

**ASSESSMENT OF SOIL EROSION IN DIFFERENT LAND USES AND  
ITS RELATIONSHIP WITH SOIL CHEMICAL PROPERTIES IN  
KURUWITA AND RANDENIGALA CATCHMENTS**

**W.W.M.C.S.B. Wijesundara<sup>1</sup>, A.G. Chandrapala<sup>2</sup>, R.A.A.S. Rathnayaka<sup>1</sup>  
and D.M.S. Duminda<sup>1</sup>**

*<sup>1</sup>Department of Agricultural Engineering and Soil Science, Faculty of  
Agriculture, Rajarata University of Sri Lanka, Anuradhapura, Sri Lanka.*

*<sup>2</sup>Natural Resource Management Centre, Department of Agriculture  
Peradeniya, Kandy, Sri Lanka.*

Accurate assessment of soil erosion is very important for sustainable land management. Fallout Radio Nucleotide (FRN) technique is widely used for estimation of soil erosion. However, applicability of this technique for Sri Lanka was rarely investigated. This study was conducted to quantify the rate of soil erosion using FRN technique in Kuruwita (WL1a) and Randenigala catchments (IM1b) of Sri Lanka. The study further investigated the relationship between soil chemical properties and soil erosion in the selected catchments. Four land uses were identified in Kuruwita (Natural Forest, Tea, Rubber and Paddy) and Randenigala (Natural forest, Plantation forest, shifting cultivation and Home garden). Nine soil samples (0 – 40 cm) were collected from each land use in three parallel transects and analyzed for both radio-isotopes of <sup>137</sup>Cs and <sup>210</sup>Pb activities using Gamma detector. Radioactivity values were converted to soil erosion/deposition values using mass balance II model. Soil samples were also tested for chemical properties such as pH, EC, available P, exchangeable K and organic matter. Post-hoc mean separation procedure was implemented to identify the differences ( $p < 0.05$ ) in soil erosion estimates and chemical properties among catchments, slope positions and land uses. The highest soil erosion was observed in tea lands ( $10.64 \text{ tha}^{-1}\text{yr}^{-1}$ ) in Kuruwita site and sediment deposition was observed in paddy soils. In Randenigala catchment, shifting cultivation fields recorded the highest soil erosion ( $50.58 \text{ tha}^{-1}\text{yr}^{-1}$ ). Conversely, the lowest soil erosion and optimum nutrients availability were observed in natural forests in both Randenigala and Kuruwita catchments. The nutrient availability showed a negative relationship with soil erosion in land uses unaffected by chemical fertilization. The study revealed that soil erosion of a given land is highly dependent on rainfall, land use type and the slope. Results conclude the occurrence of higher rate of soil erosion in shifting cultivated and tea lands among the tested land uses which have been highly influenced by human activities in both kuruwita and Randenigala catchments.

**Keywords:** Fallout radionuclides technology, Nutrients availability, Soil erosion