

ABSTRACT

Influence of Land Use Land Cover Changes on Soil Erosion in Elgeyo Escarpment, Kenya

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Land use land cover changes (LULC) are known to cause land degradation in various forms including soil erosion. The Elgeyo Escarpment is within the Kenya's Rift Valley, a mountainous section with rugged terrain and receives fairly high rainfall. These factors, coupled with unsustainable LULC changes, make the escarpment prone to soil erosion challenges. Despite this vulnerability, information on soil loss is scanty. This paper evaluates the impact of LULC changes on soil erosion occurrence in the Elgeyo Escarpment between 1995 and 2020. Revised Universal Soil Loss Equation model, remote sensing and ground truths were used. The results revealed that the average intolerable soil erosion rates were 14.0 t/ha/yr and 18.76 t/ha/yr in 1995 and 2020, respectively. Scrubland, cropland, grassland, forest and built-up areas contributed 67.1%, 20.1%, 7.8%, 4.8% and 0.2%, respectively of the total soil loss in 1995. By 2020, the contributions of shrubland and forest to erosion had dramatically declined to 39.8% and increased to 39.4%, respectively. Cropland, shrub/grassland and built-up areas contributed 20.2%, 0.3% and 0.3%, respectively. The highest rates of soil erosion occurred in built-up areas converted from shrub/ grassland (1.04 t/ha) followed by cropland converted from forest (0.59 t/ha). Soil erosion rate increased with increased slope angle owing to high velocity and runoff erosivity, with areas having slope >300 experiencing the highest rate (1225 t/ha/y). Therefore, there is need to review land use and soil conservation practices to ensure sustainable management of the escarpment.

Keywords: soil erosion, erodibility, erosivity, RUSLE, Elgeyo escarpment, land use land cover