

Sensitivity Assessment of Spectral Salinity Indices over Desert Sabkha of Western UAE

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Abstract : UAE typically lies in one of the aridest regions of the world and is thus home to geologic features common to such climatic conditions including vast open deserts, sand dunes, saline soils, inland Sabkha and coastal Sabkha. Sabkha are characteristic salt flats formed in arid environment due to deposition and precipitation of salt and silt over sand surface because of low laying water table and rates of evaporation exceeding rates of precipitation. The study area, which comprises of western UAE, is heavily concentrated with inland Sabkha. Remote sensing is conventionally used to study the soil salinity of agriculturally degraded lands but not so broadly for Sabkha. The focus of this study was to identify these highly saline Sabkha areas on remotely sensed data, using salinity indices. The existing salinity indices in the literature have been designed for agricultural soils and they have not frequently used the spectral response of short-wave infra-red (SWIR1 and SWIR2) parts of electromagnetic spectrum. Using Landsat 8 OLI data and field ground truthing, this study formulated indices utilizing NIR-SWIR parts of spectrum and compared the results with existing salinity indices. Most indices depict reasonably good relationship between salinity and spectral index up until a certain value of salinity after which the reflectance reaches a saturation point. This saturation point varies with index. However, the study findings suggest a role of incorporating near infra-red and short-wave infra-red in salinity index with a potential of showing a positive relationship between salinity and reflectance up to a higher salinity value, compared to rest.

Keywords : Sabkha, salinity index, saline soils, Landsat 8, SWIR1, SWIR2, UAE desert

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