

Investigation on the potential of digital Landsat ETM+ data for soil
salinity mapping
(Case study: Northern part of Lout Plain, Iran)

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In order to evaluate the potential of satellite data in classification of saline soils, Enhanced Thematic Mapper (ETM+) subscene of northern part of Lout Plain, Iran dated July 2002 was analyzed qualitatively. Geometric registration of image data was implemented using digital topographic map. Different image enhancement techniques such as band rationing and PCA were applied. Totally 50 samples were taken random and systematically from the top soil. The salinity parameter, electrical conductivity (EC) of the soil samples was determined in the laboratory. By specifying sample site on the geo-coded satellite image, digital number (DN) relevant to the sample extracted. The relationship between extracted DN and measured soil EC were studied. According to the results, correlation coefficient for TM7 and the first component of PCA (PCA-C1) was higher than other origin and synthetic bands. Highest correlation coefficient was related to band 7 ($r=0.74$) which is significant at 1% level of confidence. Also the results of ANOVA showed that soil salinity could be estimated using the following model which is obtained through stepwise regression method:
 $EC = 0.17\text{Band}7 - 21.06$ ($R^2=0.68$). The accuracy of produced salinity map based on the above mentioned model was 82%.

Keyword: Landsat ETM+, Soil salinity, Electrical Conductivity (EC), Stepwise regression, Digital number(DN), Image enhancement, Lout plain, Iran

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