

Estimation of Soil erosion around Jadukata Watershed of Uraniferous Sector of Mahadek basin, Meghalaya Using USLE and RS-GIS Technique

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Abstract

Soil erosion is the main reason of the soil degradation and one of the most critical environmental hazards of recent times in the mountain and plateau areas in Uraniferous sector of Mahadek basin, Meghalaya, India. Estimation of average annual sediment yield by using Universal Soil Loss Equation (USLE) in a ArcGIS environment and prioritization of catchments for the prevention of environmental risk in the proposed uranium mining (opencast) and milling activities on the hilly terrain of the study area. Lower Mahadek catchment of Jadukata watershed of uraniumiferous sector in Meghalaya was taken as the study area. Satellite imageries of Cartosat-1 and IRS-P6 LISS IV have been geo-referenced with respect to SOI toposheets (1: 50,000 scale). Soil erosion of each of the sub-watershed was estimated from the integrated map within ArcGIS environment. The sub-watershed was prioritized based on the estimation of erosion. On the basis of grid, and magnitude of average annual soil loss within the watershed for the 2003 year was estimated as 193.94 ton/ ha. It clearly reveals that the Jadukata watershed is under high risk of soil erosion which affects the removal of soil from the top thereby affecting the nutrient status and also loss of organic matter. The same type of images i.e. same sensor and same imaging date for different years could not be maintained. However, the findings reflect the soil erosion risk within the watersheds, which could be attributed to removal of vegetation and some unplanned mining activities leading to indiscriminate felling of trees and reduced shifting cycles thus affecting the natural ecosystem. From the study it can be inferred that soil erosion estimation using RS-GIS technique can be effectively used for prioritization of catchments and gives various strategies for conservation practices.