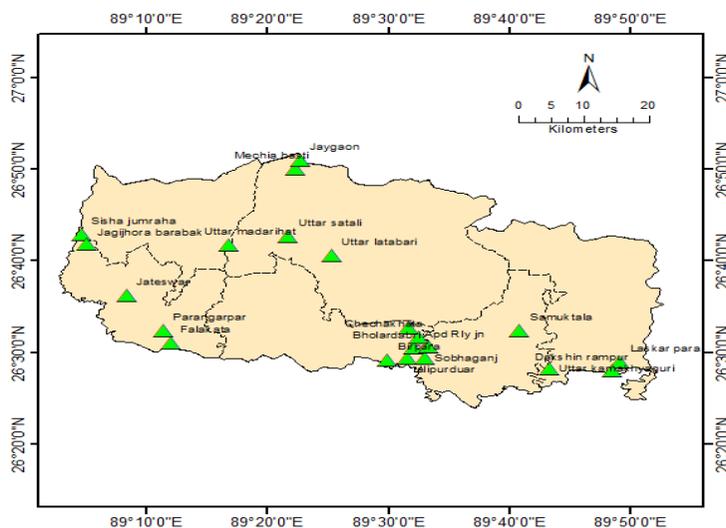
Town Name	GR 41-51	GR 51-61	GR 61-71	GR 71-81	GR 81-91	GR 91- 01	GR 01-11
JAYGAON	-	-	-	-	-	-	9.26%
UTTAR LATABARI	-	-	-	-	40.42%	19%	13.15%
FALAKATA	-	-	12.18%	-	29.49%	25%	1.74%
PASCHIM JITPUR	-	-	-	-	-	23%	7%
CHECHAKHATA	-	-	-	-	-	14%	11.19%

ALIPURDUAR RLY. JUNCTION	-	-	-	-0.07%	-8.17%	-3%	-32.49%
BHOLAR DABRI	-	-	-	-	-	-	26.56%
ALIPURDUAR	-	16.24%	26.76%	32.56%	43.22%	5%	-10.64%
SOBHAGANJ	-	-	-	-	-	-	12.14%
UTTAR KAMAKHYAGURI	-	-	-	-	-	16%	13.99%
SISHA- JUMRAHA	-	-	-	-	-	-	-
UTTAR MADARIHAT	-	-	-	-	-	-	-
MECHIABASTI	-	-	-	-	-	-	-
UTTAR SATALI	-	-	-	-	-	-	-
LASKAR PARA	-	-	-	-	-	-	-
DAKSHIN RAMPUR	-	-	-	-	-	-	-
BIRPARA	-	-	-	-	-	-	-
SAMUKTALA	-	-	-	-	-	-	-
JAGIJHORA BARABAK	-	-	-	-	-	-	-
JATESHWAR	-	-	-	-	-	-	-
PARANGARPAR	-	-	-	-	-	-	-

Source: District Census hand book of Jalpaiguri, Town Directory, GR= Growth Rate.

In the Alipurduar district a number of census town are formed in the census year 2011, which was only 9 in 2001 census year but in the census year 2011 the total number of census town are 20 with Alipurduar Municipality. The total number of urban population of this district is 307551 which is 21.56% of total population. By analyzing this two table it can be said that major population are concentrated in two urban center Alipurduar Municipality and Jaygaon. Other Census towns having a small amount of population and hence most of Towns are belong to the category of Class V. Falakata Census Town recently got the status of Municipality, but no further Process has been started yet Sisha- jumraha, Uttar Madarihat, Mechiabasti, Uttar Satali, Laskar Para, Dakshin Rampur, Birpara, Samuktala, Jagijhora Barabak, Jateshwar &Parangapar,this towns got the status of C.T in 2011 Census that’s why growth rate is 0 in this census town.Interesting Fact is that Growth rate of Alipurduar Municipality increasing up to 2001 census year but in last census year it is decreasing with -10.64% negative growth rate due to urban expansion in the surrounding census town like Paschim Jitpur, Chechakhata, Alipurduar Rly. Junction, Bholardabri, Sobhaganj. Falakata and Alipurduar Railway Jn. towns also haveexperienced noticeable growth rate though out the census years.The urban centers are sparsely distributed through out the districts and most of the urban center are located in the southern part, because the northern part of the district is denselyforested.

LOCATION OF URBAN CENTRES OF ALIPURDUAR DISTRICT, 2011



Major Causes of Growth

Since the emergence of the first urban center on the world, the urban population has been growing more rapidly than the rural population. In the case of Alipurduar it shows a diverse nature of population growth for last 60 years which is due to the natural growth rate of population and also for the external causes.

After the second Anglo-Bhutan war of 1865, the eleven Bengal Dooars were annexed by the British Govt. based on Sinchula treaty and remaining seven Dooars of Assam have already been occupied by the British (Das 2016).

