

Urbanisation and Temporal Change in Land Use with Special Reference to Bareilly City in Uttar Pradesh

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ABSTRACT: Urbanization has caused many impacts on natural resources associated with the reduction and conversion of green space. The land use pattern of a region is an outcome of natural and socio-economic factors and their utilization by man in time and space and has become a central component in current strategies for managing natural resources and monitoring environmental changes. Land Transformation is a process where changes in land use are observed at different time periods and is one of the important fields of human induced environmental transformation, with an extensive history dating back to antiquity. At present time, remote sensing and GIS are gaining importance as a vital tool for the analysis and integration of spatio-temporal data. The present study focuses on the land use changes in Bareilly City for about 10 years (2003-2012) by the comparison of two satellite images of different dates and other similar information of the intervening years for quantifying the magnitude of land use/land cover change.

Keywords: Land use, Land use change, Land use planning, Population, Urbanization, Urban Agglomeration.

Introduction:

A rapid urbanization process with a simultaneous significant development in economy and industrialization has augmented considerable urban expansion in the latest

decade. According to the 2011 Census, urbanisation in India has increased faster than expected. For the first time since independence, the absolute increase in the urban population was higher than that in the rural population. The fast pace of residential and commercial development is replacing agriculture and other undeveloped land around them. Urbanization affects land changes through the transformation of urban-rural linkages. A rapid urbanization process with a simultaneous significant development in economy, industrialization and tremendous immigration, has augmented considerable land use change in the latest decade. The problems of urban sprawl, loss of open vegetation and a general decline in environmental quality can be generally attributed to increasing population concentrating more people on less land even as the total land devoted to urbanization expands. The uncontrolled urbanization pushes too hard in the direction of “bigger cities” with inadequate enabling infrastructure. Consistent with the operation of a free market economy, people’s and market responses to economic opportunities are mediated by private and public land owners which in turn drive land cover changes – often in an unscientific manner ignoring the long term environmental and aesthetic impacts. Land use and land use changes are so pervasive that, when aggregated they define the character of a city. They also define how major infrastructure such as transport, housing, commercial and market places, greenbelt etc, will function in the future.

Bareilly is a city in North India and is classified as Class I town. It is the centre for the manufacturing of furniture and for trade in cotton, cereal and sugar. The city is administrative headquarter of Bareilly district and Bareilly division. Bareilly is also known as the counter-magnet city because it is equidistant from New Delhi and Lucknow and has a lot of potential for setting up industries to attract people to settle. Bareilly is the 4th city of Uttar Pradesh which has CNG fuel stations, after Lucknow, Kanpur and Agra. Bareilly is the 7th Largest city of Uttar Pradesh and 50th Largest city of India. The city is divided into 23 wards, each with a ward Corporator. The level of urbanisation in the Bareilly city was 8% in 1951. The urbanisation level increased in the city during 1951-1981 from 8% to 37%. It was highest in 1981. It was decreased from 37.8% in 1981 to 18.5% in 2001 and increased again from 18.5% in 2001 to 36% in 2011.

Geographical setting of the city:

The district is situated in north-west of U.P, which touches the boundary of newly created state Uttarakhand. It lies between latitude 28°.1' and 28°.51' north and longitude 78°. 58' and 79°.47' east. Its maximum length from north to south is about 96 kms., and its maximum breadth from east to west is about 27 kms. It is surrounded in north with Nainital (newly created distinct Udham Singh Nagar) and east lies the district Pilibhit and on south-west it is bounded by district Badaun. Ram Ganga forming the natural boundary between the two districts for about 30 kms. and on the west lies the district of Rampur. Total area of the district is 4,120 sq. km.

