



Urban Development and Changing Land Use in Kolhapur City: A Comprehensive Analysis

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Abstract

Urbanisation is very essential factor in regional development processes, influencing its social, economic, cultural, and physical environments. The present study looks at the complex dynamics of urban growth and shifting land usage in Kolhapur, Maharashtra. Growing urbanisation of Kolhapur City is fuelled by industrialization, increasing job opportunities, and educational breakthroughs, has dramatically altered its land use patterns during the last century. This extensive research looks at the spatial and chronological development of land use in Kolhapur, highlighting the transition from agricultural domains to urban infrastructures such residential, commercial, and industrial districts. The study relies on both primary data from field observations and secondary data from the Census of India, Kolhapur Gazetteers, and municipal development plans. The statistics show that Kolhapur's urban area has grown significantly, from 8.96 square kilometers in 1871 to a predicted 180 square kilometers by 2031. Urban sprawl has encroached on agricultural land, lowering it from 48.38% in 1977 to 29.17% in 2000, while residential land rose from 15.14% to 35.59% over the same time period. This urban expansion is accompanied by expanded acreage allocated to industrial, occupational, and transit reasons, demonstrating Kolhapur's economic diversification and infrastructure development. This research emphasises the significance of sustainable urban design and good land use management in addressing the issues faced by growing urbanisation, such as water resource management and the preservation of green areas. The insights garnered from this research are crucial for formulating policies aimed at balancing urban expansion with environmental sustainability, ensuring the resilience of Kolhapur City in the face of ongoing demographic and economic changes.

Introduction:

The population growth in India remained slow until 1921, after which it surged significantly. Consequently, 1921 is referred to as the year of the Great Divide. Post-1921, India has experienced all stages of demographic transition and is currently in the fifth phase, marked by rapidly declining fertility rates. Population growth is influenced by both birth rates and death rates. The population increase in India can be attributed to the changes in these rates. Between 1901 and 2001, the birth rate in India decreased from 49.2 per thousand to 25.8 per thousand, while the death rate fell from 42.6 per thousand to 8.5 per thousand during the same period. The natural growth rate, which was 6.6 per thousand in 1901-1911, rose to 17.3 per thousand in 1991-2001. (Tipe, 2022) This increase in natural growth rate indicates that the decline in death rates outpaced the decline in birth rates. Improvements in medical facilities and the control of epidemics and diseases contributed to the reduced death rates, signifying a positive development trend. However, census data on birth rates suggest that family planning programs need to be more effectively implemented, particularly in rural areas, to further reduce the birth rate

The extraordinary population growth has led to significant expansion and increased pressure on amenities, marking the most dramatic aspects of urbanization. This continuous expansion of city centers gradually transforms the surrounding neighborhoods. Additionally, the ongoing extension of urban areas and the integration of fringe areas into the main city, known as urban sprawl, is a continuous process. Generally, population growth is a fundamental factor in the ecological system, influencing the relationship between natural resources, the environment, and technology. In India, the unprecedented population growth combined with unplanned development activities has resulted in rapid yet uneven urbanization. This has had serious implications for the resource base, access to infrastructure, and regional development. For geographers, the study of population dynamics on the landscape is of immediate and significant interest, as the demographic structure greatly influences all other geographical elements

Objectives:

1. To examine the geographical progression of urban expansion in Kolhapur City.
2. To analyze the changes in land use patterns in Kolhapur City.

3. To elucidate the impacts associated with the city's ongoing growth.

Database and Methodology:

The current investigation relies on a combination of primary and secondary data sources. Primary data is primarily derived from field visits and observational insights, while secondary data is gathered from pertinent published reviews, the Census of India, statistical abstracts, Kolhapur Gazetteers, and undisclosed records. Additionally, relevant information will be procured through online resources to contextualize Kolhapur City on a national scale, drawing upon various internet platforms, government reports, scholarly literature, and local daily newspapers. The statistical analysis of the city development plan of Kolhapur has been done as the principal approach to investigate into the particulars of the research area.

