Analysis of Land Use Change in Trincomalee using NDVI and NDBI from 2013 to 2023

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Land use changes have a profound impact on both natural ecosystems and human settlements. As the world undergoes rapid urbanization and shifts in land management practices, monitoring and analysing these changes is vital. This study focuses on Trincomalee, a region in Sri Lanka that has experienced notable land use transformations due to various historical, geographical, and socio-economic factors. Remote sensing and GIS technology are effective tools for analysing changes in land use and cover at a spatial and temporal scale. To comprehensively analyse these changes, the study utilizes the Normalized Difference Vegetation Index (NDVI) and Normalized Difference Building Index (NDBI) from 2013 to 2023. The results reveal a significant expansion of built-up areas, totalling 324.11 km^2 (12%) by 2023, and a major change in forest cover area, with a degradation of 459.2 km^2 (17%) and an increase of 428.54 km^2 (16 %) in grasslands. These changes have occurred in specific regions that have undergone substantial transformations. The study's findings have significant implications for urban planning, conservation, and sustainable land management. By understanding how these changes affect the environment, policymakers and stakeholders can address the challenges that come with urbanization while protecting essential ecosystems. The study's comprehensive methodology, which uses satellite imagery and NDVI and NDBI analysis, provides a strong foundation for future research aimed at addressing similar land use trends and their impacts.

Keywords: Land use change, NDVI, NDBI, Urbanization