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## ***Relationship of Vegetation and Geomorphic Indices with Erosion and Sediment Rates in Koozeh Topraghi Watershed***

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### **1-Introduction**

Soil erosion is a predominant geomorphic process that threatens food security in large parts of the world. The geomorphic characteristics of the watershed play an important role in hydrology, soil erosion and sediment production and can be an indicator of erosion and sedimentation status of the watershed. Considering the results of various studies that have introduced numerous factors as effective factors in soil erosion and sediment production. In a general classification the most effective factors on erosion/sediment rate can include factors related to physiography and topography, lithology and soil, climate and hydrology, geomorphology, vegetation and land cover and land use. Geomorphic characteristics of watersheds are a set of physical factors whose values are relatively constant for each watershed and show the terrain related factors on erosion/sediment rate at watershed scale. Therefore, the purpose of this study is to investigate the relationship between vegetation and geomorphic indices with the values of erosion and sediment yield in the Koozeh Topraghi watershed.

### **2-Methodology**

The GIS and RS platforms have been used to extract the geomorphic characteristics and vegetation index of the watershed. For this purpose, erosion and sedimentation rates were calculated using the modified PSIAC model (MPSIAC). Also, in order to extract physiographic and geomorphic properties (including: topographic wetness index, stream power index, slope, curvature, plan curvature, and profile curvature), the digital elevation model with spatial resolution of 30 m is also used. Topographic and geology maps along with thematic maps has been obtained. The soil properties, meteorological data have been used in this study. The NDVI index has been calculated using satellite imagery and image processing techniques.

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### **3-Results and Discussion**

The results showed that the relationship between erosion and sediment values in the studied sub-watershed is significant in different confidence levels. In addition, the amount of erosion and sediment had a significant inverse relationship with slope values. There is also a statistically significant positive relationship between slope and stream power index. Curvature-related indices have slight variations in the sub-watersheds of the study area. However, due to the diverse topography of the area, the slope values had significant variations among the sub-watersheds.

### **4- Conclusions**

In conclusion, it can be said that geomorphic and vegetation indices can be involved as effective factors in erosion/sediment estimation and modeling. It should be noted that these factors may be different in various regions, so research on determining the factors affecting the climate and diverse topographic conditions can help in the final conclusions. Based on the results, it can be said that a factor such as vegetation can be considered as a representative of human factors, meanwhile, geomorphic indicators express the physical and natural conditions of the region in the occurrence or intensification of erosion and sediment production.

**Keywords:** Vegetation index, geomorphic indices, Topographic wetness index, Stream power index, Sediment yield, Koozeh topographi, northwestern Iran.