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Changing Space Organization and Urban Health: Problems and Prospects (2001-2021) a Geographical Study of Jammu City

Tarif Mehmood

Abstract

AN The urban environment is a system that links human intervention to with natural processes. The term urban environment refers to the space created in urban areas and their surroundings. In geography, the urban environment is the physical, social, and economic space formed by an urban center. An urban center is a place where people engage in non-agricultural activities. Therefore, under these circumstances, the urban social environment in which trade and commercial activities occur is a space created by non-agricultural activities. The urban environment in contemporary India is constantly under threat because of the concentrated production and population in urban regions, which also results in improved job and livelihood prospects and much lower unit costs for managing and delivering basic infrastructural services. However, this same concentration also transforms turns metropolitan areas into resource consumers and pollution producers, leading to a host of environmental issues in cities.

Urbanization in India has led to unprecedented spatial and environmental changes, especially in medium-sized cities, such as like Jammu. This study investigates the transformation of land use patterns, the degradation of open and green spaces, and the impact of population growth on urban health in Jammu City from 2001 to 2021. Using GIS tools, satellite data, and field surveys, this study research highlights the rapid reduction in per capita open space, growing environmental stress, and the urgent need for sustainable planning. These findings suggest that unplanned expansion has severely strained infrastructure, increased pollution, and led to encroachment of vital open spaces. This study underscores the necessity for green space preservation, balanced land use, and integrated urban health strategies to make Jammu a more livable city.

Keywords: Urban Environment, Land Use Change, Green Spaces, Urban Health, Jammu City, Urban Sprawl, GIS.

Introduction

Jammu, the capital city of the newly carved Union Territory of Jammu and Kashmir, lies at 27.33°N latitude and 88.62°E longitude in the Northern Himalayan part of India. The increase augment in the population of the city has led to a radical alteration in the land use patterns, particularly the switch of agricultural land into built-up areas. population of Jammu city (JMC) was 76,558 in 1951, which increased to 1, 02,738 in 1961, showing decadal growth rate of 34.20 %, and it further increased to 2, 06,135 in 1981 with decadal growth rate 32.70%. The census was not conducted in Jammu and Kashmir in 1991 owing to political turmoil and instability. Whereas, the population of Jammu city grew to 3, 78,431 in the year 2001 having a increase of 1, 72,296 in the population of Jammu city. According to 2011 census, the total population of Jammu city is 5, 02,197, showing decadal growth rate of 32.70%. This paper focuses on demographic growth, land use changes, and estimates future urban growth that have taken place in Jammu city since 1981 using amalgamation of remote sensing with GIS technology so as to provide give an alarm to the urban planners and policy makers about their futuristic approach towards sustainable development of Jammu City.

Need of the Study:

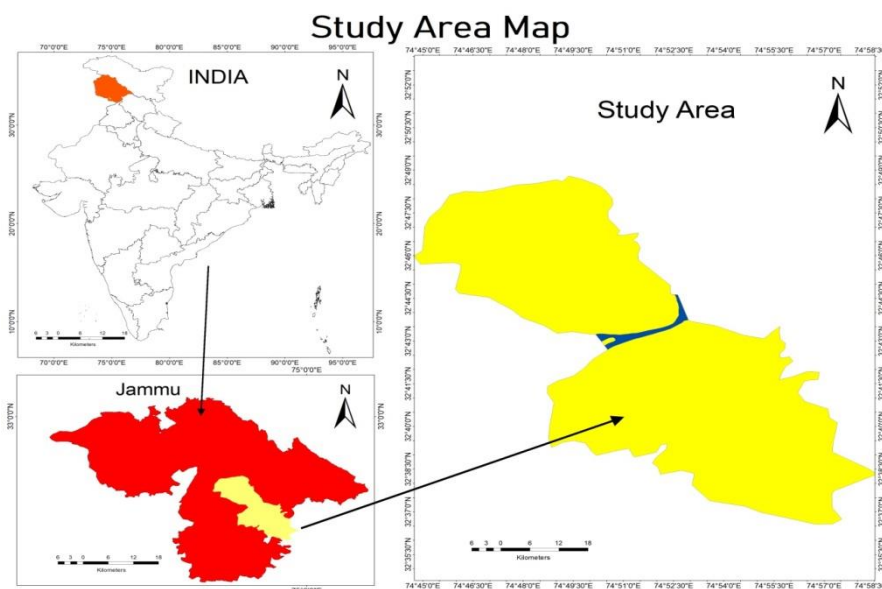
In recent years, urbanization has significantly changed the environmental systems, particularly especially in the Himalayan region. The Jammu City is witnessing rapid urban growth owing due to improved better road connectivity. As a result, urban centers in this region are becoming popular for employment opportunities. However, this growth is also cause sing several problems such as the rise of slums, traffic congestion, and environmental degradation.