Brief History:

Bareilly region is the birth place of Draupadi who was referred as 'Panchali' by Lord Krishna (Mahabharata). The folklore states that Gautama Buddha visited ancient fortress city of Ahichhatra in Bareilly. The Jain Tirthankara Parshva is said to have attained Kaivalya at Ahichhatra. It has been ruled by various Dynasties i.e. Nanda, Maurya, Gupta and Maukharistill 6th century. Later the province was ruled by different clans of Rajput's such as Bachhal, Gaur, Chauhan and Rathor until the Delhi Sultanate (Moghuls) invasion in 13th century. The Moghuls allotted the land for

Afghans settlements (known as Rohilla Afghans) to disrupt the rebellion moment in this region. The encouragement was continued beyond 1700, as a result this tribe raise more and the vicinity became as Rohilkhand region. Later Bareilly became the capital of Rohilkhand region and was handed over to Nawab Vazir of Awadh and then to East India Company and later becoming an integral part of India. The city of Bareilly was founded in 1537 by Basdeo, a Katehriya Rajput but The foundation to the 'modern' City of Bareilly was laid by Mukrand Rai in 1657. In 1658, Bareilly was made the headquarters of the province of Badaun. City flourished as trade and market centre because of surrounding agricultural activities and became economically unstable during rebellion and independence movement. Now city recorded as one of the fast growing economies among the cities of Uttar Pradesh.

Objectives of the study:

This paper attempts to assess the Impact and changing land use in Bareilly city due to rapid urbanisation. The concerns of unplanned urbanisation would also be explored.

Research Methodology and material:

The present study is based on secondary sources of data. The data relating to areal and population growth of Bareilly city has been collected from Bareilly Municipal Corporation, Bareilly Development Authority and Town Planning Authority. The District census hand book 1951, 1961, 1981, 1991, 2001 and 2011 have been used for city population and land use data.

Results and discussion:

The city is situated in the western part of Uttar Pradesh and Bareilly is the district headquarters and being the only largest city in Bareilly division. It is well-connected by several state road highways to the important cities. The city acts as the service centre for nearby towns and, significantly, traditionally had an agrarian dominated population. Lately, however, because of the emergence of several industries, the city has lost its agrarian fabric and growing numbers of its labour force work in the secondary and tertiary sectors. The city is also

expanding on to nearby fertile agricultural land. The growth of population is very uneven in Bareilly city over the years

Table-1: Population growth rate % in Bareilly city (1941 -2011)

Year	Population	Population in growth	%
1941	192688		
1951	208083	15395	8.0
1961	272828	64745	31.1
1971	326106	53278	19.5
1981	449425	123319	37.8
1991	607652	158227	35.2
2001	720315	112663	18.5
2011	979933	259618	36.0

Source: District Census Handbook of Bareilly 1941 to 2011

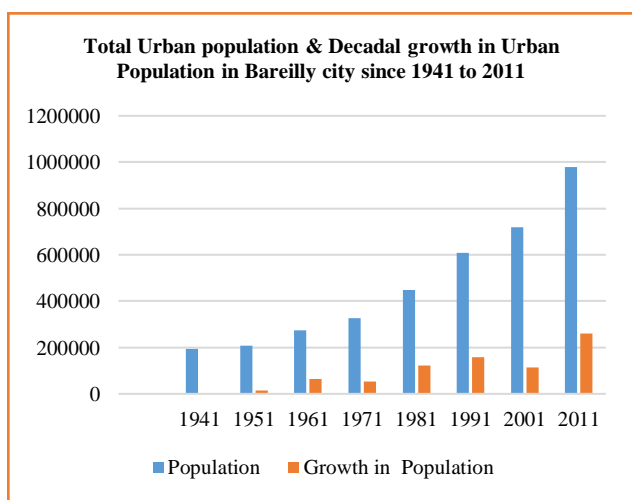
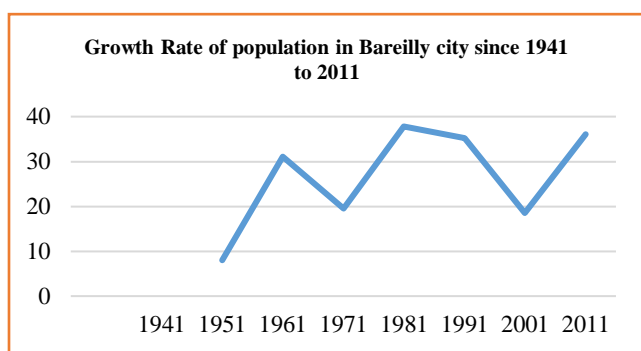


