

# A Comparative Study of Land-Use Change and its Impact on Erosion Rate Using Object-Oriented Classification Method in Simineh Rood Basin of Boukan

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## Extended abstract

### 1- Introduction

Human beings have always sought to assess changes and discover changes. Soil erosion is one of the most important factors in soil degradation and reduction of fertility. Today, erosion of the soil due to non-expert human intervention has been removed from its natural process and has led to irreparable consequences. Considering the importance of studying changes in land use and its role in soil erosion over time, land use changes in Simineh Rood of the Boukan County in West Azarbaijan province and its role in soil erosion (between 2000 and 2017) were studied.

### 2- Methodology

The current research was conducted based on the integration of data analysis and remote sensing techniques as well as the geographic information system. In the present study, the layers of distance from the waterway and the distance from the road and the slope were delineated using Boukan topographic map. Also, the soil map of the area was prepared, using the soil map of the province. Moreover, the geology map of the area was sketched according to the geology map of the province. The basin rainfall map was set out using Boukan meteorological stations data as well as the adjacent stations, obtaining gradient equation of precipitation. To identify the area and to prepare a map of the city, the map of the county lands and the images of the google earth and the terra images of the Terrestrial Sensor, pertaining to the years 2000 and 2017, were utilized. ENVI 5.3, Arc GIS 10.5, Idrisi selvi and Excel were employed for the processing of the images and for the analyses of the data. The land use map of the basin was prepared using an object-oriented method. The WLC method as a multi-criteria analysis technique was applied to prepare the erosion zonation map.

### 3- Results

The map of the studied basin was prepared in 9 classes (aquaculture, rainforest, orchards, residential areas, communication lines, water, pasture, rocky lands with scattered vegetation and Bayer lands) through an object-oriented method. According to the obtained map, the results showed that the highest area in 2000 was related to the use of rangeland with a total area of 541.979 square miles. In 2017, the highest amount of land covered with the rocky lands with a dispersed land cover

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was 591.70. Also, the lowest usage rates in both years included the use of communication lines with 5.358 and 8.192 km<sup>2</sup>, the residential areas with 9.141 and 15.639 sq. Km, and the water with 22.320 and 18.480. The coefficients of evaluation (Kappa coefficient) extracted in 2000 and 2017 were 0/89 and 0/92, respectively. According to the erosion zoning maps in the area, in 2000 the area of the high risk class was 147.924 sq. Km, which increased to 185.971 sq. Km in 2017. In contrast with the high risk area of 470,511 sq km in 2000, it increased to 571 .081 sq km in 2017.

#### 4- Discussion & Conclusions

According to the results of the study, during the study period, pastures, drought and water decreased, and in contrast with the use of aquaculture, dry land, rocky land and residential areas, there was an increasing trend. According to the results of erosion hazard zonation, the area of high-risk and high risk classes increased from 8.79% and 28.2% in 2000 to 11.04% and 34.08%, respectively, in 2017. This can be attributed to an increase of 180.408, 129.245, 96.875, and 6.498 km<sup>2</sup> from the area of arable land, bayer lands, rocks and residential areas, and a decrease of 359.806 square kilometers of rangelands. Therefore, according to the erosion zoning maps in the study area, in 2000 and 2017, the areas with high-risk categories are either unused or with agronomic uses, and the areas with low risk are very little in the pastures. It can be concluded that the results of the study are as follows: the studies of Esfandiari et al. (2014), Moradi (2016), Faizizadeh (2017), Asghari et al. (2017), Martinsmurilo et al. (2011) and Dasilova et al. (2016) are consistent with the fact that crops are the most common and the pastures have the least potential for erosion.

**Key Words: Landuse, Simineh Rood, Erosion, GIS, RS.**