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Prioritizing Sub-Basin According to Erosion and Recognition of Waterway Sensitive Reaches to Erosion using Field Reconnaissance (Case Study: Babolrood watershed, Mazandaran province)

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Introduction

Analyzing and estimating the amount of erosion and sedimentation, erosion intensity zonation, investigation of soil erosion risk factors and management options by using remote sensing and geographic information system seems essential because of progressive trend of soil erosion, and extended or impassable areas. Erosion is inevitable and cannot be completely eliminated, but human activity can be cause of acceleration or reduction it. Erosion in the watershed scale, is diverse and heterogeneous thus it is difficult to assess. This problem can be solved by using estimation erosion models. Babolrood watershed according to Area, topography, geology, various land use need to study erosion, and optimize management of land

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use. The purpose of this study is prioritization sub catchments in terms of erodibility and sediment yield using EPM (erosion potential model).

Materials and Methods

Babolrood watershed includes Azar rood, Karsang, Esklim, Babolak and low lands sub watersheds is located in Mazandaran province. The study area is located in 52˚ 38’ to 52˚ 55’ eastern longitude and 36˚ 2’ to 36˚ 22’ northern latitude. Annual average rainfall and its area is 821.8 mm and 51725 hectares respectively. The minimum elevation (55 meters) in the northern part of the basin and the maximum elevation (3317 meters) is located in the extreme southwest. To investigate and assess soil erosion in the study area some data include soil science, physiography, hydrology, climatology, Geology studies, and field visits to determine susceptibility reaches to erosion and scoring some input factors to model and required software such as ArcGIS was used. In this research EPM model was used to erosion intensity zonation that have 4 factors such as watershed erosion coefficient (ψ), land use (Xa), soil and rock sensitivity coefficient related to erosion(Y) and average slope of watershed (I) for modeling erosion rate in a watershed. Since various effective factors have a different impact and importance degree in the erosion with take into account importance proportion each of the parameters categorize these parameters into different classes and exert according to above model in the GIS software standard operation for the mention layer. These layer were assimilated and were produced erosion intensity zonation map then by considering of model result and amount of sediment rate that estimated from model, we prioritize sub-basins to management threats. For evaluate the model results, 43 years of Ghorantalar station data were used.

Discussion and Conclusions

According to the statistical results correlation coefficient between observation and estimated equal to 0.91 was obtained. Also results of model with observation data

was evaluated using binary t-test that not found significant difference in %95 confidence level. Results of erosion intensity zonation showed that in Babolrood watershed from the most to least amount of sediment yield are Babolak, Esklim, low lands, Karsang and Azar rood sub watersheds respectively.

In order to recognize and determine waterway sensitive reach related to erodibility and sediment yield results of model were used. By Field visiting and GIS software recognized 150 sensitive reaches in the case study, and from this 150 sensitive reaches a large number allocated to the Babolak sub watershed. Some factors caused to largest amount of sediment yield belonged to Babolak sub watershed compared to others. At the lowlands, population crowded, soil bare, grazing, Trampling and compacting soil structure by increasing runoff potential caused to surface erosion. At the middle parts of sub watershed, steep slope factor with elongated hills produce runoff that can be caused to rill erosion and sediment yield. At last at the uplands of Babolak sub watershed soil hydrologic group (low permeability and high runoff generation) and snow melting factors caused to rill erosion extremely. In general, the main factors of erosion in the Babolrood watershed include natural causes, Human activities (land use changes, road construction, overgrazing and soil trampling, reducing permeability and increasing runoff), specific conditions of lithological zone and Sensitive alluvial formations

Conclusions

Overall results showed that the Babolak as sensitive sub watershed in the Babolrood basin has the maximum amount of sediment yield and erosion rate and the largest number of sensitive reaches because of sensitive formation and low permeability of soil.