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Assessing Forest Cover Dynamics in Vavuniya District: Using Freely Available Satellite Images

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Abstract

Vavuniya District has 1,238 km² of wildness. Increasing population and development activities after the civil war influence disturbance on forest cover in the Vavuniya District. Understanding forest dynamics is important to sustain forest conservation and future development activities. Forest fragmentation coupled with land-use/land-cover (LULC) change analysis can be used to assessing the nature and extent of forest cover loss. There are numerous kinds of different satellite images are available for forest cover change assessment. Among them freely available images was utilized to study forest cover change in Vavuniya District from 2001 to 2018. Three images from Multi-temporal Landsat ETM2001, TM2008, and OLI/TIRS2018 were used for this study. Up to 250 training samples were used in maximum likelihood classification to create LULC maps in ArcGIS 10.2 using change detection analysis. Using the ArcGIS Landscape fragmentation tool (LFT v2.0) forest fragmentation maps were produced. From that, fragmentation patterns and status were analyzed. Conversions of land from dense forest cover and open forest/scrubland to agriculture and settlements area represent the most noticeable land-use change from 2001 to 2018 in the Vavuniya District. The overall annual rate of change in dense forest cover and the open forest is to be 0.03% and 0.06% respectively. The forest fragmentation analysis shows that a large core forest has decreased and patch and edge forest has increased during the period. The overall results showed that the increasing settlements and agricultural activities are the main causes of loss of forest and fragmentation of forest in the Vavuniya District.

Keywords: Land-use change, Land-cover change, Forest fragmentation, Landsat images, Vavuniya district