Surface Soil Erosion Potential of Mt. Makiling Forest Reserve Using Revised Universal Soil Loss Equation (RUSLE)

Marjorae T. Ignacio[1]

[1] College of Forestry and Natural Resources, University of the Philippines Los Baños, College Laguna, 4031

Corresponding Author: marjoraeignacio@gmail.com

ABSTRACT

Surface soil erosion occurs when the surface layer of the soil is detached, transported, and deposited to a new location. It affects the long-term sustainability of the soil in particular and of the natural and managed ecosystems in general. Tropical countries such as the Philippines are susceptible to erosion because of steep topography, deforested uplands, soil structure, and climatic conditions. The study aims to estimate and map the surface soil erosion potential and to determine erosion potential hotspots in Mt. Makiling Forest Reserve (MMFR). Determining soil erosion potential in the MMFR will aid in identifying priority areas for protection and conservation to minimize damages due to excessive surface soil erosion. To achieve this, rainfall, soil data, digital elevation model for topography factor, satellite image, and land-use map were integrated into ArcGIS and used as inputs to the Revised Universal Soil Loss Equation (RUSLE) formula: A= R x K x LS x C x P. The RUSLE model predicts long-term averages and provides estimation in large areas of erosion based on rainfall patterns, soil type, topography, and management practices. The annual soil loss of MMFR range from 0 to 948.4 tons/ha/yr with a mean of 9.9 tons/ha/yr. It shows the severity levels of erosion risks at the forest reserve: none to slight (68.36%), moderate (20.48%), high (8.57%), very high (1.96%), severe (0.40%) and very severe of about (0.23%). The none to slight category of potential surface soil erosion covers the largest area of about 2,971.7 ha of the study area. Results showed that the area with severe soil erosion potential minimally covers about 9.9 ha only and was observed in Sipit Subwatershed. The study also indicated that cover management and topographic feature contributed the most among all factors of surface soil erosion considered in the study.

Keywords: ArcGIS, Revised Universal Soil Loss Equation (RUSLE), Soil Erosion Potential