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Soil Loss Estimation from Kelani River Catchment, Sri Lanka

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Abstract

Soil erosion from land surfaces is a major problem worldwide including Sri Lanka, especially in the Kelani river catchment. Kelani river basin is home to around 25% of the Sri Lankan population. The river is primary source of drinking water to over 4 million people living in the capital city - greater Colombo and over 10,000 industries and businesses depend on the natural resources and services provided by the basin. The land of Kelani river catchment is 2,342.05 km² of this area 1,211.67 km² used for agricultural purposes including rubber, tea and paddy and for the home gardens 390.29 km² have been used. Another 269.38 km² are occupied for forest cover together with lowland rainforests, sub-montane forests and montane forests. In addition, 24.04 km² are covered with streams and rivers. To address these issues proper understating of soil erosion from the catchment is a vital requirement. Therefore, a study was conducted with the objective of estimating the soil erosion from the Kelani river watershed using universal soil loss equation (USLE). ArcGIS 10.2.2 commercial software was used to calculate the soil loss from the catchment. The results indicate that the average soil loss ranges between 0 to 715-ton ha⁻¹, which is considerably high soil loss from the catchment. Average soil loss is highest in urbanized areas (715-ton ha⁻¹) due to increases of the slope length factor and the lowest soil loss were found in the forested areas (0-ton ha⁻¹). The soil loss from agricultural areas (481-ton ha⁻¹), had average soil loss. Therefore, immediate soil erosion control measures must be applied to the residential areas. Also, sustainable development strategies should give major consideration for soil conservation. Since, the forested areas have the lowest erosion rates, forest cover in the upper catchments must be protected and expansion of the forests must be promoted. Therefore, this study concludes, estimation and modeling of soil erosion from the Kelani river catchment is an important tool for development of environment conservation and management plans with in the catchment.

Keywords: Catchment, GIS, Kelani River, Soil loss USLE