

# Impact of Rapid Urbanisation On Landuse Planning in Dehradun City

## Abstract

The level of urbanization is an index of change from traditional to modern society, beside it is also a symbol of economic growth and development. The Indian cities have been growing at a very high rate. Cities are central to the country's economic growth and development is gaining wider acceptance, strengthened by the increasing contribution of the urban sector to India's GDP. Despite their positive contribution, urban centers can also lead to inefficiencies, congestion, and resource conflict, if they are not planned and managed carefully. Dehradun which is the center of Uttarakhand state administration, tourism and industrial development have been mostly infused by economic development. Emerging Industries and consequently, improving commercial activities and tourism have caused immigration from surrounding regions to Dehradun. According to Census, 2011 Dehradun has 55.5 per cent total urban population. In this paper an effort has been made to examine urbanization impact on land use planning in Dehradun.

**Keywords:** Please add some keywords

## Introduction

Urbanization is defined as "the demographic process whereby an increasing share of the national population lives within urban settlements." Settlements are also defined as urban only if most of their residents derive the majority of their livelihoods from non-farm occupations. Throughout history, urbanization has been a key force in human and economic development. In most countries, the process of urbanization is generally accompanied by rapid economic growth, relocation of populations from rural areas to cities and towns, the agglomeration of secondary and tertiary industries in urban areas and an increase in the number of towns that are becoming larger everyday. The process of urbanization affects the condition of the environment by changing the levels of polluting emissions as a consequence of the shift in production and changes in the population's behavior patterns after migrating from rural to urban areas.

It is generally accepted that economic growth promotes the expansion of modern industries and an increase in the urban population; in turn, urbanization also promotes economic growth to some extent. Various programs of accelerated urbanization and rapid economic growth have, therefore, been embarked upon in many developing countries. Policies pursuing positive urbanization, with the goal of boosting economic growth, are widely found in the developing world. World urbanization is changing quickly and the rate of change has been rising faster in the last three decades than previously, in this age of globalization. The focus of world urbanization has shifted from the developed countries to the developing world. The process of urbanization is one of the most important dimensions of economic, social and physical change in India. Rapid urban population growth means an increasing demand for urban land, particularly for housing, but also for various other urban uses. In many countries, the increasing demand is most likely to affect (or is affecting) rural-urban fringe areas. As the city expands, increase in population places enormous stress on natural resources and existing social services and infrastructure.

Urbanization, one of the major drivers of land use change, has profound impact on land resource. Humans have been using land and its resources for centuries in a pursuit of their better lives. The way humans have used land and exploited its resources over time is a serious problem as it has altered land cover and impacted the functioning of the ecosystem. With the advent of agriculture, modern technology, and the rise of capitalist mode of economy, the exploitation of land and its resources has increased dramatically. In the last few decades, land use practices (agriculture, mining, logging, housing, recreation, etc.) have become so intensive and predominant that we can see their impacts in forms of uncontrolled



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development (urbanization and sprawl), deteriorating environmental quality, loss of prime agricultural lands, destruction of wetlands, and loss of fish and wildlife habitats everywhere on the earth. Such impacts have reduced the local capacity of lands to support both ecosystem and human enterprise at global scale. Therefore the effect of land use change is no longer a local environmental problem but a global one. To address such problem detailed information on existing land use pattern and sound knowledge about changes in land use through time is important for legislators, planners, and State and local governmental officials. When cities grow, it requires more land and resources to support the growth. This leads to change in land use causing environmental problems such as air and water pollution, loss of open space and biodiversity, heat island effects, and so on. Based on the fact that human population is growing and rural to urban migration is increasing, the urbanization trend will continue to rise at least for another few decades. This continuation of urbanization pattern will increase land and resource consumption, and exacerbate the environmental problems which have already posed threats to our planet and cost billions of dollars to our economy. Therefore, planners, governments, planning agencies and others should acknowledge these problems immediately and put environmental perspective into land use planning and decision making process effectively and promptly. The main objective of this paper is to study the impact of urbanization on land resource, and to evaluate the land use planning strategies to avoid or at least minimize the impact on future land use planning and decision making process.

