

TRENDS OF URBANIZATION AND ITS IMPACTS ON ENVIRONMENTAL RESOURCES: A CASE STUDY OF GANGTOK TOWN OF SIKKIM HIMALAYAS

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Abstract

The main purpose of this paper is to study the trend of urbanization in Sikkim, prior to merger and post merger with India. Urbanization has profound impacts on environmental resources. It has been revealed that more than one third of the Gangtok's local spring water resources have already been impaired or polluted, specially local springs, those were the source of drinking water for majority and alternative source for some of the inhabitants of Gangtok. The threat of flash flood, different forms of mass wasting has got increased due to constant pressure of increasing population pressure over the natural resources, similarly many civic amenities and facilities has been inadequate due to constant increase of population rather influx of population from other parts of Sikkim and Country. The analysis of the impact of urbanization on environmental resources in some of the Municipal Wards reveals that more than 10 percent of the existing urban developments are in environmentally critical areas. Many surveys and research estimates show that this trend is more likely to continue for another few decades. Therefore, the environmental impacts of urbanization are certain to intensify unless land use planning is changed and decision making processes are modified accordingly.

Keywords: Urbanization, Environment, British Influence, Resources.

Introduction

Urbanization is the physical growth of urban areas as a result of rural migration and even suburban concentration into cities, particularly the very large ones. The United Nations projected that half of the world's population would live in urban areas at the end of 2008. By 2050 it is predicted that 64.1% and 85.9% of the developing and developed world respectively will be urbanized. Urbanizations are closely linked to modernization, industrialization and the sociological process of rationalization. Urbanizations can describe a specific condition at a set time, i.e. the proportion of total population or area in cities or towns, or the term can describe the increase of this proportion over time. So the term 'urbanization' can represent the level of urban relative to overall population, or it can represent the rate at which the urban proportion is increasing. Urbanization is not merely a modern phenomenon, but a rapid and historic transformation of human social root on a global scale, whereby predominantly rural culture is being rapidly replaced by predominantly urban culture.

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Urbanization in Gangtok

The most of the development in Sikkim has been taken place in the urban areas and a high rate of migration from villages to town and from other states of India is found. Rapid urbanization has far outpaced the supply of infrastructure and civic amenities. The census of 1981 has shown a decline in rural population from 16.65 percent to 9.15 percent whereas urban population according to annual plan 1998 to 1999 has shown significant increase. Lower urban population figures in the census data are the result of the re-demarcation of revenue blocks surrounding Gangtok as rural land. Earlier, these blocks were the part of the Gangtok municipal corporation.

As there is no firm policy for the acquisition and disposal of plots in urban areas, so urban development is unplanned. Most of the towns in Sikkim have shown rapid progress in construction of private building activities in the last decade, with a little attention to aesthetic, building laws, civic amenities or even to local materials and styles. Many towns and their surroundings have been experiencing the environmental hazards which are very much affecting the beauty of Sikkim. To solve the problem of over growing buildings, the building plan should be approved in advance having fixed norms on height and areas of the structures, the development of all towns should strictly be adhered. Infrastructure and civic amenities have been developed in the major towns of the state. 61 percent of the population is connected by water schemes, 52.82 percent of the urban population has access to sanitation facilities and a very recent improvement done by the government is the garbage disposal. The government has been sole provider of infrastructure in the state.

URBANIZATION; PRIOR TO MERGING WITH INDIA: 1951 – 1974 (Pre Merger Period)

As Sikkim was under three hundred old long feudal monarchy, the state remained completely rural although the state came under the British influence there was no under growth. It was early 19th century. Sikkim remained rural for more than three centuries whereas Darjeeling a neighboring district of west Bengal grew as hill station rapidly for the influence of British. Agriculture, livestock rearing, food gathering and hunting were the dominant economic practiced by the indigenous as well as the immigrants inhabitants of Sikkim till 19th century. The inhabitants of the state consisted chiefly of Lepchas, the Bhutias and the Nepalese. Lepcha used to practice hunting; food gathering and they were typical forest dwellers, Bhutia used to practice semi nomadic activities whereas Nepalese practiced settled agriculture activities.

