*International Journal of Research Studies on Environment, Earth, and Allied Sciences (IJRSEAS)*
| *Volume-3 Issue-5* | *October -2026* | *ISSN: 3066-0637* | *Website:* https://eesrd.us

**Manuscript ID:**
IJRSEAS-2026-030502

OPEN ACCESS

Quick Response Code:

**Website:** https://eesrd.us

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**DOI: 10.5281/zenodo.23155213**

**DOI Link:**
https://doi.org/10.5281/zenodo.23155213

**Volume:** 3

**Issue:** 5

**Pp.** 7-11

**Month:** October

**Year:** 2026

**E-ISSN:** 3066-0637

***Submitted: 07 Sept. 2026***

***Revised: 18 Sept 2026***

***Accepted: 10 Oct.2026***

***Published: 31 Oct. 2026***

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***How to cite this article:***
*Bhuyar, A. R. (2026). A Comparative Geographical Analysis of Land Use Patterns in Akrani and Nandurbar Tehsils of Nandurbar District. International Journal of Research Studies on Environment, Earth, and Allied Sciences, 3(5), 7–11. https://doi.org/10.5281/zenodo.23155213*

# A Comparative Geographical Analysis of Land Use Patterns in Akrani and Nandurbar Tehsils of Nandurbar District

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***Abstract***

*"A Comparative Geographical Analysis of Land Use Patterns in Akrani and Nandurbar Tehsils in Nandurbar District," aims to analyze and contrast the features and spatial distribution of different land-use categories in the two tehsils. An key measure of how human activity and the physical environment interact is land use. Major land-use categories include agricultural land, forest land, fallow land, barren and uncultivable land, grazing land, built-up land, and water bodies are the focus of the study. Akrani Tehsil is distinguished by hilly and rugged terrain, a substantial amount of forest cover, and primarily rain-fed agriculture, whereas Nandurbar Tehsil has relatively favorable terrain, agricultural conditions, irrigation facilities, and a higher concentration of settlements and other non-agricultural activities. In addition to geographical methods like GIS and remote sensing when appropriate, the study makes use of secondary data from government reports, Census publications, statistical records, maps, and other pertinent sources. In order to determine the regional variances, similarities, and differences in land-use patterns, as well as to investigate the impact of socioeconomic and physical factors on land usage, a comparative study is conducted. By improving knowledge of regional differences in land use, the study is expected to support sustainable resource management, land-use planning, and balanced regional development in the Nandurbar District.*

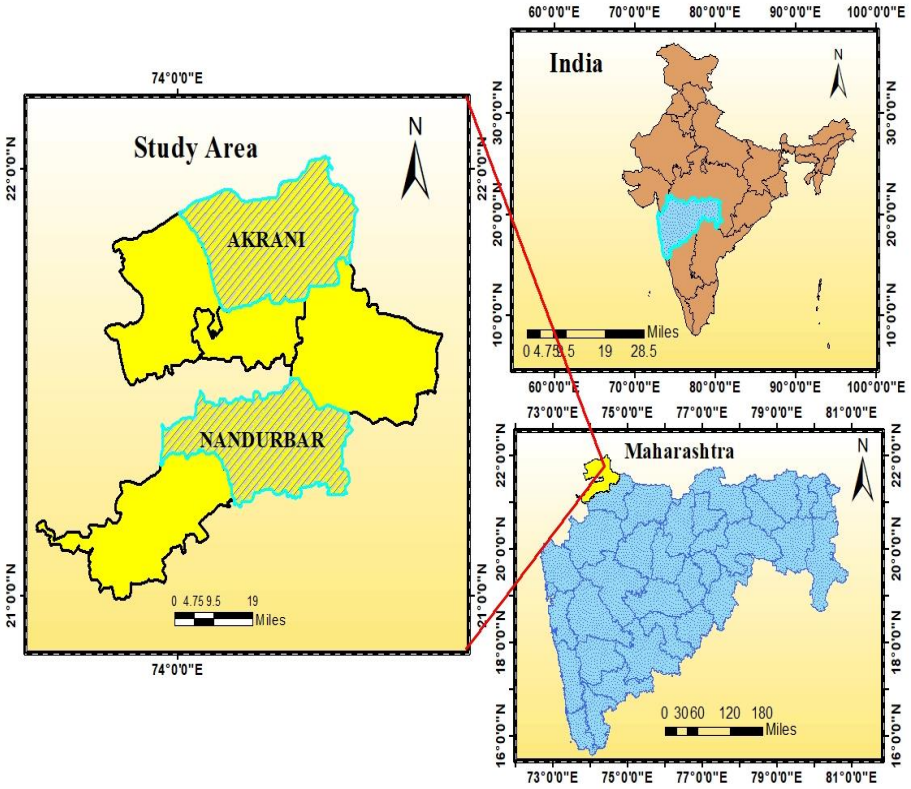
***Keywords:*** *Land Use, Land Use Patterns, Comparative Geographical Study, Akrani Tehsil, Nandurbar Tehsil, Nandurbar District, Agriculture, Forest Land, Spatial Distribution*

