

ANALYSIS OF SOIL EROSION SEVERITIES IN FORESTED, SEMI-FORESTED, AND BARE LAND IN THE CATCHMENT OF PROPOSED LOWER *MALWATHU OYA* RESERVOIR

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Soil erosion often leads to siltation and a reduction in the capacity of reservoirs. A comprehensive study of soil erosion is vital to assess erosion rates across different land uses within the catchment area of the proposed lower *Malwathu Oya* reservoir. This study covered the most abundant land uses: bare lands, semi-forested, and forested areas within the catchment. The runoff plots with a dimension of 1.2 m × 3 m (3.6 m² plot sizes) were constructed with two replicates for each land use. A calibrated rain gauge was also installed to measure the rainfall. The experimental design used was a completely randomized block design. Sediment and runoff data of seven rainfall events were collected, from 30/11/2023 to 01/01/2024. The data were statistically analysed by Generalized Linear Model (GLM), and mean separation through the Least Significant Difference test (LSD). Results revealed a significant difference ($p < 0.05$) in soil erosion rates among the three land uses. The highest rate of soil erosion was observed in bare land ($12.098 \pm 0.95 \text{ t ha}^{-1} \text{ yr}^{-1}$), followed by semi-forest ($8.438 \pm 0.55 \text{ t ha}^{-1} \text{ yr}^{-1}$), and the lowest was in the forested land use ($3.113 \pm 0.09 \text{ t ha}^{-1} \text{ yr}^{-1}$). Significantly (0.05) higher runoff rates were observed in both bare land ($7351.57 \pm 863.37 \text{ m}^3 \text{ ha}^{-1} \text{ yr}^{-1}$) and semi-forest ($5927.79 \pm 566.75 \text{ m}^3 \text{ ha}^{-1} \text{ yr}^{-1}$) than in forested land use ($2539.91 \pm 276.86 \text{ m}^3 \text{ ha}^{-1} \text{ yr}^{-1}$). Even in the absence of a significant difference in runoff between bare land and semi-forest, a higher soil erosion rate is still shown by bare land. The results highlight the pivotal role of vegetation cover in reducing erosional processes, emphasizing recommendations for afforestation initiatives and erosion control measures, particularly in bare land areas of the proposed *Malwathu Oya* reservoir.

Keywords: Runoff, Runoff plots, Soil erosion, Vegetation cover