

A case study in Kalatuwawa Catchment Area on soil erosion using Caesium – 137S M A Wasantha Anuruddha^{1*}, R Hewamanna² and W N Wilson³¹*National Science Foundation, Maitland Place, Colombo 7*²*Department of Nuclear Science, Faculty of Science, University of Colombo, Colombo 3*³*Department of Geography, Faculty of Arts, University of Colombo, Colombo 3*

Water is a powerful eroding force in tropical countries. Siltation is a major problem associated with erosion contributing to a reduction of the reservoir water storage capacity which shortens the lifetime and increases the maintenance cost of dams. The objective of this study was to use environmental ¹³⁷Cs radioisotope tracer present in the soil due to radioactive fallout to study erosion in the Kalatuwawa Catchment area.

¹³⁷Caesium activity in a soil sample when compared to activity in a reference soil site is an indication of soil erosion or deposition. The fallout radionuclide ¹³⁷Cs in soil has been widely used to investigate the rates and patterns of soil erosion and sediment deposition. Depth incremental soil samples were collected at eight different points along two directly opposite slopes in the Kalatuwawa Catchment area. The ¹³⁷Cs content in the soil was measured using high resolution gamma ray spectrometry.

The ¹³⁷Cs activities of the top soil layers (00-05 cm) of the first and second reference sites are 17.6 Bq kg⁻¹ and 18.9 Bq kg⁻¹ respectively. ¹³⁷Cs activities of the top soil layers in site one on both slopes were 28.8 Bq kg⁻¹ and 25.1 Bq kg⁻¹ suggesting that erosion has occurred. Erosion is intensive on the top soil layers (00-05 cm) compared to the bottom layers (15-20 cm) in both slopes. It was physically observed that the erosion is more of the gully type than sheets and rills. Further, it was noted that the natural rock layer formed along the bank as a barrier prevents soil erosion/washing off soil to the reservoir. Slope two shows greater erosion than slope one in respect to the ¹³⁷Cs measured in three of the sites studied. It was also observed that the slope angle does not have an effect on the erosion in both slopes. Although the soil loss could not be quantified in this study, it demonstrates the applicability of the ¹³⁷Cs technique to study soil loss and redistribution.

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