Bhutia rulers shifted capital for several times due to fear of invasion of Gorkhas from the east. Frequently shifted of the capital did not allow the capital to flourish and grow, that is why there was no growth in towns of Sikkim till the period of 19th century. The first capital of Sikkim Yuksom in west Sikkim was a typical village, the next capital at Rabdentse is in ruins; another capital at Tumlung in north Sikkim could not flourish due to climatic disturbances. In the subsequent times, the king of Sikkim found a safer and better place for capital that was in the east where they resettled capital at Gangtok and since then there was development in the form of urbanization. The first urban center then became the capital Gangtok the single most important factor that expedited the process of Urbanization in Sikkim was the construction of surface roads

and vehicular traffic road construction initiated by British which was expended by the government later on.

URBANIZATION; AFTER MERGING WITH INDIA: 1975-2011 (Post Merger Period)

Soon after merging with Indian territory, the scenario of the state was totally changed. The change of government from a monarchy to democratic set up was one of the basic factors which brought a turning point with establishment of various government departments. Employment of huge work force consisting of bureaucrats, trained professionals for service sector and all sorts of labourers for the construction works contributed to the growth and development of the urban centres. Sikkim registered an overall urban growth and Gangtok being capital witnessed rapid growth that has taken during the last few years.

During last three decades, a number of markets emerged all over Sikkim and many of them were developed with urban characteristics namely Deorali, Tadong, Arithang, Ranipool, Pakyong, Rhenock, Rongli, Dikchu in the East district ; Mangan Chungthang ,Phodong in the North district ; Melli, Ravangla, Majhitar, Temi in the south and Legship, Sombaria, Soreng, Pelling in the West district. Due to development in the tourism sector, the interior part of the state are getting connected with towns within and outside Sikkim. According to an estimate of the state tourism department, more than 1,00,000 people annually visit Sikkim and to accommodate this huge floating of population, the housing and building Department has taken the responsibilities. Demand for hotel, resort and restaurant has increased for which rural places also come to front. Urban facilities are in great demand in all country side of the state. It is interesting to note that, though the total number of urban areas in Sikkim rose to seven, none of them meet the criteria of the town as cited in the census in terms of total population density and percentage of male worker in non agricultural pursuits ; therefore all of them are given the special status of notified town area (NTA).