## Introduction

Land is one of the most valuable natural resources available to human beings. It plays an important role in the economic, social, and environmental development of a region. Land use generally refers to the various ways in which land is utilized by people for different purposes, such as agriculture, forestry, grazing, settlements, industries, transportation, and other economic activities. Land-use patterns vary from one region to another depending on the physical and socio-economic conditions of the area. In different parts of the world, land-use patterns differ considerably among developed, developing, and underdeveloped countries. India is predominantly a rural and agrarian country, and a large proportion of its population depends directly or indirectly on agriculture for their livelihood. Therefore, agricultural land occupies a significant share of the total geographical area of the country. However, the distribution and utilization of land are not uniform across different regions. Physical factors such as relief, elevation, climate, soil, rainfall, drainage, and availability of water greatly influence land-use patterns. In addition to these natural factors, population growth, urbanization, industrial development, irrigation facilities, transportation, technology, and socio-economic conditions also play an important role in determining the use of land.

## Study Area

The Nandurbar district has been selected for this study. It is an administrative district located in the northwest part of Maharashtra state in India.On 1st July 1998, the district of Dhule was divided into two separate districts, which are now known as Dhule and Nandurbar. Nandurbar is a district with a significant tribal population, and its administrative headquarters are in the city of Nandurbar. The district lies between the latitudes of 21° 00' N and 22° 03' N, and the longitudes of 73° 31' E and 74° 32' E.The total area of the district is 5,955 square kilometers. It is bordered by Dhule district to the south, southeast, and east, while Gujarat is to the west, west-north, and north.To the north and north-east, it shares a boundary with the state of Madhya Pradesh. The northern boundary of the district is marked by the great Narmada River. According to the 2011 census, the population of Nandurbar district is 16,48,295 people.




Akrani (Dhadgaon) is one of the selected tehsils. It is in the north-western part of Nandurbar District, roughly between 21°35′ N and 22°00′ N latitudes and 74°00′ E and 74°30′ E longitudes. It is mostly made up of hilly, undulating terrain that is part of the Satpura ranges. Land use and agricultural practices are significantly influenced by the rugged relief, forest cover, dispersed settlements, and reliance on seasonal rainfall. In contrast, Nandurbar Tehsil, which includes Nandurbar city and is in the central-southern portion of the district, is characterized by a greater concentration of agricultural land, settlements, transportation facilities, markets, and urban infrastructure. It also occupies relatively accessible terrain that is gently undulating. A suitable geographical framework for examining variations in forest land, agricultural land, fallow land, grazing land, barren and uncultivated land, built-up land, and other land-use categories is provided by the divergent physiographic and socioeconomic characteristics of Akrani and Nandurbar. As a result, comparing these two tehsils helps to comprehend how physical and human factors affect the distribution and use of land in Nandurbar District.

