

The application of GIS and RS to analyze Land use and land cover change in Manmunai South and Eruvil Pattu from 2005 to 2025

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Abstract

This study examines land use and land cover (LULC) changes in the Manmunai South and Eruvil Pattu Divisional Secretariat of Sri Lanka from 2005 to 2025. Utilizing satellite imagery from Landsat 5 TM and Landsat 8 OLI, the research apply unsupervised classification techniques to analyze spatial and temporal changes in land cover. The findings clearly indicate significant urban growth, with built-up areas expanding by over 3 km². Conversely, agricultural land has sharply declined due to the encroachment of residential and industrial development. Moreover, water bodies and marshlands have experienced substantial shrinkage.. However, it is important to note that vegetation, particularly mangrove forests area, has expanded due to successful post-tsunami restoration efforts. The accuracy assessment of the classified images demonstrates overall accuracy rates ranging from 79% to 88%, supported by strong Kappa statistics, which confirm the reliability of these results. This study highlights the need for effective land management strategies to ensure that urban development is balanced with environmental conservation in the region.

Keywords: Land Use and Land Cover (LULC), Remote Sensing, unsupervised classification, Landsat imagery, urban expansion, agricultural land decline, accuracy assessment, sustainable land management