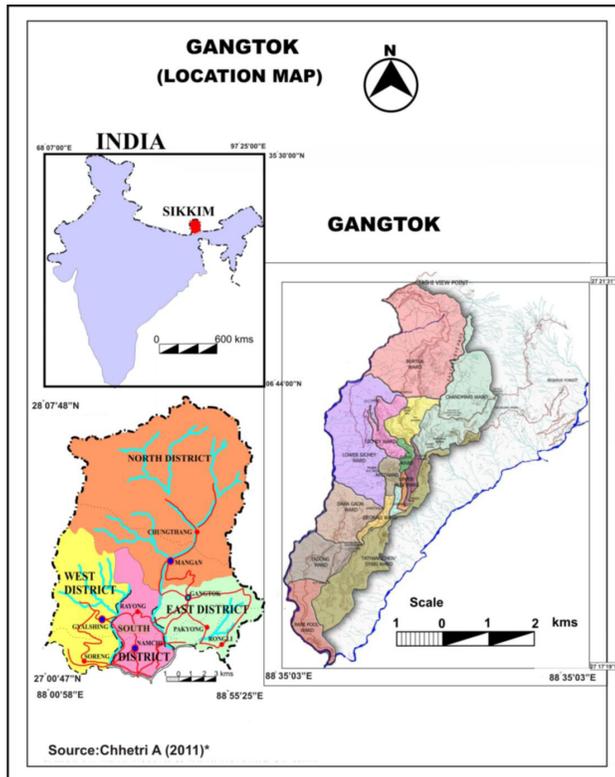
Objective of the study

The general objectives of this study are as follows:-

- To inspect and observe the degree of urbanization and its various parameters.
- To identify the areas which are suitable for further development for different use viz. residential, commercial, industrial etc.
- To identify the area and categorize them as per the density of population, building and other parameters.
- To have an overall bird's eye view to the trend of urbanization prior to pre merger and post merger of Sikkim with India.
- To have an idea of the civic amenities and facilities available in the capital town Gangtok town.

Study Area (Gangtok Municipal Corporation Area)

The precise meaning of the name *Gangtok* is unclear, though it is generally held to mean "lofty hill". Gangtok was a small hamlet until the construction of the Enchey Monastery in 1840. It became a major stopover between Tibet and British India at the end of the 19th century. Following India's independence in 1947, Sikkim became a nation state with Gangtok as its capital. In 1975, the monarchy was abrogated and Sikkim became India's twenty-second state, with Gangtok remaining as its capital. Gangtok, the capital of Sikkim is located between 27° 17' 19" North to 27° 21' 39" North latitude and 88° 35' 03" East to 89° 39' 25" East longitude. It is an elongated hill, wider towards north-east, having highest counter value of 2480m, while narrowing towards south-west corner, with lowest counter value of 826m. The area is having gentle slope from north-east towards south-west while very steep inhabitable slope from central part towards east bordered by Bushuk Khola, towards north-east by Tashi view point and Bushuk reserve forest. The north-west, west and south west portion are having moderate slope which comprise major habitable area, bordered by Rongay Khola tributary of Rani Khola from north to central part and Rani Khola from central west to south till it join Bushuk Khola. Gangtok has a total area of approximately 25 square kilometer and total Population of 98,658 (2011 census).



Gangtok Municipal Corporation (Outer Boundary)

EAST	SOUTH	WEST	NORTH
<p>From Tashi View Point the boundary runs eastwards along the valley side of Eastern Bye Pass Road up to the Maney Jhora. From here the boundary continues upstream along Maney Jhora, along the P.H.E Pipeline Road, the boundary of the zoo till the ridge near Hanuman Tok. From here the boundary runs along the ridge and down till the first turning and along the Hanuman Tok link road till the 2nd mile Check Post. From the second mile check post the boundary runs down hill diagonally till the Dichilling Jhora. From here the boundary continues down stream along the Dichiling Jhora till 300 feet below the Rongnek Road.</p>	<p>Starting from the Dichiling Jhora 300 feet below the Rongnek Road the boundary runs 300 feet along the valley side of the Gangtok - Rongyek Road westwards, till the house of Shri Pempa Wangdi then along the pine tree down till the Lok-Chu Jhora and continues along the village footpath and the boundary of Shri Karma Wangdi Bhutia's plot. The boundary runs along the approach road to Shri Karma Wangdi Bhutia residence along the footpath till the old D.G.P Quarter. There after; it continues in a straight line unto the house of Smt Amgi Bhutia. From there on, the boundary runs southwards along the village footpath running above the house of Shri Passang Bhutia and continues till it meets the foot path adjacent to the house of Shri Phigu Tshering and continues along the village footpath below Government Press Bhir towards Syari and continues down the stairs and along a rough village road near the Jhora till the edge of the class four Quarter. From here the boundary runs along the edge of the Quarter and after meeting the PWD road, the boundary continues along the PWD road and the Trinity Jhora. From the Jhora the boundary runs along the plot boundaries of shri K. T Bhutia, Mr. Ongyal Bhutia and Shri Pemba Lepcha up to the gate of Shri Tashi Zangpo bhutia's residence and then along the border of his land moves up towards the boundary of Tibetology. From here the boundary runs along the plot boundary of Tibetology and the Defence area, further down till Dharamsala at Ranipool and then the steel bridge.</p>	<p>From the intersection of the Rorrochu Khola with the Rani Khola the boundary runs along the Rani Khola till Takste Jhora. then along Takste Jhora. From here the boundary continues along the footpath behind the army area till the Taktse link road. The boundary runs via the Taktse link road and the North Sikkim Highway till the Tashi View Point.</p>	<p>From Rani Khola the boundary runs along Takste Jhora. From here the boundary continues along the footpath behind the army area till the Taktse link road. The boundary runs via the Taktse link road and the North Sikkim Highway till the Tashi View Point.</p>