#### **Aim of the Study**

1. To study the effect of urbanization on land use planning practices in Dehradun city
2. To study the modification in natural landscape due to rapid urbanization.
3. To assess land use deviation in existing Master Plan 2001.
4. To analyze land use change in proposed Master Plan 2025 in comparison of Master Plan 2001.

#### **Study Area**

Dehradun is the capital city of the state of Uttarakhand in the northern part of India. The district lies between latitudes 29°58'N and 31°2'N and longitudes 77°34' E and 78°18'E. Dehradun has the Himalayas to its north, the Shivalik range to its south, the sacred river Ganga to its east and the river Yamuna to its west. Located in the Garhwal region, it lies 236 kilometers north of India's capital New Delhi and is one of the "Counter Magnets" of the National Capital Region (NCR) being developed as an alternative center of growth to help ease the migration and population explosion in the Delhi metropolitan area and creation of highways to establish a smart city at Dehradun.

Dehradun is renowned for its natural resources, publishing services and particularly for its educational institutions. When the improvement of the cities of Dehradun district is observed from historical times to the present, it is seen that there has been a physical growth from the city-center to outer places.

As a result of this surrounding green fields of the cities have been exposed to adverse effect of constant urban growth. Dehradun district is a unique region in many respects. The old areas of cities have little land to grow. On the other hand, industrial development in its neighborhood is likely to attract large number of people to the city. The unparalleled influx of several million tourists to the cities creates tremendous pressure to the city and its infrastructure. The demands and challenges of development and preservation of its rich cultural and spiritual heritage and natural environment require to be met concurrently.

Thus, the city has to cater to the need of not only its own residential population, but also to meet the demand of the huge floating population that visits the cities on several occasions. The importance of the Region has further increased, when Uttarakhand State was formed in 2000. It is now the most industrialized region of Uttarakhand State. The area of the proposed study is an administrative, commercial, industrial, religious and principal service center. An explosive increase of urban population in Dehradun, particularly in all adjacent areas of city, has the consequent strain on the existing system manifested in an environmental chaos. The phenomena of accelerated urbanization is the main cause, wherein besides bringing higher standard of living, it has also brought problems, like growth of dense and unplanned residential areas, environmental pollution, non-availability of services and amenities, solid waste etc. This paper attempts to describe the positive and adverse effects of land use change and explains the role of land use planning in avoiding or at least minimizing the impact of urbanization on future urban growth.

#### **Methodology**

The present paper is primarily based on desk study, involving compilation and analyses of information and data from official documents, research papers, media reports and articles. This paper analyzes the impact of urbanization in Dehradun on land use pattern, changes in land use and unplanned growth of urban area in recent time. It involves the use of Geographic Information System (GIS) tool ArcGIS in mapping.

#### **Urban Growth in Dehradun**

According to 2011 census of India, Dehradun district population was 1,696,694 persons in which 754,753 persons live in rural and rest 941,941 persons in urban parts. The population of the district was 1,282,143 at the time 2001 Census and growing by 32.3 per cent during the decade 2001-2011 it has grown to 1,696,699 persons in 2011 Census. The decadal growth of 32.3 per cent in the district is higher than in the state at 18.8 per cents. The urban population in the district is about 55.5 percent. The urban population is maximum at about 80.3 percent in Dehradun tehsil. Out of the total urban population of Dehradun (941,941) as much as 569,578 live in Dehradun Municipal Corporation. The district has an area of 3,088 square kilometer. The population density in the district is 549 persons per sqkm.