**Objective:**

1. To study the existing land-use pattern of Akrani and Nandurbar Tehsils.
2. To analyze the spatial distribution of major land-use categories
3. To compare the land-use patterns of Akrani and Nandurbar Tehsils and identify their similarities and differences.
4. To examine the influence of physical factors such as relief, soil, rainfall, drainage, and climate on land-use patterns

**Database and Methodology:**

The data used for this research paper is secondary. The secondary data comes from a variety of sources, including government and private publications, as well as books that have been published. District statistical abstract, socio-economic review, and the district census handbook for the area under study. Obtained data is processed and present in the form of tabular and graphical method

**General Land use in Akrani and Nandurbar Tahsil**

Land use is an important indicator of the physical, economic and socio-demographic characteristics of a region. The spatial distribution of agricultural land, barren/fallow land, forest and natural vegetation, settlements and water bodies reflects the interaction between physical conditions and human activities. A comparative analysis of land use in Akrani and Nandurbar tahsils helps to identify differences in resource utilization and the degree of human intervention in these two areas. For the present analysis, the total geographical area of Akrani Tahsil is 1,287.52 sq. km, while that of Nandurbar Tahsil is 1,122.40 sq. km. The analysis is based on five major land-use categories: agriculture, barren/fallow land, forest/natural vegetation, and settlement and water bodies.

**1. Agriculture**

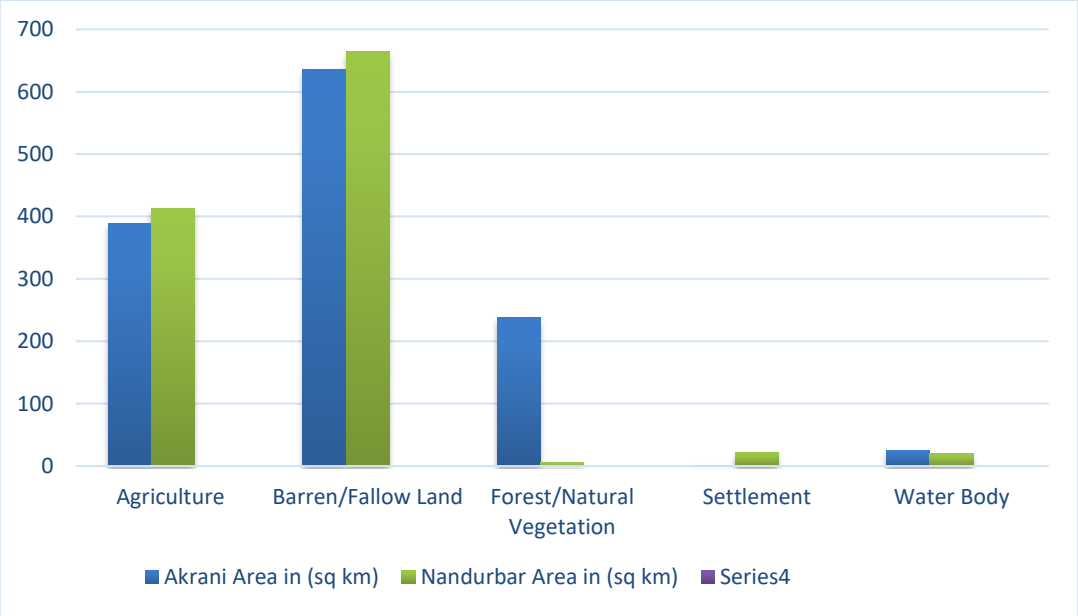
Agriculture plays a significant role in the land use of both Akrani and Nandurbar tahsils. In Akrani, agriculture occupies 388.10 square kilometers, making up about 30.14% of the total area. Meanwhile, Nandurbar has

a larger agricultural footprint, with 412.62 square kilometers dedicated to farming, which is 36.77% of its land. This means Nandurbar has 24.52 square kilometers more farmland than Akrani, and its agricultural area is 6.63 percentage points higher. The difference highlights how agriculture is more central to Nandurbar's land use, while Akrani maintains a more varied landscape with a considerable portion covered by forests and natural vegetation. These variations likely stem from differences in physical conditions, soil quality, water availability, and socio-economic factors, which would need deeper exploration to fully understand. Overall, Nandurbar leans more heavily on agriculture, whereas Akrani balances farming with nature's presence