Source: (Schedule- 1) Urban Development and Housing Department Government of Sikkim.

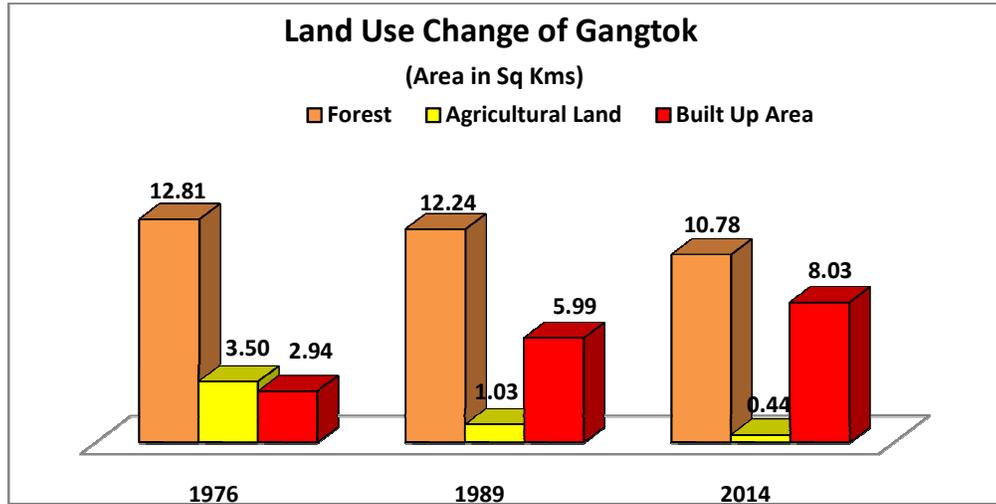
Land use and Landcover Map of GMC 1976- Source Landsat Image

Sl.No.	Name	Area (in sq kms)
1	Forest	12.8144
2	Agricultural Land	3.4988
3	Built Up Area	2.94181
Landuse and Landcover Map of GMC 1989- Source Landsat TM Image		
Sl.No	Name	Area (in sq kms)
1	Agricultural Land	1.02713
2	Built Up Area	5.98803
3	Dense Forest	4.61382
4	Open Forest	7.62603
Landuse and Landcover Map of GMC 2014 - Source Landsat ETM PLUS Image		
Sl.No	Name	Area (in sq kms)
1	Agricultural Land	0.439289
2	Built Up Area	8.03205
3	Dense Forest	3.63647
4	Open Forest	6.56988
5	Tree Clad Area	0.577317

