Application of Remote Sensing in Evaluation of Vegetation Change for Sustainable Development

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Abstract

Sustainable forest management has become the primary goal of forestry institutions worldwide, as it involves managing forests to achieve production of continuous flow of services without excessive reduction of their future productivity. One of the significant initiatives for sustainable forest management is assessing forest change. In this paper a case study in semi arid forest (El Rawashda forest reserve, Gedaref State, Sudan) serves as a research site where a comprehensive coverage affords an evaluation of the vegetation change. Gedaref State lies in the zone of low rainfall woodland savannah on clay. El Rawashda forest is located near the transition between two main vegetation types of low-rainfall woodland savannah on clay: *Acacia mellifera* thorn land and *Acacia seyal-Balanites aegyptiaca* woodland.

Multi-temporal Landsat ETM+ and Aster data acquired during early dry season in 2000 and 2006 have been used for classification and mapping land cover. Training data were selected in easily identifiable areas of the following four classes: grassland, close forest, open forest and bare land. Following classification of imagery from the individual years, a post-classification, approach of subtracting the classification maps 2000 and 2006, was applied. An advantage of this approach is that it provides "from-to" change information. As part of our analysis we have compared area estimates from the Landsat classifications with aster classification. In our research, the potential to derive indicators of sustainable resource use from satellite remote sensing is discussed. Particular attention focuses on indicators related to land cover condition and type in semi-arid forest environments. This includes quantitative and qualitative assessment of forest cover change as well as the impacts of human and other biophysical factors on the forest. Each of these issues is discussed with emphasis on the potential to increase the level of information extraction beyond that derived with conventional approaches in order to obtain more usefull information for sustainable development practices.

Keywords: Forest change, remote sensing, sustainable development

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