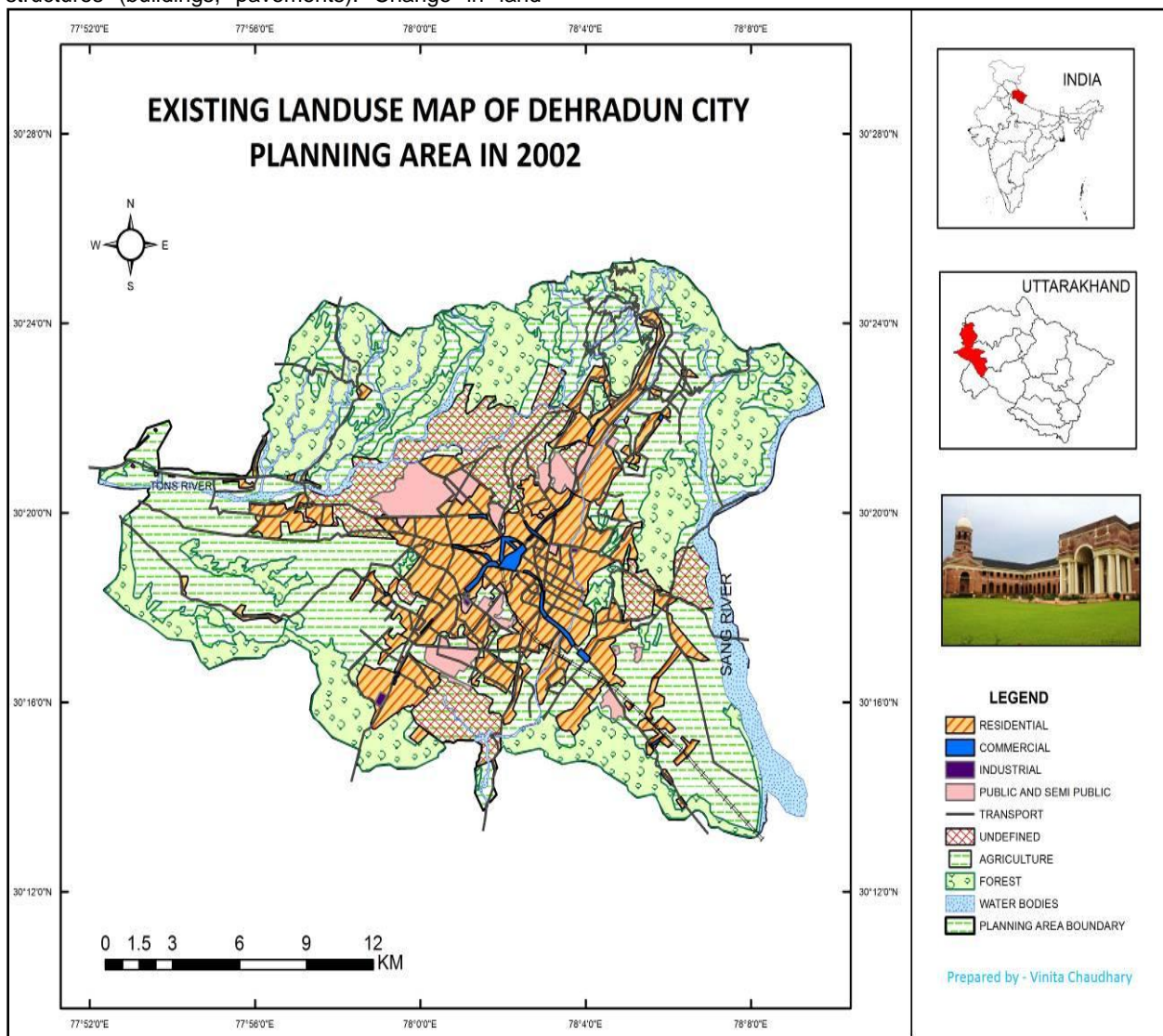
**Table 1: Dehradun Population and Decadal Growth Rate**