Source: DST, Gangtok-Sikkim

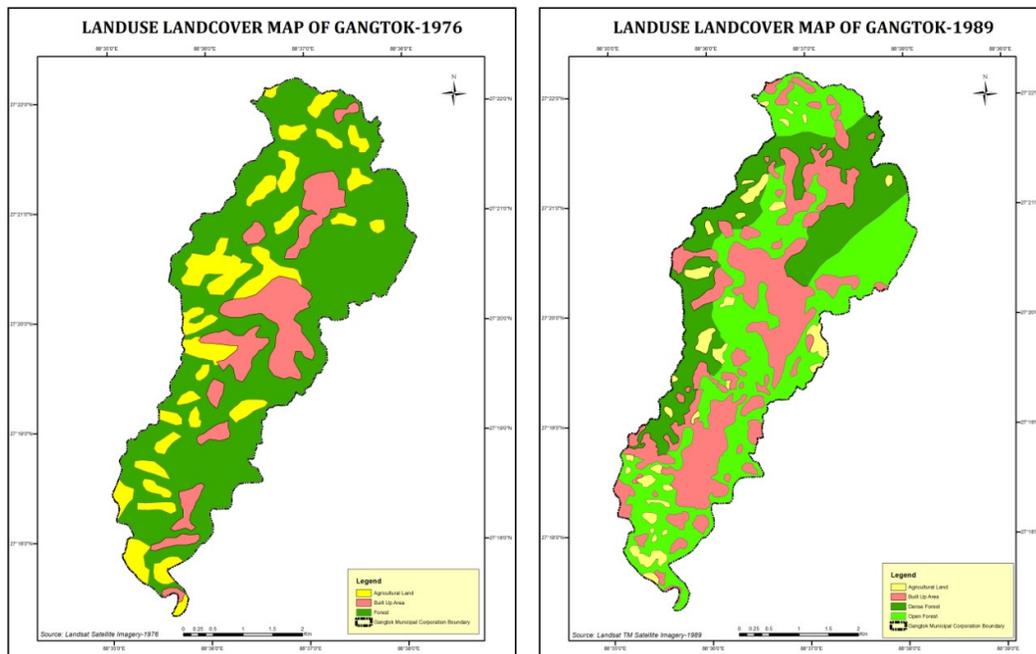
Land Use Change of Gangtok (Area in Sq Kms.)			
Year	1976	1989	2014
Forest	12.81	12.24	10.78
Agricultural Land	3.50	1.03	0.44
Built Up Area	2.94	5.99	8.03

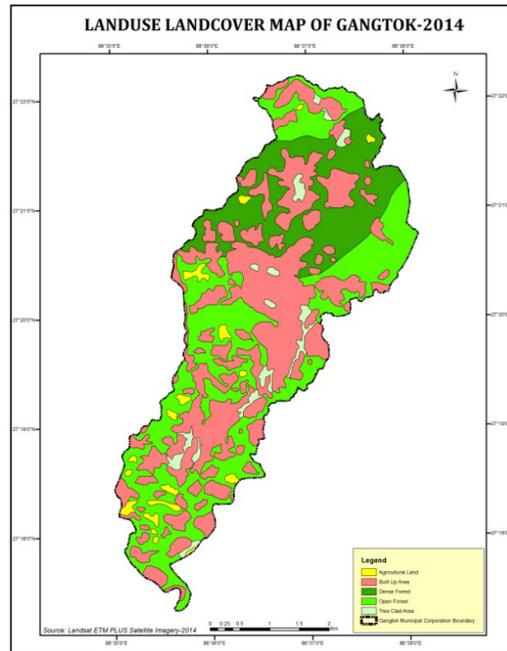
Source: DST, Gangtok-Sikkim



Source: DST, Gangtok-Sikkim

To easily understand the impact of urbanization, a simple three fold land-use map has been prepared; Gangtok has witnessed a stiff change in land use pattern due to rapid urbanization. Being the capital of Sikkim, numerous administrative, academic and other infrastructural building has set up here. In comparison to the rest of the state Gangtok has the most advance facilities and amenities like school, hospital, market etc. and hence everyone tends to move in and around the capital. Gangtok is like an elongated shaped shark fin, steep slope along one slope and gentle to moderate slope along the other side.





The impact of urbanization over a span of almost 30 years can be clearly identified by comparing the land use and land cover map prepared from various Land-Sat Images, comparative land use map clearly shows that the red patch has increased to four times i.e. 2.94181 sq km to 12.8144 Sq Km from 1978 to 2014. These maps are classified under same folds/parameters which clearly reveals the increase of settlement area, forest cover has decreased to some extent and agriculture area in Gangtok has almost extinct.

