



**University of Zabol
Graduate school
Faculty of Natural Resources
Department of Environmental Sciences and
Engineering**

**A Thesis Submitted to the Postgraduate Studies Office in Partial
Fulfillment of the Requirements for the Degree of M.Sc. in
Environment Sciences and Engineering-Land Use Planning and
Environment Impact Assessment**

**Title:
Spatial Analysis of Soil Erosion and Habitat
Quality Based on Land Use Patterns in Sistan
Region**

**Supervisor:
Reza Dahmardeh Behrooz
Fatemeh Eynollahi Pir**

**Advisor:
Fatemeh Rajaei**

**By:
Mohammad amin Izadipoor**

2024

Spatial Analysis of Soil Erosion and Habitat Quality Based on Land Use Patterns in Sistan Region

Abstract

Soil erosion is a significant environmental issue in terrestrial ecosystems that can impact habitat quality in a region. This study aimed to evaluate soil erosion and habitat quality in the Sistan region, Eastern Iran, based on land use patterns. The InVEST model was used to evaluate soil erosion and habitat quality after collecting the necessary data. The relationship between soil erosion and habitat quality was analyzed using Spearman's correlation test and geographically weighted regression (GWR). The study found that the annual soil erosion in the region was 3.41 Mt, (averaging 2.07 t ha^{-1}). Despite having higher quality, the western habitats showed a higher potential for soil erosion. The highest and lowest erosion were observed in rangelands ($3.6 \text{ t ha}^{-1} \text{ y}^{-1}$) and wetlands ($0 \text{ t ha}^{-1} \text{ y}^{-1}$), respectively. The highest and lowest habitat quality were seen in rangelands and built-up areas, respectively. Spearman's test revealed a positive and significant correlation between habitat quality and soil erosion ($R=0.71$, $P\text{-value}<0.01$). GWR analysis also confirmed a significant spatial correlation between the two variables ($R^2=0.91$, $P\text{-value}<0.01$). The spatial pattern of habitat quality and soil erosion in the study area was similar, with higher-quality habitats located in the western parts of the region, which naturally had a higher potential for erosion. This study provided valuable information on habitat quality and soil erosion and emphasized the importance of managers and planners adopting effective strategies to reduce

soil erosion, particularly in high-quality habitats in the region.

Keywords: Soil erosion, Habitat quality, Land use, InVEST, GWR