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A GEOGRAPHICAL ANALYSIS OF FOREST COVER IN AKRANI TEHSIL OF NANDURBAR DISTRICT

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Abstract

Forest cover plays a vital role in regulating the environmental cycle by maintaining ecological balance, supporting biodiversity, and mitigating climate change. It helps in preventing soil erosion, conserving water resources, and sustaining local wildlife. Akrani Tehsil, known for its rich forest cover, has been an important ecological zone contributing to environmental stability in the region. However, in recent years, it can be seen a continuous decline in forested areas, raising concerns about deforestation and its consequences. A researcher conducted a detailed study to analyze the rate of change in forest cover within Dhadgaon, also known as Akrani Tehsil. The findings revealed a significant and alarming decrease in the forested landscape over time. To accurately assess these changes, the researcher employed Remote Sensing (RS) and Geographic Information System (GIS) techniques.

Introduction

The results of this study indicate that the reduction in forest cover has had a profound impact on the physical environment. The loss of trees has contributed to higher surface temperatures, and disruptions in the local hydrological cycle. Changes in forest cover have also affected wildlife habitats, leading to biodiversity loss and ecological imbalances. Furthermore, the decline in vegetation can contribute to more frequent natural disasters such as landslides and flash floods, ultimately affecting local communities. To address these concerns, it is essential to implement strong conservation strategies, reforestation programs, and sustainable land-use policies. Utilizing RS and GIS for continuous monitoring can help in tracking environmental changes and guiding policymakers

Location of Study Area

Location Map of Study Area
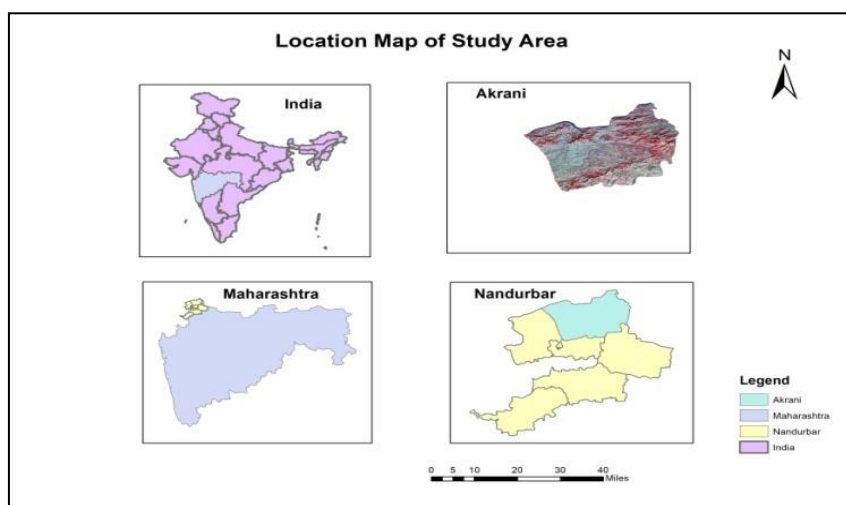
Database & Methodology

