

Monitoring of Land Use Changes Using Remote Sensing and GIS, A Case Study in Kandy Divisional Secretariat

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Abstract

Multi-temporal satellite imageries help in understanding land use dynamics. The study illustrates the spatial-temporal dynamics of land use and land cover of Kandy Divisional Secretariat Division (DSD). Understanding and quantifying the spatial temporal dynamics of urban land use and land cover changes and its driving factors is essential to put forward the right policies and monitoring mechanisms on urban growth for decision making. Main objective of the study was to analyze land use and land cover changes in Kandy DSD by integrating remote sensing and GIS techniques for the period of 2000 - 2015. In order to achieve this, Landsat satellite imageries of three different time periods were acquired and quantify the changes in the Kandy DSD from 2000 to 2015. The images of the study area were categorized into four different classes namely water bodies, dense forests, built up areas and other. The Maximum Likelihood Algorithm of Supervised Classification has been used to generate land use and land cover maps. For the accuracy of classified land use and land cover maps, an error matrix was used to derive overall accuracy. The results of this study have shown that from 2000 to 2015, the rate of dense forest area has massively declined by 14.44 km² (24.54%) and the built-up area has increased by 9.28 km² (15.81 %). In addition to that, water area has increased by 0.14 km² (0.25%) during this period. Category of other has increased by 4.96 km² (8.48%) which includes mixed forest lands, scrubs, home gardens, other crop fields etc. The overall accuracy performed in this study was identified as 88%, 87% and 90% for year 2000, 2007 and 2015 respectively. These changes were mainly attributed by the increase of population associated with high demand for urban development as well as unplanned urban expansion. GIS based land use models have high potential as a tool in land use and land cover change studies. But using high resolution imageries such as IKONOS and Quick Bird are essential in generating good quality land cover maps. For optimum utilization of rare land resource, national policy should be enacted which is directed towards sustainable development not only in Kandy DSD but also in the country.

Keywords: *Land use, Land cover, GIS, Remote Sensing, Dynamics*