The Study Area Profile:

The first step in conducting research is to identify the area of interest, which is Jammu city in the southwestern part of the union territory of Jammu and Kashmir. The city is located at latitude °of 32°73'N and longitude of 74°87'E latitude. Jammu is a city with of temples on the slopes of a ridge, with the Tawi River serving as its lifeline. The average elevation of Jammu city is 327 metres (1073feet).

The city is situated at the foothills of the Shivaliks on an uneven low-lying ridge. Its boundaries are the Trikuta range, the home of the Shri Mata Vaishno Devi, in the northwest, and the Shivaliks range to the northeast and south east. Its terrain consists is made up of plains, plateaus, the Shivaliks, and the spurs of the Tawi River. It is connected to major highways, railroads, and airports, and is situated approximately 600 miles from New Delhi, the nation's capital. The city is connected by five bridges, three flyovers, and a new one on the Gandhi Nagar-Vikram Chowk route. The modern city has mostly expanded on the left bank of the river, whereas while the old city is restricted to the right bank. However, a growing number of new settlements, such as Roop Nagar, Janipur, and Anand Nagar, and others, have arrived on the right bank.

The old city is haphazard, unorganized, and congested, where as while the new Jammu City is more planned. The plain area near the Tawi River is suitable good for farming. There are countless rills, gullies, and seasonal streams in all over the Jammu region. The region's average annual temperature is approximately 27 °C and the its average winter temperature is 15 °C. The average annual rainfall is 60 cm, with most of it falling in July and August. The population density is 3389 people per square kilometer, making Jammu the second most densely inhabited city after Srinagar. Jammu's densely populated areas are formed by urban settlements that have developed along be side national roads, waterways, surrounding religious and heritage centers, bus stops, and railway stations. Most people in the study region were employed in the private sector and offered services to the government.



Source: Goggle Earth Pro and ARC GIS

Objectives:

The broad aim of this study research paper was to examine the issues and potential of the urban environment in the study area. While keeping in mind the basic objectives of this study were as follows:

- To study the land use pattern and changes in it.

Review of Literature:

The first stage of the research study is the literature review, which aims to revive, analyze, and quantify the research work. A review of the literature reflects the compelling arguments put out by different academics worldwide. A literature review also informs us about the types of research being conducted globally and the methodologies used by social scientists to develop various approaches, particularly in the context of studies on urbanization and the environment. Urbanization and environment-related factors, such as population growth, deforestation, increasing pressure on natural resources, and unplanned developmental processes, have been identified as major contributors to the deterioration of environmental conditions.

According to Harold E. (1966), urban geographers have focused on cities as distinct entities. He has also emphasized how the patterns of the natural environment, the land use, the social and cultural patterns, the circulation patterns, and the interior layout of the city all relate to and interact with one another within the urban region.

According to the World Development Report (1994), infrastructure plays a crucial role in a region's progress. However, studies have shown that in urban India, there is a lack of infrastructure development in line with population growth. Recognizing the crucial role of infrastructure contributes to a country's success or failure in diversifying production growth, reducing poverty, or improving environmental conditions.

Sharma (2009) found that residents of Jammu city toss their waste and other garbage out in the open, polluting the surrounding environment and making it the primary source of pollution in the city.

Methodology:

Data it was collected to determine the area of available open spaces in different wards of Jammu city. The area of various types of open space in all 75 wards of the city was calculated using GIS software, including 'Google Earth Pro,' 'Global Mapper,' and 'ArcGIS.' Using in Google Earth Pro, all nine types of open spaces were digitized into vector polygonal files. After completing the polygons for all available open spaces, the vector files in Google Earth Pro (Keyhole

Markup Language, .mLkml) were converted and stored in shape files (.shp) with the help of Global Mapper. These shape files were then processed in ArcGIS to obtain the area of all the polygons. Subsequently, the obtained data were converted into maps in .jpeg format. This process achieves an accuracy rate of more than 95%.

