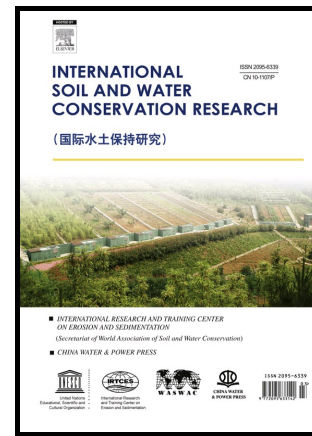


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Modelling the Impacts of Structural Conservation Measures on Sediment and Water Yield in Thika-Chania Catchment, Kenya

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Abstract

Recently, there have been a growing need to implement soil and water conservation measures in order to control sediment and water yield from agricultural areas. The objective of this study was to use a modelling approach to evaluate the impacts of structural conservation measures on water and sediment yield from Thika-Chania catchment in Central Kenya. SWAT model was calibrated and validated for stream flow and sediment yield at selected gauging station in the catchment. The calibrated model was run to create a base scenario for the simulation structural conservation methods i.e. terraces and grassed waterways. Model simulation results indicated that terraces and grassed waterways would significantly impact on water and sediment yield at the catchment outlet. Terraces were found to provide the greatest reduction in sediment yield by 80.7% from the baseline scenario while grassed waterways reduced sediment yield by 53.90%. Terraces indicated a reduction in surface runoff by 30.25% from the base annual average value of 202.28 mm. This was attributed to the increased infiltration that was indicated by increase in base flow by 8.35%. However, grassed waterways did not indicate any significant reduction in water yield. The results of this study show that structural conservation measures could reduce sediment yield from cultivated areas by more than 50% at the sub-catchment level. Results also indicated that the effectiveness of structural conservation measures can be increased by implementing more than one method. Structural conservation measures studied in the current study were found to have a positive impact in controlling water and sediment yield in the catchment. However, further studies need to be conducted to evaluate the costs and benefits of implementing them at small scale level.

Keywords: Terraces, grassed waterways, SWAT, conservation measures, sediment yield

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