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Spatio-Temporal Analysis of Land Use Land Cover Change in East Pokot, Kenya

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Abstract

Multispectral Landsat surface reflectance products at 30 m spatial resolution from Landsat 4/5 Thematic Mapper, Landsat 7 Enhanced Thematic Mapper Plus and Landsat 8 Optical Land Imager were classified to five classes i.e. water, maize fields, bare soil, dense shrubs and trees and shrub savanna using random forest algorithm for the years 1985, 1990, 1995, 2000, 2005, 2010, 2015 with overall accuracy of 91.38 %, 92.48 %, 90.68 %, 88.59 %, 89.68 %, 87.11 % and 87.55 %, respectively. Analysis of the land use land cover change (LULC) revealed the spatial trend of maize cultivation. There is around sevenfold increase in maize fields in last 30 years, from 1104.21 ha in 1985 to 8176.14 ha in 2015, signifying that this region is gaining agricultural dependency esp. in maize for food security. Apart from East Pokot counties near Baringo Lake, the new counties in East Pokot near Turkana are identified as new area for maize cultivation. The expansion of maize cultivation is attributed to the intervention of the government of Kenya and development partners to promote food security along with the resolution of the armed conflict in the region. The region is also experiencing bush encroachment over the last 30 years which coined the decrease in availability of shrub savanna and grazing grassland for the pastoralism. These results will definitely assist planners and development workers to a long-term portrait of the rangeland pastoral LULC allowing mobile grazing pastoralism with balanced agriculture extension ultimately conserving the historical culture of East Pokot. The study also showed a significant positive relationship between spectral reflectance and tasselled cap components greenness, wetness and dryness, indicating the remote sensing offers trustworthy resource assessment and monitoring options for informing, planning and interventions in semi-arid regions.

Keywords: Land use land cover change, maize, rangeland pastoral grazing resource trend, tasseled cap

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