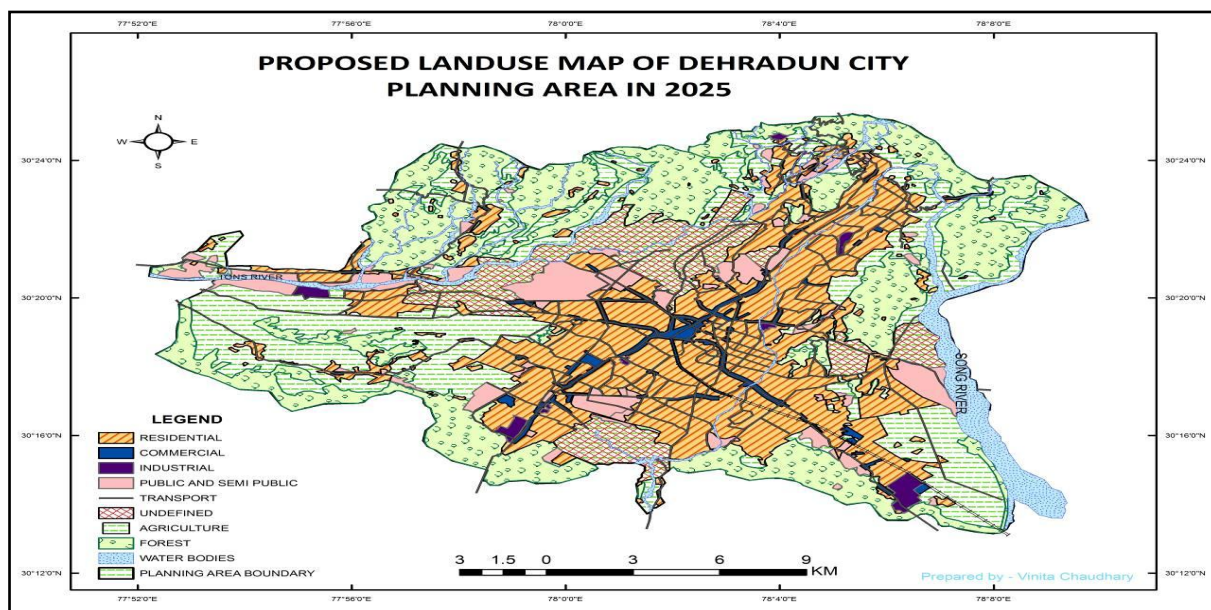
Year	Population ('000 persons)	Decadal Growth Rate (%)
1971	166	
1981	211	21.53
1991	270	21.85
2001	448	39.73
2011	578	29.01

**Land Use Change Analysis**

Land use change is the change in land cover and land use. Land cover is the physical state of the land surface which includes both natural amenities (crop lands, mountains, vegetation, soil type, biodiversity, water resources) and man-made structures (buildings, pavements). Change in land

cover usually happens in two ways- land cover conversion and land cover modification. Land cover conversion is a change in the overall classification of land cover through a complete replacement of one type of land cover by another type due to change in urban extent, agricultural expansion or deforestation. Whereas, land cover modification is simply a change in the character of land cover without undergoing its overall classification. Land use refers to the way human beings employ and exploit land cover for several purposes such as farming, mining, housing, logging, or recreation. Therefore, land use change is the exploitation of land cover through its conversion and/or modification over time primarily to serve human needs.





During the post-independence period Dehradun had registered steady urban growth. The growth rate took a quantum jump from 1991 registering a nearly 40 per cent decadal growth during 1991-2001 and 29.01 per cent during 2001-2011. With a view to check the uncontrolled growth of Dehradun, the State Government, in 1963, declared the area falling within municipal limits and the areas falling within 5 mile radius beyond municipal limit as “Regulated Area” under Section 3 of the UP (Regulation of Building Operations) Act, 1958. In October 1984, the State Government notified “Mussoorie-Dehradun Development Area” under the provision of UP Urban Planning and Development Act, 1973 including 185 revenue villages and surrounding Mussoorie and Dehradun Urban areas. Thus Mussoorie Dehradun Development Authority (MDDA) was constituted for the planning and development of the aforesaid development areas. Till now two master plans have been prepared for the city of Dehradun. The first master plan for 1982-2001 came into effect in 1982 and continues to be the legal document since 2001. The limits of the development area coincide with Dehradun District boundary in the north, forest areas in the south and west and the river Song in the east. Planning area indicates all the land use zones such as Residential, Commercial, Industrial, Public and Semi-Public, Water Bodies and Undefined uses etc. Master Plan 1982 projected a population of 6 lakhs by 2001 for the urban agglomeration plus the villages falling within the future urban limits. Area under residential use appeared to be sufficient at the city level, yet there was shortage of housing because a large portion of the existing residential area had a very low density and large portion of land were unusable owing to excessive slopes and undulations particularly in north and north-east. The development and construction of unauthorized and unplanned colonies had increased due to lack of proper regulation and control of development activities.

