Actual Soil Erosion Risk Mapping Using Modified CORINE Method
(Case Study: Jahrom Basin)

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Introduction

Soil losses and erosion is one of the main causes of fertility decreasing, sedimentation in River cannels and irrigation canals, decreasing of storage capacity in dams, increasing of floods frequency, environmental pollution and it prevents from stable development. More than 70% of Iran land is covered with arid and semi-arid areas. Soil erosion as one of the main causes of soil degradation, annually loss large volume of fertile soils in the Fars province. CORINE [۱] methodology is a standard method used by the countries of the European Union to determine erosion risk and qualities of the lands. Using the methodology, countries of the European Union sharing the coasts of the Mediterranean Sea have completed their erosion risk maps and classification of their lands. The main goal of this research is preparing actual soil erosion and potential soil erosion map. In this research, the CORINE method has been modified according to the Jahrom watershed basin as study area of the research. CORINE model applied for assessing and estimating soil erosion risk in the Jahrom basin. To calculate of actual soil erosion, estimating erodibility, erosivity, slope, land use and vegetation is needed.

Material and Methods

Topographic and geologic maps with scales of 1:25000 and 1:100000 were used as the main data source to provide digital elevation model (DEM) of the study area. The paper maps of the study area have been scanned and rectified. The DEM have been derived from contour maps. Slope layer has been generated from DEM data and classified into 5 groups according to the geomorphologic units.

The erosionvity index has been calculated by Fournier index, which determines the precipitation energy to loss soil. For investigating soil erodibility, 1:250000 scale soil maps were used. Soil texture, soil depth and soil large stone fragment amounts have been considered for providing soil erodibility.

The integrating soil erodibility with soil erosivity based on slope map leads to potential soil erosion risk map. To prepare actual soil erosion risk, the vegetation map, which shows the conservation areas, has been applied. The actual soil erosion risk has provided by integrating potential soil erosion risk and vegetation type maps.

Results and Discussion

The results showed more than 60% of the study area is categorized with high potential erosion risk. About 20% of the study area is classified with high severity erosion, which is

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located in the areas with steep slope, low vegetation coverage and high precipitation. The results indicated that more than 80% of the catchment is categorized with high and moderate potential risk of soil erosion, while the actual risk of the study area is low. High precipitation, high slope and low vegetation cover lead to increase actual risk of soil erosion.

Vegetation coverage is one of the most important factors in soil erosion risk assessment. The vegetative cover and land use conventions of the study site have been detected by digitized of stand maps with in GIS environment. In general CORINE methodology showed reliable results and was modified based on the studied area conditions. Advantages of this model, in contrast to other common erosion and soil erosion prediction models, is its simple usage to assess the dataset, the commonly used software it employs, and mapping actual soil and potential soil erosion risk.

Conclusion

Soil erosion is considered as one of the major threats to Iran soils, particularly in the arid and semi-arid areas, which cover more that 75% of Iran climatic zones. In order to effectively formulate mitigation strategies and implement conservation measurements to counteract soil erosion, it is essential to objectively identify and quantify areas at risk.

The goal of this study is to develop and verify an erosion and soil erosion risk model that can be easily employed in Iran under conditions of limited data availability. The model 'CORINE' is well suited for this application. The Fournier index has been applied for erosivity of studied area. The soil erodibility was prepared by soil texture, soil depth and stoniness indicators. Ultimately the integrating potential soil erosion risk and vegetation type maps based on slope leads to provide actual soil erosion risk map.

The simple algorithms utilized for running the model are flexible to different spatial and temporal data accuracies. Also, the model can universally be applied in areas with semi-arid to semi-humid climate conditions without spatial limitations.

Key Words: Soil Erosion, CORINE Model, Semi-arid climates, erosivity, Jahrom bastin.