Land use and land cover change in Vientiane area, Lao PDR using Object-Oriented classification on multitemporal landsat data

Abstract

Monitoring of land use and land cover change using remote sensing is important to evaluate the impacts of anthropogenic activities on the environment. Digital change detection using post-classification can help to elucidate dynamics of landscape change. This study illustrates the effectiveness of object-oriented classification compared to pixel-oriented classification in generating land cover information and its temporal changes. Spatio-temporal dynamics of land cover types in Vientiane area, Lao PDR were analyzed using Landsat images in two-time series (1990 and 2015). We used the top-down approach to classify the Landsat images in iterative steps with three hierarchical scale levels. Scale levels of 25, 10 and 5 with different weighting parameters were used to map the land cover type of Vientiane in 1990 and 2015. With object-oriented classification, overall accuracy and Kappa statistic were improved by 13.44% and 0.16 for land cover classification (LCC) 1990. For LCC 2015, the improvements in overall accuracy and Kappa statistic were 28.71% and 0.25. Based on the LCC 1990 and 2015, we observed an significant growth of plantation areas over the 25 years in the study area . Instead of traditional agricultural activity, the plantation seemed to be the new driver in the rural areas of Lao PDR. The object-oriented classification approach can be applied in other areas of Lao PDR to generate accurate information on land cover changes for better land resource management.