



Assessment of land cover changes in Lake Olbolossat region of the Central Kenyan highlands using Landsat satellite imagery

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ABSTRACT

The region around Lake Olbolossat located in the central Kenyan highlands has witnessed significant land-use changes, which are today believed to be major cause of the dwindling Lake volumes. Very few studies have been carried out in the region due to limited observed in-situ data important for monitoring purposes. It is thus urgent that contemporary cost effective techniques are explored to assess the space and time land cover changes with a view to provide information required for appropriate land and water resource management. In this preliminary study, the land cover changes around Lake Olbolossat region were investigated using remotely sensed data obtained from Landsat satellites. Two imageries for 1989 and 2010 when significant changes were witnessed in the area were selected for the study. The maximum-Likelihood function of the supervised classification technique was applied to classify and discern the changes. Five predominant land cover classes that included forest land, built-up area, water body, flood plain and farmland were selected for the study. From the results obtained, the area of the Lake (water body) was noted to have shrunk significantly by 68%. Farmlands in the region were noted to have increased by about 31% largely due to the favorable humid climatic conditions for commercial and subsistence agriculture. The study also revealed that built-up areas increased by about 33% consequent of the rise in the human population. The flood plain area was noted to have reduced by about 26% as most of the area were gradually been turned to farmland. The study also revealed intense deforestation in the upstream Aberdare forest, which was noted to have reduced in area by about 30% during the study period. In general, the study revealed significant land cover changes worth provoking the need for a better land-use planning system to avoid further decline and extinction of Lake Olbolossat.

Keywords: Lake Olbolossat; Landsat satellite; Maximum-Likelihood; Supervised classification.