The second master plan is conceived for 2025. The plan covered approximately 35,867.20 ha which includes Dehradun Urban Agglomeration Area, undefined area and 172 rural villages. The draft Master Plan (2025) projected a population of 15.30 lakhs by 2025. Master Plan 2025 indicates all the land use zones (divisions) such as Residential, Commercial, Industrial, Public and Semi-Public and Other uses. Details of major Land use changes are given below:

1. Large areas under agricultural land use converted for residential purposes
2. Land under residential use converted for industrial and commercial land uses
3. Land under green belt and nallas converted for residential development purposes
4. Most of the land use deviations occurred along Sahastradhara road, Haridwar road, Haridwar bypass, Rispana and Bindal rivers and also areas lying between Saharanpur road and Haridwar bypass.
5. Land use deviations are mainly due to residential use of land

**Table 2: Existing and Proposed Land Use in Dehradun city Planning area**

Land Use	Existing Land Use in 2002		Proposed Land Use in 2025	
	Area in Ha	% age to Total	Area in Ha	% age to Total
Residential	4071.8	11.35	5325.65	14.84
Commercial	341.43	0.95	423.32	1.18
Industrial	183.44	0.51	331.67	0.92
Public and Semi Public	2677.33	7.47	3270	9.12
Undefined	3129.1	8.73	3129.1	8.73
Transport	821.96	2.29	1517.80	4.23
Agriculture	11174	31.15	8401.63	23.43
Forest	12288.36	34.26	12288.36	34.26
Water bodies	1179.25	3.29	1179.25	3.29
<b>Total</b>	<b>35867.2</b>	<b>100</b>	<b>35867.2</b>	<b>100</b>

Source: Master Plan 2025,

Both human population and economic activities are growing rapidly. In next 10 years, Dehradun will add more than one million people. Based on the current urban population growth trend, more land will be needed to accommodate the future urban population growth. If we consider other infrastructure developments such as roads and transportation, recreation and businesses, the amount of required land will increase substantially.

The role of land use planning is vital to determine the future land use pattern and development. According to Dale et al. (2000), the main purpose of land use planning is to ensure the sustainability of three major societal attributes. These attributes are: (1) infrastructure (jobs, roads, schools, Commercial areas, etc.), (2) environmental resources (open spaces, parks, watersheds, natural areas, wetlands, etc.), and (3) public health and safety (avoidance of flood plains, unstable soils, etc.). We can at least minimize damage to our valuable environmental resources from future land use decisions. Protection of environmental resources can be achieved through the kind of land use decisions and plans that ensure "where to" develop and "how to" develop without jeopardizing environment. The "Where to develop" strategy seeks for the immediate, intellectual, and serious attention of planners, developers, planning agencies, governments and citizens for the protection of environmental resources. This mission of conservation, preservation and regeneration of our environment depends upon our ability and willingness to recognize environmental resources and their importance while making land use decisions and performing land use practices.

#### **Conclusions**

The vision of India's urban growth must be aligned with the objectives of inclusion and sustainability. Urbanization should be guided towards inclusive, equitable and sustainable growth of towns and cities with proper civic amenities. The smart cities of our vision would be engines of growth as they would increasingly compete for investments nationally and internationally too. Therefore, cities must provide world class infrastructure and services at affordable costs to give a competitive edge to the economic activities they host. Environmental sustainability of Indian cities is another integral part of the vision. Future growth should be consistent with cities' natural endowments and the economic potential of the region in which they are situated. All cities should be efficient in using available resources particularly energy, water and land. Our cities must also preserve and foster their cultural and historical heritage and benefit from the tourism potential of their heritage and natural endowments.

Many argue that urbanization is one of the major drivers of land use change. Through land use

change, it modifies natural landscape for several purposes such as housing, transportation, recreation and so on. Such modifications of natural land into urban land have provided space and opportunities for millions of people to live, work and raise their standards of living. Many believe that cities (urban areas) are ecosystems in themselves, called "urban ecosystems" where we see complex and interesting interactions of social, biological, and physical components. But it is important to understand that urban ecosystems constitute only a small part of the larger ecosystem required to support the urban population. Therefore, we must protect, not neglect, the whole natural ecosystems upon which humans depend for survival. We must not continue using urbanization as a weapon to dominate natural ecosystem. We need to bring a fundamental change in our thinking of understanding urbanization. We must not understand urbanization as an evil to environment. It is just a name given to the process how cities grow by size with increasing population growth and demand for goods and services. What we must understand is urbanization does not drive land use change in an environmentally detrimental way without our decisions about how to use land and its resources.

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