Land Use Pattern:

Land serves as the foundation for all types kinds of human activities and is a very precious resource. We cannot increase the total availability of land, but we can optimize the use of the available land resources through sustainable practices. Land is internationally defined as the total area of Earth's territorial surface, encompassing all attributes of the biosphere just above or below the surface. Meanwhile, Land use can be defined as the aggregate of arrangements, activities, and inputs that people employ in various land-cover types (FAO, 1977). Land is an immensely important asset to humans. It forms the basis of human survival and all human activities, serving as a fundamental requirement for any form of production and development.

Total Area of Jammu City 1961- 2011 (Municipal Corporation)

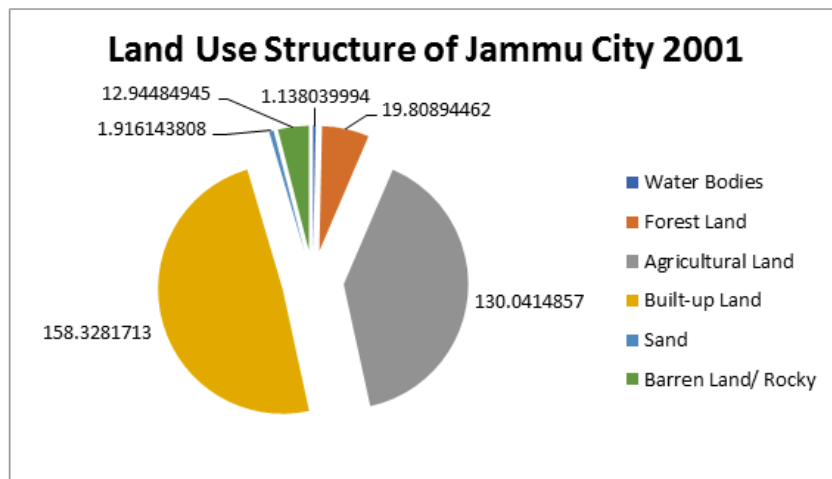
Year	Area (in km ²)
1961	18.30
1971	21.42
1981	60.99
1991	143.52
2001	150.99
2011	167.00
2018	240

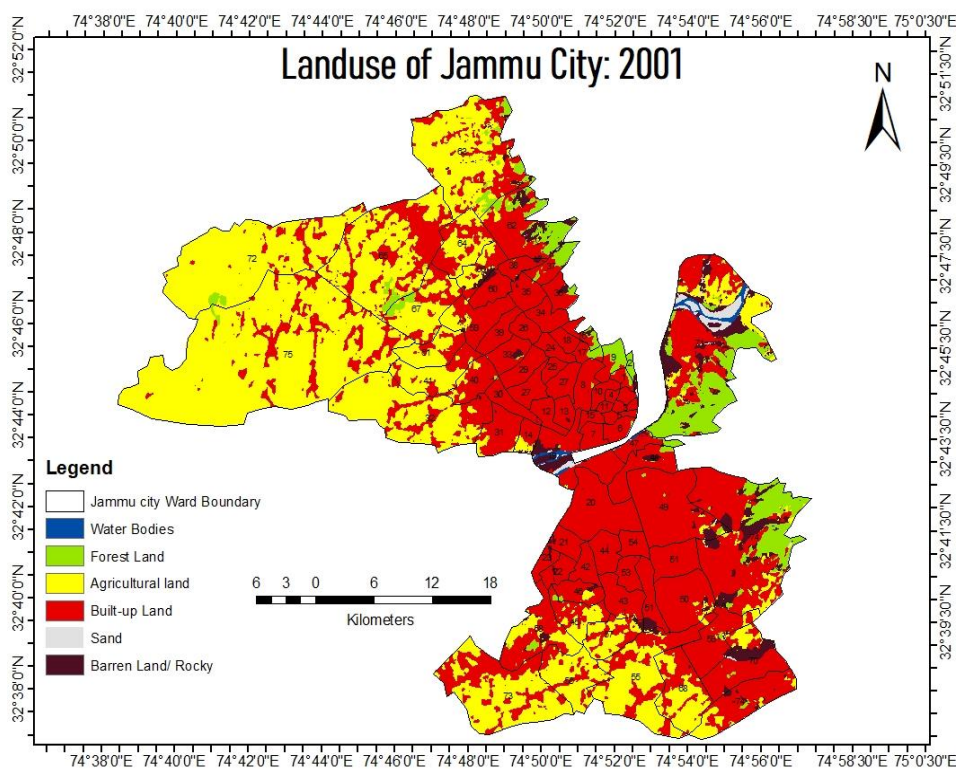
Source: Census of India 1981, 2001 and 2011, Jammu and Kashmir.