Due to increase in carpeted area the green patches and the yellow (vegetation and agricultural lands) has decreased to a great level. Along with urbanization it brings numerous environmental problems and hazards. Due to loss of green vegetation on one hand and increased of carpeted area (settlement) on other, the surface runoff has increased to a great level which led to flash flood like situation along the roadways and the same is the factor of mud flow and landslides even during moderate down pouring of rainfall. Increasing human habitation has also created solid waste, which is unmanageable especially in those area where human transportation of waste is required, as a result waste are thrown here and there along jhoras which choked the jhoras leading to catastrophe during rainfall.

CONCLUSION

The vegetation cover and agricultural area are being encroached day by day. The sustainability of land resources should be taken into consideration for the long run programmes. Since land acts as a living organism which can heal up itself if time is provided. Different types of land have different properties and their production potentialities. It depends on physical and cultural factors i.e., the capacity of soil on one hand and use of culture such as irrigation, selection of crops, scientific farming on the other. Such practices will not only increase the productivity, but also sustain the land resources.

Nearly half the world's population now lives in urban settlements. Cities offer the lure of better employment, education, health care, and culture; and they contribute disproportionately to national economies. However, rapid and often unplanned urban growth is often associated with poverty, environmental degradation and population demands that outstrip service capacity. These conditions place human health at risk. Reliable urban health statistics are largely unavailable throughout the world. Disaggregated intra-urban health data, i.e., for different areas within a city, are even rarer. Data that are available indicate a range of urban health hazards and associated health risks: substandard housing, crowding, air pollution, insufficient or contaminated drinking water, inadequate sanitation and solid waste disposal services, vector-borne diseases, industrial waste, increased motor vehicle traffic, stress associated with poverty and unemployment, among others. Local and national governments and multilateral organizations are all grappling with the challenges of urbanization. Urban health risks and concerns involve many different sectors, including health, environment, housing, energy, transportation, urban planning, and others. Two main policy implications are highlighted: the need for systematic and useful urban health statistics on a disaggregated, i.e., intra-urban, basis, and the need for more effective partnering across sectors. The humanitarian and economic imperative to create livable and sustainable cities must drive us to seek and successfully overcome challenges and capitalize on opportunities. Good urban planning and governance, exchange of best practice models and the determination and leadership of stakeholders across disciplines, sectors, communities and countries will be critical elements of success.

While there is consensus that urbanization is one of the major trends of the 21st century which increase vulnerability to water sources in hill areas. The relationship between urbanization and water vulnerability is perfectly negative. Although the link between urbanization and water vulnerability is highly site-specific, our results show some generalized factors exist. First, the urban transformation of the water system is decentralized as irrigation springs are converted to domestic use by private individuals, and not by the municipal authority. Second, urban vulnerability to water shortages depends on a combination of several factors: the formal water infrastructure, the rate and spatial pattern of land use change, adaptation by households and the characteristics of the ground and surface water system. Third, vulnerability is dynamic, spatially variable and scale dependent. Even as household investments in private source of water make individual households less vulnerable, over time and cumulatively, they make the entire region more vulnerable. Taken together, the results suggest that in order to reduce vulnerability to water

shortages, there is a need for new forms of urban governance and planning institutions that are capable of managing both centralized actions by utilities and decentralized actions by thousands of households.

The most important anthropogenic influences urbanization on climate is the emission of greenhouse gases and changes in land use, such as urbanization and agriculture. But it has been difficult to separate these two influences because both tend to increase the daily mean surface temperature. The impact of urbanization has been estimated by comparing observations in cities with those in surrounding rural areas, but the results differ significantly depending on whether population data or satellite measurements of night light are used to classify urban and rural areas.

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