

INTEGRATION OF REMOTE SENSING AND SPATIAL METRICS FOR ANALYZING LAND USE/COVER CHANGE OF THE JAFFNA PENINSULA

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Temporal and spatial information on land use/cover is a prerequisite for effective planning decisions in the context of social and economic development. Satellite remote sensing has become increasingly important in the study of land use/cover changes. One of the most rapidly growing applications of remotely sensed data is the derivation of spatial pattern metrics for the assessment of land use/land cover condition and dynamics. This paper uses satellite data and spatial metrics to classify and spatially characterize land use/cover changes in the Jaffna Peninsula, northern Sri Lanka from 1985 to 2004. Over this period, the Jaffna Peninsula has been impacted severely by armed conflict between the government of Sri Lanka and the Liberation Tigers of Tamil Eelam. An object-oriented image classification approach is used to classify satellite images into different land use/cover classes. A post-classification confusion matrix and spatial metrics derived from the classified images are used to describe the spatial characteristics of land use/cover changes over the study period. Three groups consisting of 12 spatial metrics have been used in this study: pattern density and size metrics, edge metrics and shape metrics. A detailed land use/cover maps with 12 categories were derived from satellite images for the Jaffna Peninsula. This study is assessing how land use/cover categories vary in their spatial configuration, spatial metrics were found to provide the most important information for differentiating land uses and the dynamics of land use/cover changes. Results indicate that the land use/cover patterns have been very dynamic, showing a remarkable decrease in agricultural land use and concomitant increase in non-agricultural land uses. Results from this work suggest that integration of remote sensing and spatial metrics is a potential new avenue to extract detailed land use/cover information. Moreover, the results of this study are important in aiding efforts to reconstruct the Jaffna Peninsula after decades of physical and socioeconomic devastation.

Keywords: Armed conflict, Spatial metrics, Jaffna Peninsula, Land use/Land cover change, Remote sensing

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