

EFFECTS OF INCREASED LAND USE CHANGES ON RUNOFF AND SEDIMENT YIELD IN THE UPPER RIVER NZOIA CATCHMENT

ABSTRACT

Managing a watershed is vital to the protection of drinking water, recreational opportunities, and river ecosystem health. However, the effect of land use changes and management practices on rivers is often difficult and unmeasured. With increased anthropogenic activities, land cover has continuously altered. The above scenario has resulted to increased quantity of physical parameters in river water among them, suspended sediments, higher turbidity, colour among others especially during rainy season. This study looks at the current state of the upper river Nzoia catchment in Kenya in terms of sediments and run runoff, compares with past cases, simulates future scenarios and proposes the best approach in mitigating the quantities of sediment load in Nzoia River. The study will as well determine in particular the relationship between the catchment practices and sediment yield and likely future scenarios. The data to be used in this study include: (a) Meteorological data from Kenya Meteorological Department as well as volunteer weather stations within the catchment (b) Stream flow data from the Ministry of Water, environment and natural resources (Water Resources Management Authority), (c) land cover generated from Landsat satellite imagery, Graphical Constituent Loading Analysis System and processed using ENVI 4.7 software (d) soil map from Kenya Soil and Terrain database. The study shall use Arc-GIS 10.1 to develop and process the Digital Elevation Model prior to use. Soil Water Assessment Tool (SWAT 2012) which is an extension of Arc-GIS 10.1 shall be used to carry out modeling and simulation exercises. Expected results include, Calibrated SWAT model for upper Nzoia river catchments, Different Runoff flow regimes of the river Nzoia based on land use changes with varied sediments graphs and correlation between the sediment loading and rainfall with given different land cover scenarios. The research will be handy in policy formulation as far as protecting the quality of raw water in rivers within the basin is concerned.

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