

## Assessment of Spectral Indices for Soil Salinity Estimation in Irrigated Land

**Authors :** R. Lhissou , A. El Harti , K. Chokmani, E. Bachaoui, A. El Ghmari

**Abstract :** Soil salinity is a serious environmental hazard in many countries around the world especially the arid and semi-arid countries like Morocco. Salinization causes negative effects on the ground; it affects agricultural production, infrastructure, water resources and biodiversity. Remote sensing can provide soil salinity information for large areas, and in a relatively short time. In addition, remote sensing is not limited by extremes in terrain or hazardous condition. Contrariwise, experimental methods for monitoring soil salinity by direct measurements in situ are very demanding of time and resources, and also very limited in spatial coverage. In the irrigated perimeter of Tadla plain in central Morocco, the increased use of saline groundwater and surface water, coupled with agricultural intensification leads to the deterioration of soil quality especially by salinization. In this study, we assessed several spectral indices of soil salinity cited in the literature using Landsat TM satellite images and field measurements of electrical conductivity (EC). Three Landsat TM satellite images were taken during 3 months in the dry season (September, October and November 2011). Based on field measurement data of EC collected in three field campaigns over the three dates simultaneously with acquisition dates of Landsat TM satellite images, a two assessment techniques are used to validate a soil salinity spectral indices. Firstly, the spectral indices are validated locally by pixel. The second validation technique is made using a window of size 3x3 pixels. The results of the study indicated that the second technique provides getting a more accurate validation and the assessment has shown its limits when it comes to assess across the pixel. In addition, the EC values measured from field have a good correlation with some spectral indices derived from Landsat TM data and the best results show an  $r^2$  of 0.88, 0.79 and 0.65 for Salinity Index (SI) in the three dates respectively. The results have shown the usefulness of spectral indices as an auxiliary variable in the spatial estimation and mapping salinity in irrigated land.

**Keywords :** remote sensing, spectral indices, soil salinity, irrigated land

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