**Comparative Land-use Structure**

| Sr.no | Land-use Category | Akrani | | Nandurbar | | Difference in Area (sq. km) |
|---|---|---|---|---|---|---|
| | | Area in (sq km) | Area in (%) | Area in (sq km) | Area in (%) | |
| 1 | Agriculture | 388.10 | 30.14 | 412.62 | 36.77 | +24.52 |
| 2 | Barren/Fallow Land | 636.11 | 49.41 | 664.13 | 59.17 | +28.02 |
| 3 | Forest/Natural Vegetation | 237.39 | 18.44 | 5.02 | 0.45 | -232.37 |
| 4 | Settlement | 1.35 | 0.10 | 21.03 | 1.87 | +19.69 |
| 5 | Water Body | 24.57 | 1.91 | 19.59 | 1.75 | -4.98 |
| 6 | **Total** | 1,287.52 | 100.00 | 1,122.40 | 100.00 | 165.12 |

Percentage is calculated as: Land-use percentage = (Area under particular land use / Total geographical area) × 100




**2. Barren/Fallow Land:**

Barren/fallow land is the largest land-use category in both Akrani and Nandurbar tahsil. In Akrani, it covers 636.11 sq. km, representing 49.41% of the total geographical area, while in Nandurbar it covers 664.13 sq. km, accounting for 59.17% of the total area. In absolute terms, Nandurbar has 28.02 sq. km more barren/fallow land than Akrani. However, the percentage difference is more significant, as the share of barren/fallow land in Nandurbar is 9.76 percentage points higher than that of Akrani. Thus, nearly half of Akrani and approximately three-fifths of Nandurbar are classified under barren/fallow land. This indicates that barren/fallow land plays a dominant role in the overall land-use structure of both tahsil, particularly in Nandurbar. The relatively higher proportion in Nandurbar suggests a greater concentration of land that is not under continuous agricultural or built-up use. Nevertheless, barren and fallow land should not be treated as completely unproductive land, because fallow land may be temporarily uncultivated and can potentially be brought under cultivation depending on rainfall, irrigation, soil conditions and agricultural practices.

**3. Forest/Natural Vegetation:**

The most important difference between the tahsils of Nandurbar and Akrani is their forest and natural vegetation. Akrani has 237.39 sq. km under forest/natural vegetation, accounting for 18.44% of its total geographical area, whereas Nandurbar has only 5.02 sq. km, representing 0.45% of its total area. The two tahsils

differ by approximately 17.99 percentage points in percentage share and by 232.37 square kilometers in absolute terms. In relative terms, the area under forest/natural vegetation in Akrani is nearly 47 times that of Nandurbar. This significant distinction demonstrates that natural vegetation has very little representation in Nandurbar, whereas it is a significant part of Akrani's land-use structure. Consequently, Akrani can be regarded as having a relatively stronger natural-landscape component, while Nandurbar is more strongly characterized by agricultural and barren/fallow land. Differences in accessibility, human land use intensity, relief, slope, soil conditions, climatic characteristics, and forest and natural vegetation distribution may be to blame. However, rather than being inferred solely from the land-use data, such relationships ought to be established through separate analysis of physical and socioeconomic variables.

**4. Settlement Land:**

Settlement land occupies a very small proportion of Akrani compared with Nandurbar. In Nandurbar, the settlement covers 21.03 sq. km, or 1.87 percent of the area, while in Akrani, it only covers 1.35 sq. km, or 0.10 percent of the area. Therefore, Nandurbar has 19.69 sq. km more settlement land than Akrani

**5 Water body**

The comparison of water-body land use between Akrani and Nandurbar reveals a noticeable difference in both absolute area and proportional coverage. 24.57 square kilometers of Akrani's land are designated as water bodies, or 1.91 percent of its total area. In contrast, Nandurbar has 19.59 sq. km, representing 1.75% of its area. Therefore, Akrani contains 4.98 sq. km more water-body area than Nandurbar.Major Differences between Akrani and Nandurbar

