

ABSTRACT

Spatio-Temporal Dynamics of Land Use and Land Cover in Elgeyo Escarpment, Kenya

R. Kanda, C. Sang and S. Letema

The Elgeyo Escarpment has undergone land use and land cover (LULC) changes over the last five decades. However, past LULC change assessments focused on forests and river basins and little on LULC changes and their drivers in the escarpment. This paper, therefore assesses spatio-temporal dynamics of LULC and their drivers. Satellite images were analyzed to assess LULC changes using remote sensing and geographical information system (GIS) techniques; and validated using ground-truthing. Structured questionnaires were administered to 180 household heads, eight focus group discussions and key informant interviews conducted to determine LULC change drivers. The survey participants were over fifty-five years of age, to provide historical LULC change trends. The images were pre-processed and classified using the maximum likelihood algorithm in Environment for visualizing images (ENVI), with images overall classification accuracies being over 70%. The results indicate LULC conversions varied in trends and magnitude. Between 1995 and 2014, grassland and shrubland decreased by 78.15% and 24.41%, respectively. Conversely forest, built-up and cropland gained by 411.82%, 200.95% and 13.62%, respectively. In 2014- 2020, forest cover increased by 63% while grassland, built-up, shrubland and cropland decreased by 79.69%, 39.14%, 21.57% and 11.80%, respectively. Overall, forest, built-up and cropland gained while shrubland and grassland decreased. Notably, forest gained by 734.52% while shrubland decreased by 40.72%. Population growth is the primary LULC driver triggering increased demand for food (88.9%), settlements (52.2%) besides cattle rustling (44.4%) and forest evictions. Periodic LULC assessments are crucial to guide policies and guidelines formulation for the sustainable management of the escarpment.

Keywords: Escarpment, land use/cover change, degradation, Landsat, remote sensing