In this research study, we acquired Landsat satellite images for the Akrani tehsil region for the years 1999 and 2022. Once the images were collected, we employed advanced GIS software to perform necessary corrections and calibrations, ensuring that the data was accurate and comparable across the two time periods. This preprocessing step was critical in mitigating any distortions or discrepancies inherent in the raw satellite data. Following the corrections, we used supervised classification techniques to accurately delineate and calculate the area under forest cover for both years. Supervised classification allowed us to reliably separate forested areas from other land cover types by using training samples to guide the classification process. This method enabled us to quantitatively assess how forest cover has changed over time in Akrani tehsil. Moreover, the study examined the environmental impacts of these changes in forest cover, with a particular focus on rainfall patterns. To support this analysis, we sourced detailed rainfall data from the Maharashtra Agriculture Department. By correlating the variations in forest cover with changes in rainfall.
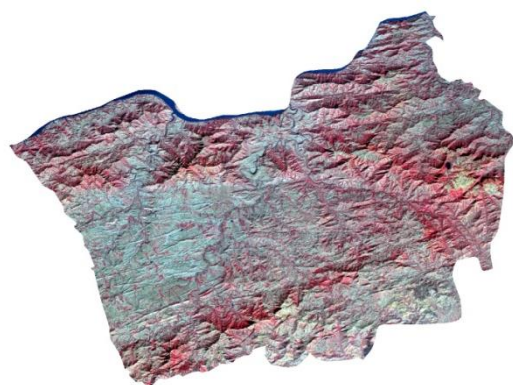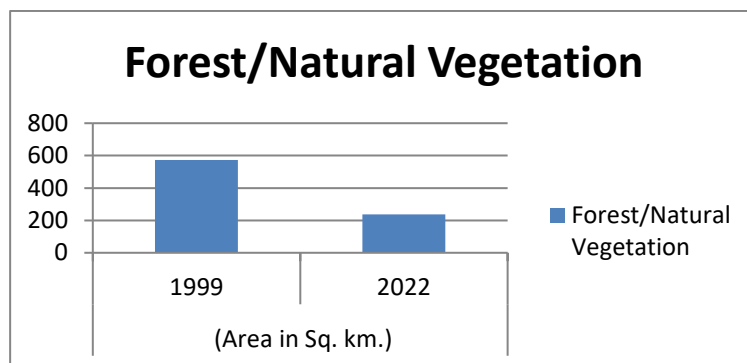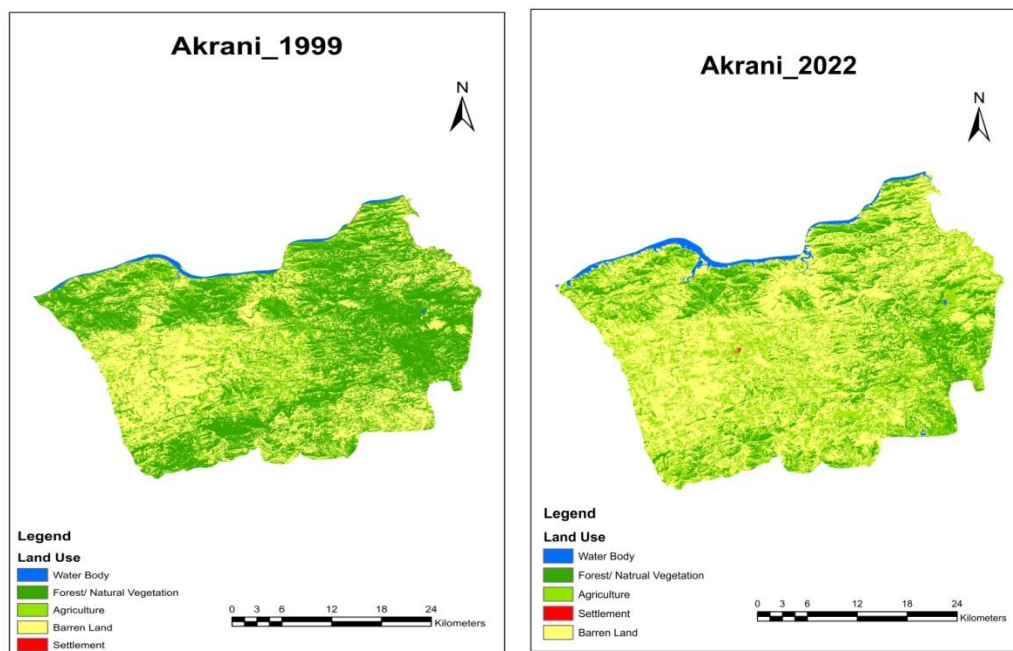

(AkraniTehsil-1999)　　　　　　　　　　(AkraniTehsil-2022)

Results
Akrani Forest Cover (1999 & 2022)

Land use Type	(Area in Sq. km.)	
	1999	**2022**
Forest/Natural Vegetation	572.25	237.39

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Forest/Natural Vegetation

(Area in Sq. km.)