Study Area:

Kolhapur city is the main center of the Kolhapur district. So, in this city urbanization and urban growth is being enormously. The latitudinal and longitudinal extent of Kolhapur city is $16^{\circ} 42'$ North Latitude to $74^{\circ} 16'$ East Longitude. The total area of Kolhapur city is 62.82 sq. km. The population of Kolhapur city is 549283 by the 2011 census. The city is developing thoroughly like industrial sectors, educational and commercial sectors are growing. As a result of this growth large numbers of people from the circumference area are migrating towards Kolhapur city. And it's affecting on land use pattern of Kolhapur city. The location of the study area is shown in the following figure 1 (Kale, S. S., & Shinde, S. D., 2017)

Location Map of Kolhapur City

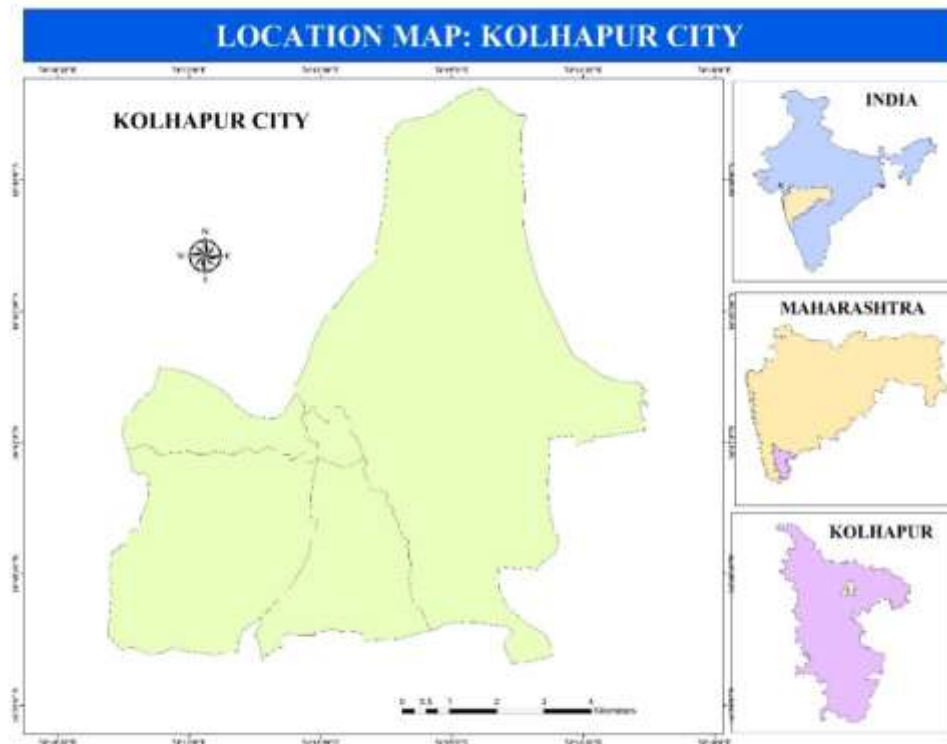


Fig.1

Urbanization Definition and Meaning:

The present research focuses on change in areal occupancy with duration. Generally, urbanization is a process that underlines various factors like the area of that urban place, available amenities, population change increase or decrease, and so on. The following definitions of urbanization help to understand the concept thoroughly:¹

As per W.S. Thompsons' opinion "Urbanization is characterized by movement of people from small communities concerned solely with agriculture to other communities generally

large whose activities are primarily centered in government trade manufacturing interests". Urbanization must consist of an inward flow of a large number of people from scattered rural to urban communities said Marvin E-Olsen. (Hassan, M. I. 2008)

A general understanding of land use and its management can be found in various academic sources and textbooks on environmental science and urban planning. (Turner, 1995)

Urbanization is a population shift from rural to urban areas and how society adapts to the change. It predominantly results in the physical growth of urban areas, be it horizontal or vertical. The United

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Nations projected that half of the world's population would live in urban areas at the end of 2008. It is predicted that by 2050 about 64% of the developing world and 86% of the developed world will be urbanized. (United Nations, 2007)

Kolhapur City: Change in area occupancy with duration

Kolhapur City: Change in area occupancy with duration

Earlier, Kolhapur was the smallest commercial center. But with changing duration various commercial activities take place like Jaggery market, *charmodyog* and various types of factories and industries Kolhapur become an enlarging city. Before independence the city had having extent of 17.15 sq. km., but after independence city's extent became 66.82 sq. km.