Land-Use of Jammu City in 2001 (Calculated in GIS Software Program, Google Earth Pro, and ArcGIS)

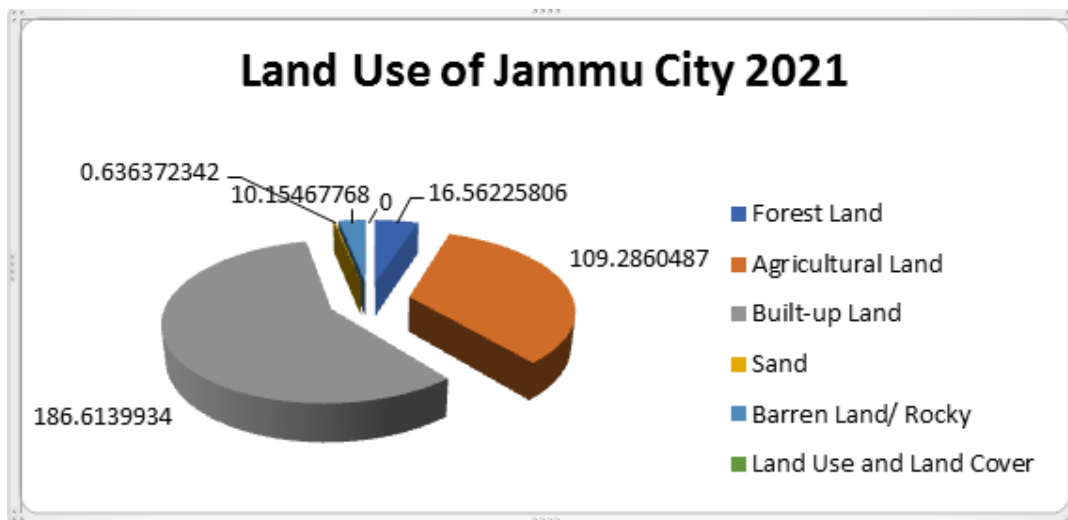
S. No	Land Use and Land Cover Category	Area (Km ²) 2001	Percentage
1	Water Bodies	1.138039994	0.35
2	Forest Land	19.80894462	6.11
3	Agricultural Land	130.0414857	40.11
4	Built-up Land	158.3281713	48.83
5	Sand	1.916143808	0.59
6	Barren Land/ Rocky	12.94484945	3.99

