Capability of integrated MODIS imagery and ALOS for oil palm, rubber and forest areas mapping in tropical forest regions

ABSTRACT

Various classification methods have been applied for low resolution of the entire Earth's surface from recorded satellite images, but insufficient study has determined which method, for which satellite data, is economically viable for tropical forest land use mapping. This study employed Iterative Self Organizing Data Analysis Techniques (ISODATA) and K-Means classification techniques to classified Moderate Resolution Imaging Spectroradiometer (MODIS) Surface Reflectance satellite image into forests, oil palm groves, rubber plantations, mixed horticulture, mixed oil palm and rubber and mixed forest and rubber. Even though frequent cloud cover has been a challenge for mapping tropical forests, our MODIS land use classification map found that 2008 ISODATA-1 performed well with overall accuracy of 94%, with the highest Producer's Accuracy of Forest with 86%, and were consistent with MODIS Land Cover 2008 (MOD12Q1), respectively. The MODIS land use classification was able to distinguish young oil palm groves from open areas, rubber and mature oil palm plantations, on the Advanced Land Observing Satellite (ALOS) map, whereas rubber was more easily distinguished from an open area than from mixed rubber and forest. This study provides insight on the potential for integrating regional databases and temporal MODIS data, in order to map land use in tropical forest regions.

Keyword: Accuracy mapping; Forest; Oil palm; Rubber; Tropical regions; ALOS; MODIS