Alipurduar town originated on the bank of river Kaljani based on military settlement in pre independent India. Further, the growth of the town accelerated with the setup of railway lines and for immigration from East Pakistan to this part of Bengal. Hedayet Ali, a colonel was posted as the commander at the military settlement on the bank of river Kaljani nearby Alipurduar town and that military settlement in course of time became less important because of the fast growth of military cantonment at Buxa and Cooch Behar (Debnath, 2010).

In 1876 Richard Haughton, the pioneer of the tea industry was started the tea gardening on this Dooars Region, for that a huge amount of workers from backward tribal areas such as Bilashpur, Chhotnagpur, to migrate to the tea plantations of Bengal and Assam. *Oraon, Munda* and *Santal* peasants from Chhottanagpur and Santal Parganas had been organized by the planters (overwhelmingly Europeans) into the Dooars tea gardens (Das Gupta, 1989). Before these *Adivasis* migrated to Dooars (i.e. 1876), the main communities inhabiting the area were *Rajbanshi, Koch, Mech, Bodos, Garo, Bhutia* and the Muslims (Dey Roy 2016).

Later on extraction of Dolomite from Buxa and Jayanti hill started and was transported through the railway line which is also the primary reason for setting up of railway line in this area.

'Bongal kheda' movement refers to cleaning of 'Bengalis' from the North East, mainly from the Assam originated during the 1960s and 1970s which expelled around 50,000 Bengalis from Assam who then took shelter in many parts of West Bengal mainly in Alipurduar and Coochbehar.

Another reason for the population growth of Alipurduar is, forming a railway division in 1958. For this a number of people from different places came to these towns and after their service they have become the citizen of these towns whatever I found during the survey and it is the reason for forming the census town Alipurduar Rly Junction and others.

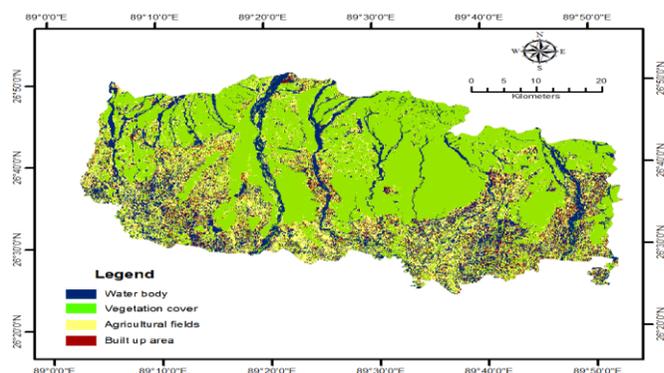
A good transport and communication network is essential for the growth of a town. Better transport facilities, besides increasing the mobility of the town's people encourage the establishment and expansion of towns along its main transport routes. For this reason, the catchment area of the town also increases which results in urbanization. Alipurduar city is divisional headquarter of NF railway. So the connectivity with the North East as well as with the rest of India is satisfactory. Besides railway, NH 31C passes through this city which also connects Alipurduar with north-east and Bihar.

Establishment of Alipurduar Junction to New Jalpaiguri Railway track through the forest region has changed the forest ecology. A large number railway stations have been set up in this region, namely Rajabhatkhawa, Kalchini, Garopara, Hashimara, Madarihat, Dalgaon which are either in the forest areas or in nearby areas for that a large number of population influx here.

Now Govt. of W.B declared Alipurduar as a Tourism District to promote the unexplored the beauty of nature and also started constructing Helipad in Jaygaon and District Town itself. This initiative will help in the growth of tourism in near future. As a result, land use pattern has been remarkably changed with an increase of residential and build up area particularly in the urban areas.

The Changes in Land Use and Land Cover

Land use and land cover map of Alipurduar district, 1999



Land use and land cover map of Alipurduar district, 2016

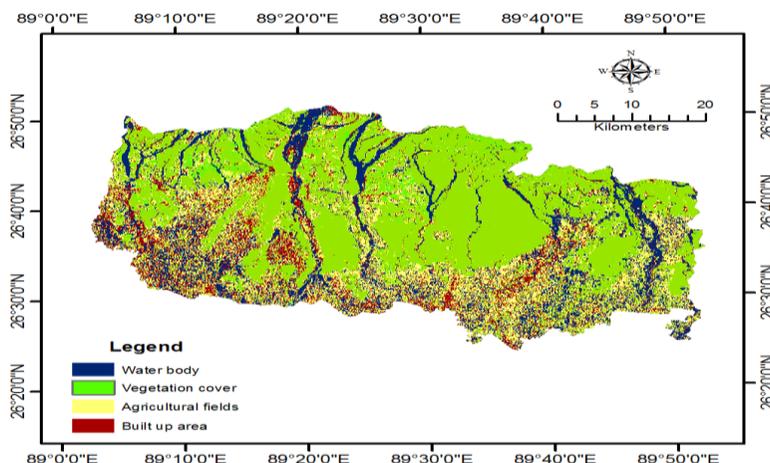


Table: Land Use and Land Cover Change Detection of Alipurduar District (1999-2016)