Table 1

Sr. No.	Year	Area (sq. km.)
1	1871	8.96
2	1931	11.52
3	1941	17.15
4	1951	63.48
5	1977	63.48
6	1989	66.82
7	2000	66.82
8	2031	180 (esti.)

Source: City development program report, Kolhapur.

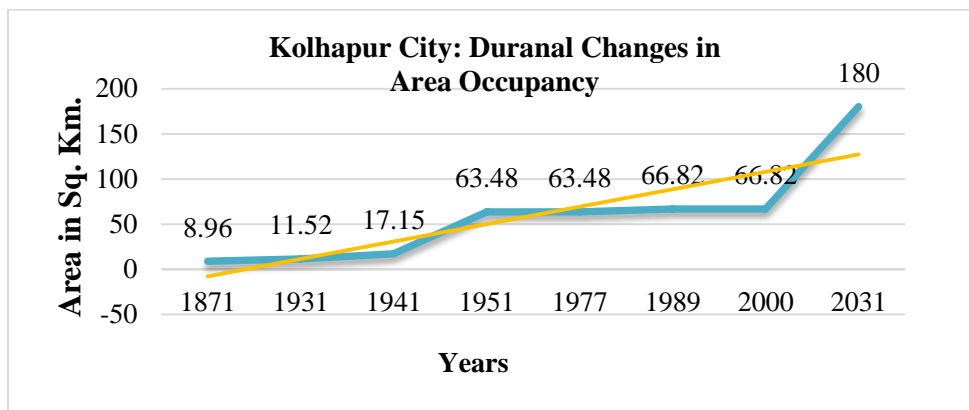


Fig. 2

Land use of Kolhapur city:

The present study investigates the urban development and changing land use patterns in Kolhapur City over the past century. The table presents a chronological overview of the city's area expansion from 1871 to an estimated projection up to 2031, focusing on significant milestones in its spatial growth. Kolhapur, historically known for its cultural heritage and economic activities, witnessed modest urbanization in the late 19th and early 20th centuries. In 1871, the city covered 8.96 square kilometers, indicating its relatively compact size during that period. By 1931, the urban area expanded to 11.52 square kilometers, reflecting gradual growth influenced by industrialization and administrative developments. (Tipe, Temporal Changes of Landuse-Landcover Pattern In Pune City and Area Around – A Geoinformatics Techniques, 2018)

The most notable increase occurred between 1941 and 1951 when the area expanded from 17.15 to 63.48 square kilometers. This surge can be attributed to post-independence economic reforms and population influx, leading to rapid

urban sprawl. The stagnation in the area between 1951 and 1977 at 63.48 square kilometers suggests stable urban boundaries amidst demographic changes and infrastructural developments.

Further analysis reveals a slight increase to 66.82 square kilometers by 1989 and 2000, underscoring controlled expansion strategies and urban planning interventions during these decades. The projected estimation for 2031 anticipates a significant rise to 180 square kilometers, highlighting future urban growth trends influenced by economic expansion, population dynamics, and infrastructural advancements. (Tipe, Morphometric Analysis of Watershed by Using Geospatial Technology: A Case Study of Padi Village (South Goa), 20178)

This comprehensive analysis of Kolhapur City's urban development underscores the dynamic interplay between geographical, demographic, and socio-economic factors shaping its spatial evolution. Future research will delve deeper into the implications of this growth on land use patterns, environmental sustainability, and urban governance, offering insights crucial for effective urban planning

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and sustainable development strategies in rapidly growing cities like Kolhapur.

