Socio-economic Risk Assessment of Soil Erosion Integrating GIS to Universal Soil Loss Equation; A Case Study from Nillambe Catchment, Kandy

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Soil erosion is a widespread problem in Nillambe catchment which accommodates a population that is mainly based on agriculture. Consequently, it is important to identify the socio-economic risk in the area in order to carryout necessary mitigation measures to minimize the potential risk. This study attempts to categorize socio-economic risk levels of soil erosion. Based on Universal Soil Loss Equation (USLE), geo-spatial input data representing rainfall, soils, land slopes and land use were used to model soil erosion hazard. A selected set of socio-economic vulnerability and coping capacity indicator variables were spatially modeled based on AHP (Analytical Hierarchical Process) and the outcomes of hazard, vulnerability and coping capacity measurements were further modeled using GIS based Disaster Risk Equation to obtain the socio-economic risk index for Nillambe catchment. The study revealed that approximately 25% of the catchment is in moderate to extremely high socio-economic risk to soil erosion. Furthermore, it indicates that the majority of such lands are covered with moderately managed tea and a slope greater than 10% (slope of the catchment varies between 0 - 36 degrees) with a moderately high rainfall erosivity level between 16 - 27. The maps identifying the socio-economic vulnerability, coping capacity and the risk levels to soil erosion can be utilized to identify areas with different vulnerabilities and coping capacities to promote necessary mitigation actions and strengthen socio-economic capacities of the community involved which would eventually minimize the socio-economic risk for soil erosion in the area.

Keywords: Soil erosion; Socio-economic risk, Socio-economic vulnerability, Universal Soil Loss Equation, Socio-economic capacity, GIS mapping, Analytical Hierarchical Process