

Predicting soil erosion by water: RUSLE Application for Soil Conservation planning in Central Rift Valley of Ethiopia

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Abstract

In Ethiopia, research on soil erosion assessment has largely focused in its cereal crop dominated subtropical and temperate highlands. This study is almost unique since it has been carried in the semiarid and arid lowland areas of pastoral economic belts of Ethiopia where little research attention has been given. The RUSLE model is employed to estimate soil erosion rates in the pastoral and agro-pastoral semiarid lowland of the Afar region, Ethiopia. The RUSLE parameters were acquired from meteorological, soil and satellite image data, group discussions and field observation. The result showed that mean annual soil loss rates varied from 0.5 on flatter slopes to slightly over 20 t ha⁻¹ yr⁻¹ on poorly vegetated areas. The study area was classified into very high (>20 t ha⁻¹ yr⁻¹), high (10- 20 t ha⁻¹ yr⁻¹), medium (1 –10 t ha⁻¹ yr⁻¹), low (0.5 – 1 t ha⁻¹ yr⁻¹) and very low (0-0.5) erosion risk categories. Areas with high (10 to 20 t ha⁻¹ yr⁻¹) and very high (>20 t ha⁻¹ yr⁻¹) erosion risk parts of the study site need to be prioritized for land management interventions. Areas which require immediate land management account about 22.06% (473.9m km²) of the study area. The severity of soil erosion was largely linked to high soil erodibility, poor vegetation cover and lack of effective conservation practices. Therefore, improving soil erodibility, vegetation cover and implementing locally suitable soil and water conservation technologies are recommended.

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