The comparative analysis indicates distinct structural variations in the land-use composition of Akrani and Nandurbar Tehsils, reflecting differences in their physical environment and intensity of human utilization. Akrani is characterized by a relatively higher proportion of forest/natural vegetation (18.44%), which indicates the persistence of natural land cover and the influence of its predominantly hilly and forested physiography. In contrast, Nandurbar records only 0.45% forest/natural vegetation, while comparatively greater proportions of agricultural, barren/fallow, and settlement land indicate a higher degree of anthropogenic transformation of the landscape. The 6.63 percentage-point higher agricultural share in Nandurbar further demonstrates its stronger agricultural orientation and comparatively intensive utilization of available land resources. The forest/natural vegetation category exhibits the most pronounced inter-tehsil variation, with a difference of 17.99 percentage points, making it the principal land-use characteristic differentiating the two areas. In addition, the substantially higher proportion of settlement land in Nandurbar reflects greater concentration of population, built-up areas, infrastructure, and associated socio-economic activities. Thus, the comparison suggests a clear spatial contrast between the relatively natural-land-dominated landscape of Akrani and the more intensively cultivated, settled, and human-modified landscape of Nandurbar, demonstrating the combined influence of physiographic conditions and socio-economic processes on land-use organization.

| Sr.no | Indicator | Akrani | Nandurbar | Interpretation |
|---|---|---|---|---|
| 1 | Agricultural share | 30.14% | 36.77% | Higher in Nandurbar |
| 2 | Barren/Fallow share | 49.41% | 59.17% | Higher in Nandurbar |
| 3 | Forest/Natural Vegetation | 18.44% | 0.45% | Much higher in Akrani |
| 4 | Settlement share | 0.10% | 1.87% | Much higher in Nandurbar |
| 5 | Water-body share | 1.91% | 1.75% | Slightly higher in Akrani |
| 6 | Total geographical area | 1,287.52 sq. km | 1,122.40 sq. km | Akrani is larger by 165.12 sq. km |

The analysis demonstrates that Akrani and Nandurbar have distinctly different land-use structures.

The land-use pattern in Akrani is relatively diverse, with agriculture, barren/fallow land, and forest/natural vegetation all occupying significant portions of the area. Akrani has a particularly strong natural-landscape component thanks to the 18.44% forest and natural vegetation percentage. Nandurbar, in contrast, exhibits a more strongly concentrated land-use pattern, with nearly 59.17% of its area under barren/fallow land and 36.77% under agriculture. These two categories together make up about 95.94% of the total area in Nandurbar. The corresponding combined share is approximately 79.55 percent in Akrani. This is an important finding because it demonstrates that Nandurbar has a much greater concentration of land in the agriculture–barren/fallow categories, whereas Akrani has a more significant natural-vegetation component.

**Conclusion**

The comparative study of land use in Akrani and Nandurbar tahsils reveals a clear spatial differentiation in land utilization. Barren/fallow land is the dominant category in both tahsils, but its share is higher in Nandurbar. Agriculture is also more prominent in Nandurbar, both in terms of absolute area and percentage share. The most remarkable difference is in forest/natural vegetation, which covers 18.44% of Akrani but only 0.45% of Nandurbar.

This indicates that Akrani retains a considerably larger natural-vegetation component. Conversely, Nandurbar has a substantially higher proportion of settlement land, suggesting greater built-up development and human occupation.

Thus, the two tahsils can be broadly characterized as follows: Akrani – relatively natural-vegetation-rich and diversified land-use structure. Nandurbar agriculture and barren/fallow-land dominated land-use structure with a relatively higher settlement component. The findings suggest that differences in physical geography, land capability, agricultural practices, settlement distribution, accessibility and socio-economic conditions may have contributed to the observed land-use pattern. For a stronger geographical interpretation, these factors should be examined alongside the land-use data.

**Acknowledgement**

The author expresses sincere gratitude to all individuals and institutions whose support, guidance, and encouragement contributed to the completion of this research paper entitled "A Comparative Geographical Analysis of Land Use Patterns in Akrani and Nandurbar Tehsils of Nandurbar District." The study examines the spatial distribution and comparative characteristics of major land-use categories, including agricultural land, barren/fallow land, forest and natural vegetation, settlement, and water bodies.

The author gratefully acknowledges the support and cooperation of N T V S's G. T. Patil Arts, Commerce and Science College, Nandurbar, for providing an academic environment conducive to research and scholarly work. The author is also thankful to colleagues, research scholars, and well-wishers for their valuable suggestions, encouragement, and cooperation during the preparation of this study.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

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

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