

Abstract

Human interference in the upper River Njoro catchment has led to the increased exposure of the land to accelerated erosion. An application that combined the capabilities of remote sensing, geographic information system (GIS) and agricultural non-point source (AgNPS) model was used to estimate peak runoff rate and sediment yield from the upper River Njoro catchment. Remotely sensed Landsat Thematic Mapper (TM) images were used to obtain land cover and associated AgNPS model input parameters. Other input parameters for the model were extracted from GIS layers using the agricultural non-point source-integrated land and water information system (AgNPS-ILWIS) interface. Surface water quantity and quality data including peak runoff and sediment yield of selected storm events were obtained from two gauging stations, within the catchment. Base flow separation was done so that measured direct peak runoff rate and sediment yield generated by direct runoff could be determined and compared directly with the model simulated results. Simulated peak runoff rates in Upstream (Treetop) station were satisfactory with an EFF of 0.78 and a percent error of 4.1%. The sediment yield was also reasonably estimated with an EFF of 0.88 and a 2% error. The downstream (Egerton) station results were also satisfactorily predicted with peak runoff rate having an EFF of 0.69 and a 5.5% error of estimates, while the estimated sediment yield had an EFF of 0.86 and a 2.5% error.