Source: GIS Software Program, Google Earth Pro and ArcGIS

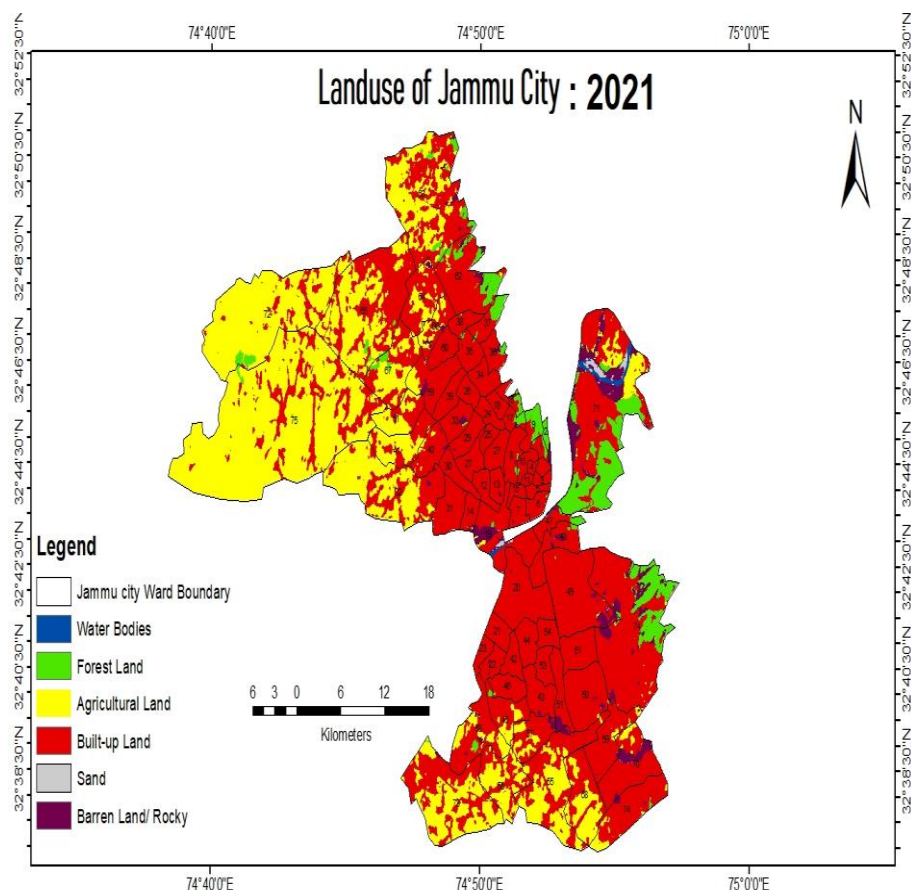




Source: Google Earth Engine& Arc GIS.



Shows Graphical Representation of and Land Use Structure of Jammu City 2021



Source: Google Earth Engine& Arc GIS.

The above table clearly shows slight changes in water bodies, forest land, sand, and barren land, but major changes have been seen in agricultural land and built-up land in 2001 and in 2021. This clearly indicates that decadal changes in land cover and land use were have been studied in Jammu city in under the present study.

Conclusion:

Continuous population growth has resulted in the expansion of urban areas, which perpetually requiring more space for habitation. An increasing population is leading to changes in the land use patterns in the city. These changes occur in various forms of built-up areas such as residential, commercial, industrial, and transportation, etc. The pressure of increasing urbanization is encroaching upon open spaces in the center and middle parts of the city, resulting in the expansion of the city towards outer regions. Consequently, adjacent villages (agricultural lands) are being incorporated into the city to fulfill the needs of the growing population. Over time, these agricultural lands will also undergo transformation into urbanized areas, and will never revert to their original state.

Suggestions:

Jammu city has a strong economic and tourist attraction base, and it attracts capital, labor, and pilgrims. The city has also experienced high population growth. Growth is an under-rated process. The efficient and planned allocation of open spaces and infrastructure ensures a sustainable urban environment. The following measures should be maintained in the city to make it green and healthy.

Horizontal Greenery: In wards where open spaces are available (such as parks, playgrounds, mela maidans, green belts, rows of trees, water bodies, crematorium/burial grounds, and other open spaces), efforts should be made to increase greenery by planting dense rows of trees along their boundaries.

Conservation of Agricultural Green Belts: These green belts are located in the outermost part of the city. They are being rapidly being converted into built-up areas because of the outward growth and the lack of space in the central parts of the city. The city's expansion is encroaching upon these surrounding agricultural areas. Protecting these agricultural lands has become essential for the urban environment of the city. These agricultural lands offer extensive areas for polluted air pollution to disperse freely and become free of pollutants.

Traditional Plant Species: The Places in the city where natural forests and trees still exist should be conserved as they are. Some of these places in the city include Maharaja Hari Singh Ji Park (in the C.B.D.), Manda Park, and B C Park. These are essential locations for traditional plant species that serve as the city's lungs of the city. Decomposition of the vegetative parts of traditional plant species is more efficient, where as while foreign plant species decompose more slowly. Therefore, our focus should be on increasing the plantations of traditional plant species rather than planting foreign ones.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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