

Abstract

Turkwel reservoir is a Hydro-electric power plant that serves to be the second largest after Masinga Hydro-electric power plant. The design storage capacity of Turkwel reservoir has been reducing over the years and the main reason attributed to this reduction is the sedimentation of loose aggregates of soil particles that are detached due to erosion and transported downstream by stream networks that drain into the Turkwel reservoir. Therefore, this study was undertaken mainly to determine land cover change trend within the Turkwel catchment area, erosion and deposition hotspot areas within the catchment area.

Erosion and deposition processes were performed using Unit Stream Power Erosion and Deposition Model (USPED) to identify spatial and temporal trends of erosion and deposition rates within the catchment area of the reservoir. The quantity of soil that gets deposited on the Turkwel reservoir annually was then determined for 2001, 2009 and 2017. The study results depicted a continuous increase in the quantity of soil particles that ends up in the Turkwel reservoir annually by 13.80 tonnes, 14.73 tonnes and 15.11 tonnes for 2001, 2009 and 2017 respectively. From the study, it can be concluded that the quantity of soil that reached the reservoir after the process of soil erosion and deposition increased by 0.73 tonnes between 2001 and 2009 and increased by 0.38 tonnes between 2009 and 2017. Recommendation drawn from the above study is that KENGEN should construct smaller terraces on the upstream areas of the reservoir catchment area to act as soil collection structures thus reducing the amount of soil that gets deposited into the reservoir.