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VERIFICATION OF RUSLE MODEL FOR SRI LANKA: A GIS BASED CASE STUDY IN UPPER MAHAWELI CATCHMENT

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Erosion is a natural process of continual removal and transportation of soil, rock fragments, and ions from one location to another. However, in the last few centuries, it has greatly accelerated in many parts of the world due to human activities. Therefore, continuous monitoring of soil erosion rates is needed to determine suitable conservation methods. Soil erosion rates are estimated through conventional methods or empirical modelling. The empirical modeling is a popular technique for estimating soil erosion rates because field-based measurements are time consuming and costly. This study focuses on assessing the soil erosion risk in Upper Mahaweli Catchment (UMC) using the RUSLE Model, and evaluate the applicability of the model and GIS based methodology as a robust tool for determining the erosion rates. Soil erosion rates were estimated for six sub-catchments of the UMC using the RUSLE Model and GIS as a tool. The estimated erosion rates were compared with the same estimated using the river load data monitored by the Mahaweli Authority of Sri Lanka for the six sub catchments. A Digital Elevation Model was developed for the study area to derive topographic factors, while the other factors of the model were calculated using GIS on secondary data such as rainfall, land use, and soil maps. The model estimated erosion rates ranged from 250 to 800 t km^{-2} y^{-1}. The erosion rates for the six-sub catchments computed from measured river-load gauging data were between 130 and 2100 t km^{-2} y^{-1}. Importantly, the erosion rates predicted by the model tallied with the field-based erosion rates estimated using river-load data, within the uncertainties of both methods. Therefore, it is concluded that the RUSLE Model and the GIS methodology used in this study can be readily applied to infer erosion rates in catchments of Sri Lanka where soil erosion is an acute problem.

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