ASSESSMENT OF SOIL SALINITY USING LANDSAT-8 SATELLITE IMAGERY AND GEOGRAPHIC INFORMATION SYSTEM: A CASE STUDY OF THE IRRIGATED AREA IN THE LA MINA REGION OF ALGERIA

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Soil salinity is a soil degradation rocess in which an excessive concentration of soluble salts accumulates in the soil, negatively affecting its fertility and its ability to support plant growth. The objective of this research work is to assess soil salinity in the irrigated area of La Mina using remote sensing and geographic information systems (GIS). Several soil samples along with readings from electromagnetic induction (EM38) were collected in the field and geolocated using a GPS positioning system, Garmin Etrex 10 model. Furthermore, spectral indices (IS2, IS4, NDVI, and RVI) were calculated from the spectral bands of Landsat 8 OLI satellite imagery. The results showed a good correlation between the visible spectral bands and the measured electrical conductivity values (ECe) in the laboratory. The search for the best prediction model between spectral bands, spectral indices, and salinity values (ECe) revealed that the combination of spectral bands (green and red) and the salinity index IS2 are the relevant variables for mapping soil salinity variation ($r = 0.54$; $p < 0.01$). This model allowed identifying areas at high risk of salinization where appropriate management practices are needed. Finally, it is concluded that the use of Landsat 8 satellite imagery and GIS offers a promising approach and opens up interesting prospects for the potential use of multispectral remote sensing to map soil salinity status. These tools enable spatial-scale monitoring and a comprehensive understanding of the factors influencing soil salinity distribution in the study area.