In the present paper, the periods of 1977, 1989, and 2000 comparative study of land use

change have been studied. Changing land use patterns with changing time are shown more clearly by following charts and diagrams.

Table 2: Kolhapur City: Land use pattern in 1977

Sr. No.	Land use	Area	Per cent
1	Domestic use	961.26	15.14
2	Occupational	111.17	1.75
3	Industrial	124.76	1.97
4	Private and semi-private	811.6	12.78
5	Roads and transportation	275.31	4.34
6	Private services	56.08	0.88
7	Private services and burial place	10.96	0.27
8	Defense	120	1.89
9	Water resources	130.8	1.95
10	Agriculture	3071.8	48.38
11	Fallow Land	365.78	10.65
	Total Area	6349.52	100

Source: City development program report, Kolhapur.

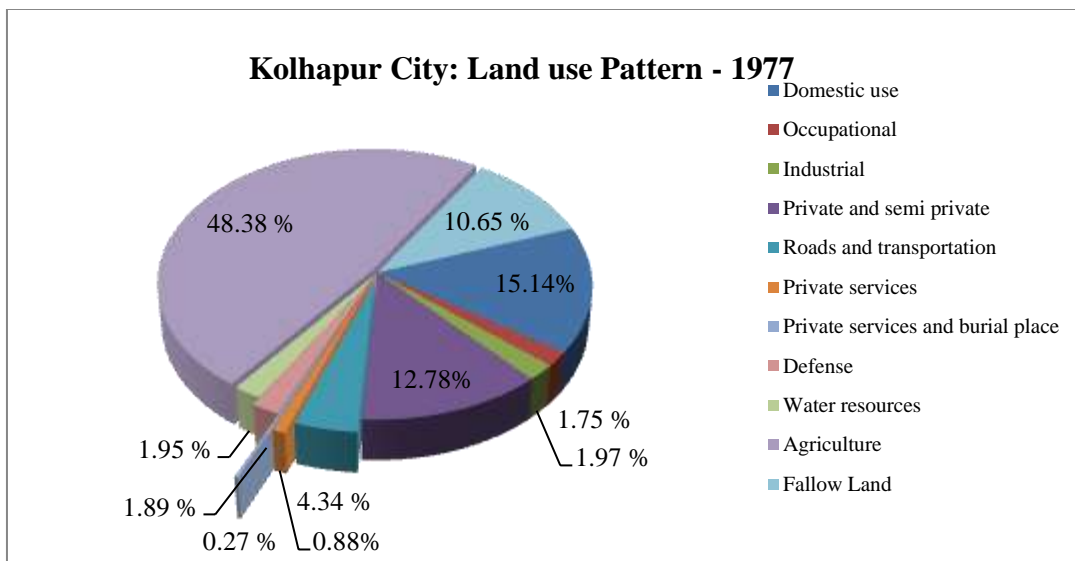


Fig. 3

The above pie chart shows the land use pattern of Kolhapur city in 1977. It shows that 48.38 percent area is under agriculture which is at its highest level. The second largest region is occupied

by domestic use which is 15.14 percent. The 11 percent of the land was fallow land. Private Sectors, Occupational, Industrial, and transport sectors did not progress during 1977.

Table 3: Kolhapur City: Land use 2000

Sr. No.	Land use	Area	Per cent
1	Domestic use	2378.12	35.59
2	Occupational	171.04	2.55
3	Industrial	147.88	2.21
4	Private and semi-private	991.52	14.83
5	Roads and Transportation	501.29	7.5
6	Private services	237.64	3.55
7	Private services and burial place	55.63	0.87
8	Defense	120	1.78
9	Water resources	130.27	1.95
10	Agriculture	1949.22	29.17
11	Fallow Land	-	-
	Total Area	6682.00	100

Source: City development program report, Kolhapur.