Type	1999		2016		Change Detection	
	Area (Sq. Km)	Percentage	Area (Sq. Km)	Percentage	Area (Sq. Km)	Percentage
Green Cover	1485.34	53.36	1397.55	50.20	-87.55	3.16
Agricultural Land and Allied	601.65	21.61	629.04	22.60	27.39	0.99
Water Body	533.23	19.16	460.43	16.55	-72.6	2.61
Built-up Area	163.48	5.87	296.48	10.65	133	4.78
Total	2783.7	100.00	2783.7	100.00	-	-

This shows the land use and land cover change of Alipurduar district from 1999 to 2016 under four categories. The land use map of Alipurduar district 2016 shows that the agricultural and allied lands have been increased by almost 27.39 Sq. Km than the area of 1999. Here, the term Agricultural Land and Allied stands for fallow lands, river banks, vacant land, and barren land along with the lands used for agricultural activities. The area under water bodies, i.e. the rivers, canals, ponds, lakes and all other semi or permanent wetlands have been decreased by 2.61 per cent. The water bodies and wetlands acts the natural stabilizer by maintaining the ecological balance in the environment, but the loss of wetlands and water bodies is the most alarming problem that is going to be faced by this region in near future. The region has witnessed sharp growth in population due to national and international migration with the natural increase in population. The development of tea industry and the recent growth in tourism sector has altered the land use pattern with different associate infrastructural development. Table-1 highlights that the built-up area has been increased by 4.78 per cent in the year 2016 if compared to 1999.

Problems associated with Urban Expansion

Urbanization, which was seen as the hallmark of economic development and civilization, brought many of its ills. Because of high rate of urbanization, significant problems have taken place. The problems due to the urbanization of the Alipurduar city and other census towns can be summed up as follows-

Housing shortages and shortages of urban services finally lead to a situation when the settlement degenerates into slums and squatter settlements. Slums are areas of substandard, overcrowded and deteriorated occupied by the poor, the unemployed persons.

In Alipurduar Trading within the town also helps to add to traffic as it allows commercialvehicles, such as pickup vans, trucks, lorries,auto rickshaws which also creates congestion in the bazar area and bypass xing. Alipurduar city has a sub divisional hospital which has been converted to district hospital in last year with 300 bed facilities. It also has 5 private nursing homes and one eye care center, although not sufficient for this huge population.

Environmental degradation is a major effect of urbanization. Pollution such as air, water, excessive noise levels, uglification of landscape through careless planning and urban poverty are found in these

towns. Increasing number of cars, auto rickshaws, buses, bikes, and use of air cooler, refrigerator in houses leads to emission of CFC, carbon monoxide, sulphur oxides, lead which is the causes of air pollution.

Being a class – II town Alipurduar don't have a dumping ground till now which is necessary for the proper waste management. Alipurduar town is surrounded by Kaljani and Dima River in the east and south which are affected by sedimentation problem and degradation of water quality, because sewage system of this city is directly linked with these two rivers. Beside these, for the rapid growth of population, the area of Buxa forest is decreasing. Because of the huge concentration of people in the city, the city governments are in a hard pressure to provide all the human beings the services like, housing services, running water facilities, garbage disposal systems, recreational facilities etc. that would fulfill the basic needs of the residents.

Since last 10 to 12 years the land price of this city is pushed to such a height that a majority of the population can't afford this, which bound them either to live in a very smaller area or to create the slum by the grass root people. Water supplied by the municipality is not sufficient for the people of this city. Average six hours per day water supply can't fulfill their needs, so they arrange own pumps and deep tube wells which lead to scarcity of ground water.

In Falakata town traffic contestation is a common phenomenon, as it is located in the junction point (NH31 and NH31D) on the way of Coochbehar and Alipurduar Town.

Jaygaon town located on international border with Bhutan, offers unrestricted entry and exit of goods from India to Bhutan. The Road condition is dismal and the condition of traffic & transportation also growing up due to encroachment of road by roadside shop and parking areas. The utility infrastructure, such as water supply, drainage and solid waste management needs immediate attention not only for present condition but also to accommodate the future population. Other towns till now don't get the status of municipality, so the condition might be miserable.

Recommended Suggestions and Conclusion

With the discussion of a wide spectrum of urbanization of Alipurduar District, it is revealed that the rate of population growth is very rapid. Thus the quality of environment depleted in various way. The land use, land cover changing gradually due to tea plantation and recent development of tourism industry in Dooars region has accelerated the change of land use pattern with establishment of transport network and other associated infrastructure. The built-up, agricultural and plantation areas have been increased with population growth, on the other hand forest land and water bodies have been decreased significantly. Some Environmental planning must be taken under consideration to sustain the Environmental Sustainability. Beside this some modern and advanced technique required to solve or reduce the problem associated with urban growth and enhanced quality of life. It is earnestly required to ensure positive march towards environmental sustainability and make Queen of dooars -Alipurduar efficient, livable for the entire region in future days.

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