African Physical Geography (Pure - Earth Science)

Remote Sensing and GIS for Environmental Monitoring in Ethiopia,

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Abstract

Remote sensing and Geographic Information Systems (GIS) are increasingly used for environmental monitoring in Africa, offering cost-effective solutions to assess large-scale land cover changes. Remote sensing data from Landsat satellites were collected, processed, and analysed using the Object-Based Image Analysis (OBIA) method for land cover classification. A Geographic Information System was employed to map and analyse spatial patterns of deforestation. A significant reduction in forested areas was observed, with approximately 15% decrease in tree coverage across monitored regions compared to previous years, suggesting a need for enhanced conservation measures. The integration of remote sensing and GIS provided robust insights into the dynamics of deforestation in Ethiopia. The findings highlight the effectiveness of these tools in monitoring environmental changes at regional scales. Future studies should extend the analysis to more regions and incorporate additional data sources such as ground surveys for a comprehensive assessment of land cover changes. The empirical specification follows $Y = \vec{\beta}_{0+\beta} p\, X + varepsilon$, and inference is reported with uncertainty-aware statistical criteria.

Keywords: *African Geographic Information Systems (AGIS), Remote Sensing, Geospatial Analysis, Land Cover Mapping, Environmental Change Detection, Precision Agriculture, Sustainable Development Strategies*

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