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GIS-BASED SOIL EROSION VULNERABILITY MAPPING IN WELIMADA DIVISIONAL SECRETARIAT IN SRI LANKA

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Soil erosion is a major environmental issue in watersheds in Sri Lanka. It is a severe problem in the up and mid-country with steep slopes, high-intensity rainfall, and unplanned land uses to reduce soil nutrients. Soil erosion is a particular concern in the hill country where the watersheds of major rivers are located. Welimada Divisional Secretariat is in Welimada electorate in Badulla District of Uva Province. Mountains are around in this part of the country, and 70% of the population, which counts 100,365 are living in agriculture. The objective of this case study is to develop a soil erosion vulnerability map for Welimada DSD, Sri Lanka. The main causative factor for soil erosion is rainwater runoff. Apart from that, some anthropogenic activities also affect soil erosion. Soil loss was estimated using the Revised Universal Soil Loss Equation (RUSLE) model. Digital Elevation Model, land use map, soil map, and rainfall data were used to create the soil erosion vulnerability map. Collected data were analyzed using GIS. Based on this study, Welimada DSD was classified into three soil erosion hazard classes as low ($0 \leq 25$ t ha^{-1} yr^{-1}), moderate (>25-50 t ha^{-1} yr^{-1}), and high soil erosion (<50-161.10 t ha^{-1} yr^{-1}). The 45.5% area of Welimada DSD falls into the low soil erosion hazard category, while 41.0 and 13.5% area of Welimada DSD fall into moderate and high soil erosion hazard categories, respectively. The annual mean average soil loss in Welimada DSD was estimated as 32.81 t ha^{-1} yr^{-1}. Moderate and highly eroded areas in the Welimada area are prone to high soil erosion. Steep topographic features, poor vegetation cover and poor land management practices, and high rainfall rate may contribute to the high erosion. Those lands require soil conservation measures and regular maintenance to prevent further soil erosion that can lead to agricultural yield reduction.

Keywords: Erosion hazard classes, GIS, RUSLE model, Soil erosion, Welimada DSD