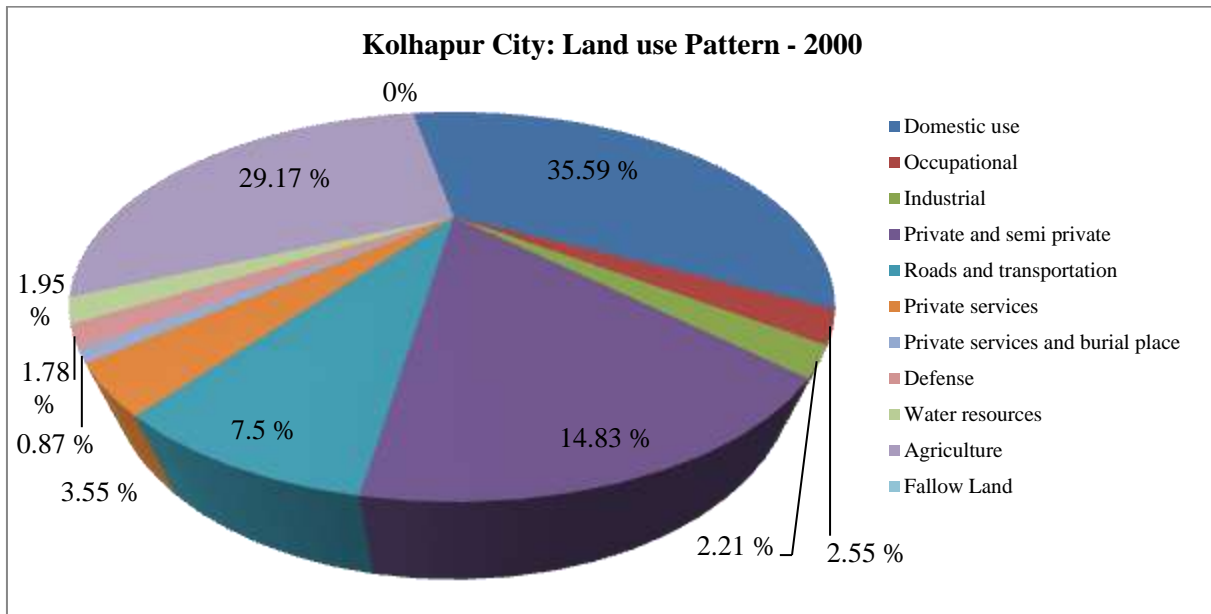


Fig. 4

Land use of Kolhapur city in the year 2000 is shown in the above pie chart. It shows that the highest land use is under domestic use which counts 35.59 per cent. After that second highest land use is under merely agriculture which is 29.17 percent. And private and semi-private sector shows 14.83 percent land use of Kolhapur city.

Road and transportation indicate 7.5 percent at the same time private services include 3.55 percent. The occupational and Industrial sector shows 2.55 and 2.21 percent land use in Kolhapur city respectively. For defense and water resources it is 1.78 and 1.95 respectively. This is the very lowest proportion as compared to other fields.

Table 4
General Land use of Kolhapur City

Year	Developed area (Land under Domestic use, Occupational, Industrial, Private and Semi-private, Road and Transportation, Private Services, Private Services and Burial place)	Underdeveloped area (Water Resources, Agriculture and Fallow Land)
1977	38.92	61.08
2000	68.88	31.12

