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ASSESSMENT OF SPATIO-TEMPORAL VARIATION OF SALINITY, SOIL MOISTURE, AND VEGETATION DYNAMICS IN ARID REGIONS OF THE CENTRAL PLATEAU OF IRAN

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Abstract

An environmental challenge of significant concern, particularly in arid and semi-arid regions, is soil salinity, which has adverse effects on soil productivity and agricultural fields. Remote sensing technologies have emerged as a highly promising method for monitoring affected areas, playing a crucial role in land management studies. This paper focuses on estimating soil salinity, soil moisture, and vegetation conditions using Landsat 7 and 8-satellite imagery for the years 2000 to 2019 in a region severely affected by salinity-related issues. We calculated several indices in this study, specifically the Soil Salinity Brightness Index (BI), Salinity Index (SI), and Normalized Difference Salinity Index (NDSI). We conducted a field study to measure the pH and Electrical Conductivity (EC) of various soil samples. The results indicated significant increase in soil salinity due to past droughts and subsequent reductions in humidity in the studied area, which led to the loss of vegetation in Iran's central plateau (Dehshir). The highest levels of soil salinity were observed in the northern and southeastern parts of the region. One of the primary causes of salinization was the occurrence of past droughts and the subsequent desiccation of salt lake. According to the laboratory tests conducted on soil samples, it was observed that in certain sample basins, the pH level reached 8.5, indicating alkaline and sodic soil. Furthermore, the most significant decrease in NDVI values was identified in the northeast and southeast regions of Dehshir. These findings collectively indicate the occurrence of land degradation in the studied area.

Key words: arid areas, soil moisture, soil salinity, vegetation

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