Crop Vigorous limitations under Soil Salinity Variation by Using Remote Sensing Indices in Arid Environments

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Abstract

Soil salinity is the key factor limitation of agricultural expansion over poorly drained soils. In Saudi Arabia, the main source of irrigational water is the groundwater aquifers. Therefore, groundwater resources are under constant pressure and over exploited to fulfill the irrigational water demands. Moreover, soils in Saudi Arabia are poor and lack tolerable drainage system. Harsh agricultural environments thrust the farmers to maximize daily groundwater pumpage to overcome the substantial daily evapotranspiration caused by the massive turbulent heat fluxes in the designated study area. Normalized Difference Salinity Index (NDSI) was generated based on remotely sensed data derived from Landsat 8 acquired on April 14th of 2014 after proper radiometric and atmospheric corrections. Thematic map of soil salinity was generated and then reclassified into four classes based on the natural break classification techniques. On the other hand, Fraction of Absorbed Photosynthetically Active Radiation (FAPAR) is an another remotely sensed vegetation index established to envisage the effect of different soil salinity on the crop vigorously. FAPAR index was estimated using remote sensing data derived from the Medium Resolution Imaging Spectrometer (MERIS) on the same day of acquisition for consistency reasons. Results demonstrated that the FAPAR index is highly dependent on soil salinity. Higher soil salinity values were corresponded to lower FAPAR values. Findings of the current research will help decision makers and decision takers to take soil salinity into consideration in future strategic plans.

Keywords: Crop Vigorous, Efficiency, Environmental Management, FAPAR, Soil Salinity Index, Remote Sensing Indices.