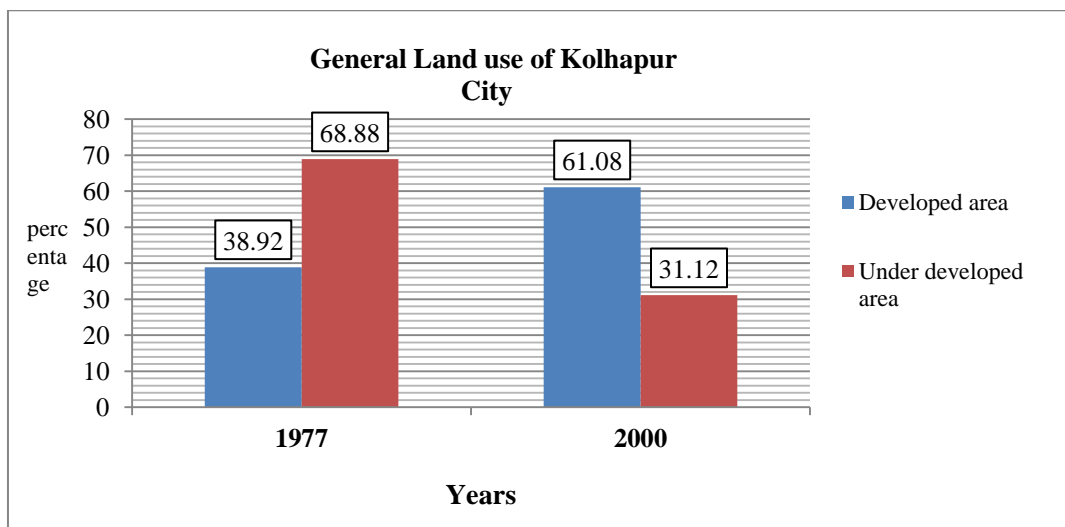


Fig 5

The bar graph above illustrates a significant surge in development between 1977 and 2000. This period saw a notable reduction in underdeveloped areas as Kolhapur city experienced substantial growth. These findings

underscore the city's remarkable level of progress and development during this timeframe.

Estimations about the expansion of Kolhapur City:

It is estimated that by 2031 urban development plan, encircled 17 villages will be merged in Kolhapur city. If it becomes possible then the area of Kolhapur city will increase up to 18,000 hectares. And maximum expansion will be towards north and south direction.

Conclusion:

1. Shift from Agriculture to Urbanization: Over the years, Kolhapur City has experienced a notable shift from agricultural to urban land use. In 1977, agriculture covered 48.38% of the city's land area, which decreased significantly to 29.17% by 2000, indicating a trend towards urban development and infrastructure expansion.

2. Rise in Urban Land Use: Concurrently, urban land use has seen a steady increase, rising from 15.14% in 1977 to 35.59% by 2000. This growth reflects the city's expanding built environment and increasing population density.

3. Expansion of Occupational Areas: The proportion of land dedicated to occupational purposes has also grown, reaching 2.66% in 2000 compared to 1.6% in 1977. This expansion underscores the city's economic development and industrial growth.

4. Influence of Infrastructure Development: The expansion of road transportation areas has been significant, influenced by historical factors such as colonization and modern urban planning initiatives. This has facilitated connectivity but also impacted land use patterns.

5. Challenges of Water Resource Management: Despite a growing population, the allocation of land for water resources has not increased proportionally, raising concerns about water scarcity and sustainable resource management in Kolhapur City.

6. Industrial Sector Growth: The industrial sector has witnessed substantial growth over time, with its share of land increasing from 1.7% in 1977 to 2.21% by 2000. This growth reflects economic diversification and industrialization trends within the city.

7. Impact of Residential Expansion: Residential areas have expanded significantly, accommodating the city's growing population and changing demographic trends. This expansion has reshaped urban landscapes and influenced community dynamics.

8. Conservation Efforts and Green Spaces: Efforts to preserve green spaces and natural habitats have become increasingly important amidst urbanization pressures. Parks and recreational areas play a crucial role in enhancing urban livability and environmental sustainability.

9. Land Use Planning and Governance: Effective land use planning and governance are essential for managing urban growth and mitigating environmental impacts. Zoning regulations and infrastructure investments shape the city's spatial organization and development trajectory.

10. Future Directions: Looking ahead, understanding these transformative changes in land use is crucial for

sustainable urban development in Kolhapur City. Addressing challenges such as water scarcity, balancing industrial growth with environmental conservation, and enhancing infrastructure resilience will be key priorities for future planning and policy decisions.

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