The above table & graph presents a clear comparison of forest or natural vegetation cover between 1999 and 2022, measured in square kilometers. In 1999, the area covered by forest and natural vegetation was recorded at 572.25 sq. km. By 2022, this figure had dramatically decreased to 237.39 sq. km. This stark reduction, which equates to a loss of approximately 334.86 sq. km or about 58.5% of the original forest area, highlights a significant change in land use over the 23-year period. The data suggests that the region has experienced extensive deforestation or a conversion of natural landscapes into other land uses, which could have substantial implications for local biodiversity and environmental stability.
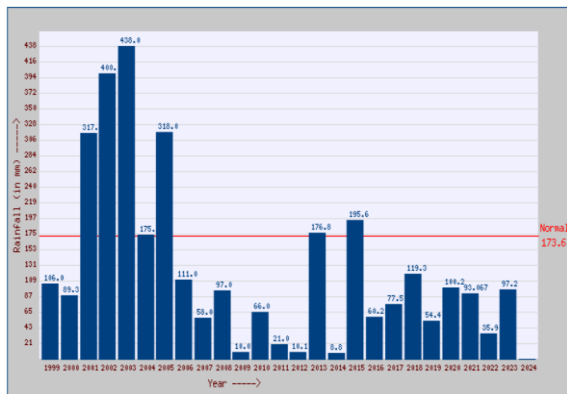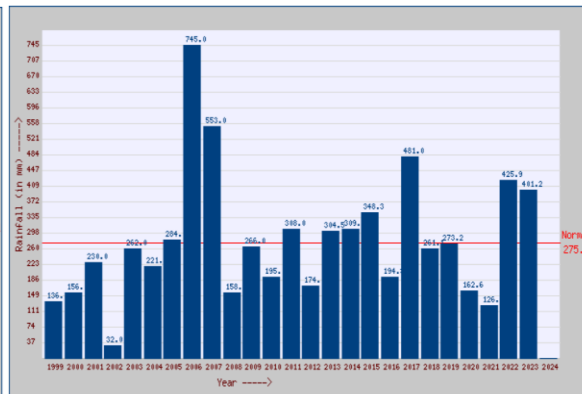

Rainfall

Rainfall data for Akrani tehsil was analyzed for the years 1999 and 2022, revealing notable changes in precipitation patterns over time. In 1999, the rainfall was observed to be quite regular, suggesting a stable and predictable climate during that period. However, by 2022, the rainfall pattern had become increasingly irregular, with significant fluctuations that

diverged from the historical norm. This shift in rainfall consistency may be linked to environmental changes, particularly deforestation.
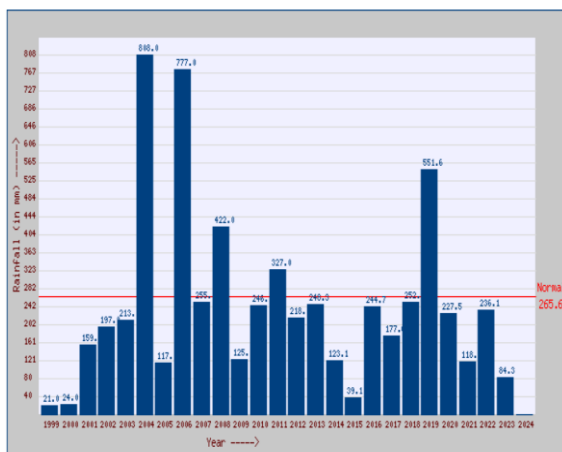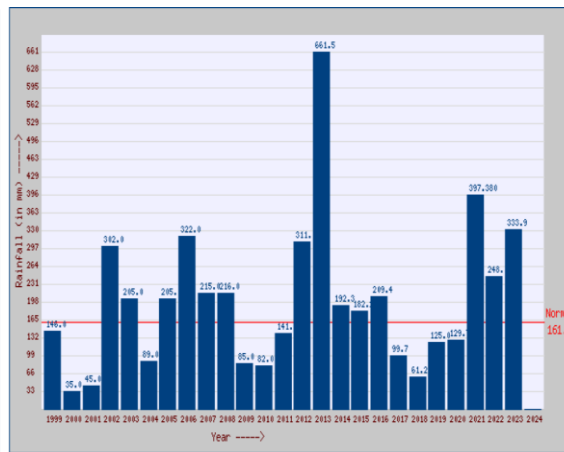

(Source: Agriculture Department, Maharashtra government)

Conclusion

The area covered by forests and natural vegetation has significantly decreased over time, indicating a rise in deforestation activities within the study area. This ongoing deforestation has led to several adverse environmental consequences, particularly affecting local climate patterns. One of the most noticeable impacts is the disruption of rainfall patterns. Due to the reduction in forest cover, the natural process of moisture retention and cloud formation has been disturbed, resulting in irregular rainfall. The absence of dense vegetation reduces the ability of the land to retain water, leading to increased surface runoff, soil erosion, and a decline in groundwater recharge. Furthermore, changes in precipitation patterns can negatively impact agriculture, water availability, and overall biodiversity in the region. If deforestation continues unchecked, the area may experience worsening climatic conditions, including prolonged dry spells or unpredictable weather patterns, further exacerbating environmental instability.

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