Figure -1: Population growth rate % in Bareilly city (1941 -2011)

Source: District Census Handbook of Bareilly 1941 to 2011

Figure -2: Growth Rate of population in Bareilly city since 1941 to 2011



2011

Source: District Census Handbook of Bareilly 1941 to 2011

The growth rate of the population varies in the Bareilly city over the seven decades. Immediately after impendence it rises from 8.0% during 1941-51 to extreme 31.10% during 1951-61 and thereafter it declines due to poor allocation of urban infrastructure development funds in the city, remarkable growth in the population found during the decade 1971-81 and 1981-91. The population growth rate declined to 18.5% during 1991-01 and later a

steep rise was observed during 2001-11 indicating increased urbanisation. Overall the population growth rate in the city seems to be very uneven which suggest that the speed of urbanisation process in the city observed both, reverse and upward growth from 8% during 1941-51 to 36% in 2001-11. Thus it becomes apparent to analyse thoroughly about the change in the land use pattern of Bareilly city during 2001 to 2011.

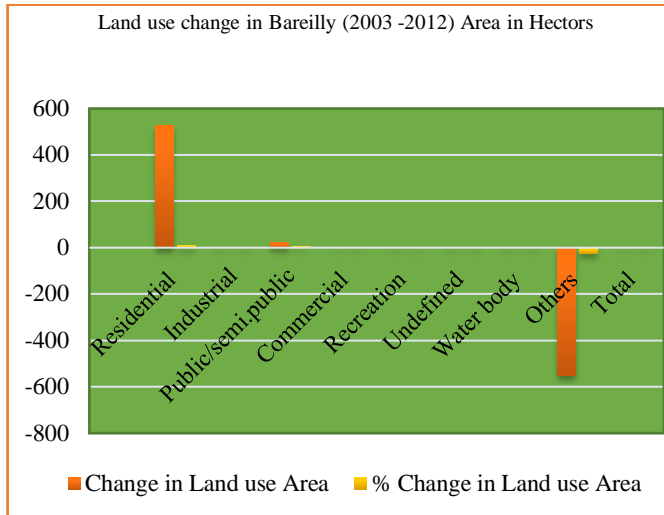
Table -2: Land use change in Bareilly (2003 -2012) Area in Hectors:

Land use group	2003	%	2012	%	Change in areas	% change in areas
Residential	5688.499	52.10	6217.51	56.95	529.011	9.30
Industrial	153.827	1.41	153.827	1.41	0	0
Public/semi. Public	571.128	5.23	593.128	5.43	22	3.70
Commercial	27.221	0.25	27.221	0.25	0	0
Recreation	0.546	0.01	0.546	0.01	0	0
Undefined	2111.449	19.34	2111.449	19.34	0	0
Water body	201.681	1.85	201.681	1.85	0	0
Others	2163.198	19.81	1612.187	14.77	-551.011	-24.46
Total	10917.55	100.00	10917.55	100.00	0	0

Source: Based on satellite image (2003-2012), Google Earth

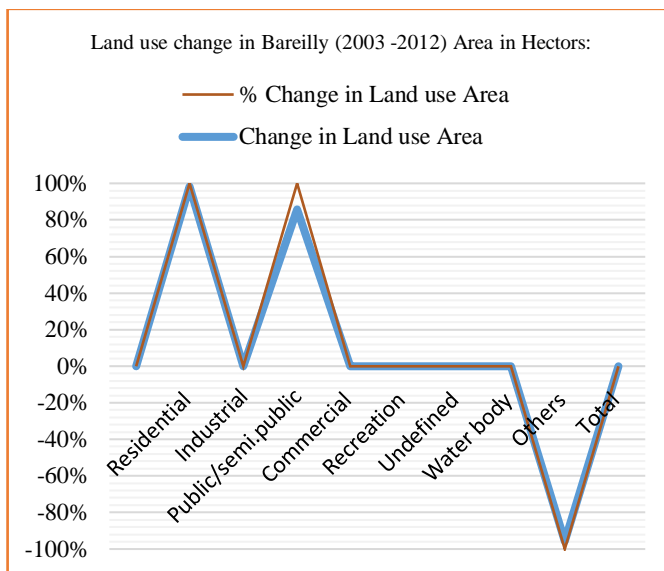
During 2003, the maximum area covered in the city is the residential area accounting 52.10% of the area, followed by others areas (19.81) (it includes Plantation, Agriculture field, farm etc.) and undefined area (19.34%) that includes uses restricted for specific purpose. The public and semi-public institutions have 5.23% of the area and water bodies only have 1.85% area of the city while the industrial area contributes only 1.41%. The pattern of distribution of land use in the city remains same during 2012. However, there is change in the area of others which was 2163.198 sq. hectare in 2003 has now reduced to 1612.18 sq. hectare in 2012. Thus about 25% of others (that includes agriculture land, plantation, and farming) area was lost to urban development. There is increase in the residential area by 9.30%. Besides there is 3.7% of the area change in the public and semi-public institution coverage in the city. This continuous change in the land use is either by economic activities or due to man-made process resulted into land transformation with sub groups of land use as indicated in above table-2.

