

Distribution of soil erosion sensitive area in Guna-Tana watershed, Blue Nile, Basin Ethiopia.

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Abstract

The main objective of this study was to identify the most vulnerable areas to soil erosion in Guna-Tana watershed, Blue Nile basin; Ethiopia by using the Geographic Information System based decision support system use that of multi-criteria evaluation (MCE). This study focus on the identification of soil erosion-prone areas in Guna-Tana watershed (area: 3528 sq km), which drains overall catchment to Lake Tana. Using the MCE analysis, an attempt was made to combine a set of factors (land use, soil, slope, Rainfall, altitude, and TWI) to make a decision according to the stated objective. Raster-based pairwise comparison methods considering six soil erosion driving parameters have been done in ArcGIS 10.3 environments. MCE is used to quantify the raster-based qualitative spatial erosion vulnerable model produced through pairwise comparison. Raster-based spatial model reveals that out of total watershed area, 202.84 sq km (5.75%), 227.65sq km (6.45%), 1091.02sq km (30.93%), 1681.99sq km (47.68%) and 324.03sq km (9.19%) areas are extremely sensitive, Highly sensitive, Moderately sensitive, Marginally sensitive and Less sensitive prone to soil erosion respectively. The results of this research can help decision-makers and policy-makers identify the "hotspots" of soil erosion and the relevant soil and water conservation measures.

Keywords: Soil erosion; Guna-Tana watershed; MCE; GIS; Pairwise comparison; Ethiopia

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