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Using Spectral Indices in Detecting the Degradation of Soil Physiographic Units in Al-Wahda Project South of Baghdad

Jinan Abdul Ameer Abbas

College of Education for Women, University of Baghdad, Iraq
E-mail:Jianaaa11@gmail.com

Abstract: Al-Wahda project at the southern part of Baghdad governorate was selected to detect the degradation of the soil physiographic units during 1990-2005-2020. The images of the location of the project were determined of the three years, where 30 soil sites were chosen, which were distributed to cover most of the lands of these units. Particular physical and chemical properties of soils were measured, their textures varied between moderate and fine. Some have high salinity 23.7 dsm^{-1}, while all samples are low to very low in organic matter with a decrease in the cation exchange capacity values. Land covers were classified into four types, and their extent varied as Non-Vegetation (NV)> Barren (Ba)> Vegetation (V)>, Urban (U) in 1990, and their arrangement changed in (2005) to NV> V> Ba> U. During 2020 were arranged as NV> V> U> Ba. Accordingly, the values of the Normalized Difference Vegetation Index (NDVI) and the Land Degradation Index (LDI) were obtained. The status of lands was evaluated in relation to the ranges of NDVI which were divided into five classes or categorizes. The dominance of the weak class 88.39, 74.01, 53.25 % for the years 1990> 2005> 2020 in the study area, and its dominance varied with the moderate class in the physiographic units. The degrees of lands degradation were specified depending on LDI values. The largest area was for moderate degradation of land at rates of 100.0, 99.04, 97.65 % for the whole study area and for the years 1990> 2005> 2020, and this degree of degradation also has a dominance overall the physiographic unit with the presence of a strong degree of degradation with a greater percentage of light degradation in the year 2005-2020. There are only two types of the relative extent of the degrees of degradation (infrequent> dominant) at a rate of 57.14 and 42.85 % respectively for all the physiographic units and the three years. The significant positive correlation (r) was for NDVI and LDI with organic matter value (0.797, 0.882), respectively, and a significant negative correlation for NDVI values with Bd> $CaCO_3$> EC, -.856, -0.727, -0.679 respectively, and LDI values have a negative correlation with Bd> EC> $CaCO_3$, -0.853, -0.772, -0.708, respectively.

Keywords*:* NDVI, LDI, Land cover, Degradation degree, Al-Wahda project