Figure -3: Land use change in Bareilly (2003 -2012) Area in Hectors



Source: Based on satellite image (2003-2012), Google Earth

Figure – 4: Land use change in Bareilly (2003 -2012) Area in Hectors.



Source: Based on satellite image (2003-2012), Google Earth

Findings:

The sprawl of the city leaves marked impact on the land use changing. The present study is primarily related with the land transformation which has severely affected the aerial extent of residential area, public/semi-public area, water bodies and others etc. Bareilly city is not only the largest urban centre both in terms of population and areal extent but also the rapidly growing city among all the State urban centres. During this period due to the increasing population in the city which in turn results the increasing demand of land which resulted the loss in agriculture, Forest area, Marshy lands,

Water bodies land and Barren. While as the area under built-up and public & semi-public have increased and others decreased.

1. The population of Bareilly city has increased from 192688 in 1941 to 979933 persons in 2011 with its decadal growth rate from 8% in 1941 to 37.80% in 1981 and 36% in 2011.
2. The residential area of the city has increased from 5688.499 hectares (52.10%) in 2003 to 6217.51 hectares (56.95%) in 2012 with the increase of 529.011 hectares indicating the increasing percentage change of 9.30 percent.
3. Due to the expansion of the residential area on fertile agricultural land, due to the occupational shift of the people from primary to secondary and tertiary activities and also due to the shift from crop growing activities to the horticulture activities by many agricultural land owners led to the decrease in the total area under agricultural land use and the area under plantation.
4. The area under public/semi. Public of the city has increased from 571.128 hectares (5.23%) in 2003 to 593.128 hectares (5.43%) in 2012 with the increase of 22 hectares indicating the increasing percentage change of 3.70 percent.
5. The area under others use of the city has decreased from 2163.198 hectares (19.81%) in 2003 to 1612.187 hectares (14.77%) in 2012 with the decrease of 551.011 hectares indicating the decreasing percentage change of -24.46 percent.

Recommendation & Conclusion

It is clear from the above analysis that the population growth has changed the land use of the city. Agricultural land is being gradually converted into built-up land like industrial, residential, commercial and other urban uses without any systematic development plan. Similarly, the marshy area has been converted into agricultural and built up area. These problems require immediate attention of the planners and administrators. The expansion of the city leaves marked impact on the land use change, which has shown tilt towards built-up areas, which is growing in an unplanned way along the main roads. The rate, at which agricultural land is being destroyed, needs serious thinking on part of planners and policy makers. The population growth of the city has

changed internal geomorphology of the city. City has a sizeable flood prone and low-lying portion mostly toward the Rāmgangā river. These areas are not suited for city expansion and development but have experienced widespread residential expansion and river bed encroachment. Thus, there is an urgent need to look into the unplanned urban expansion within the city and also in the surrounding areas.

In Bareilly district, the whole process of plan making is strictly regulated by legal framework, indirectly fulfilling the constitutional as well as social obligations and there is no mention of goals. This may be due to the lack of motivation from the decision makers and insufficient infrastructure to produce more comprehensive plans.

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