

Spatial Variability of Salinity and Extractable Boron in Soils of Hossein Abad Area, Yazd

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(Received: June 19-2012 ; Accepted : Nov. 28-2012)

Abstract

Salinity and ions toxicity are one of the main problems of agricultural lands in arid and semi-arid regions, such as Iran. In addition to the salinity problem, some other marks like boron toxicity in crops have been seen in Hossein Abad area as one of the main agricultural regions of Yazd. Therefore, this study intends to evaluate and analyze spatial variability of soil salinity as an aspect of soil degradation, and prepares soil salinity and boron maps. A regular grid sampling scheme was done through a 150 m interval. Salinity and boron were measured at the depth of 0 to 30 cm. Totally 104 samples were measured. After statistical analysis of the data and studying their distribution, Kriging estimator was used for mapping the mentioned variables. Results showed that the region has a salinity problem and does not have any boron toxicity. According to the relationship of nugget effect and sill, there was a strong dependency among all the measured factors except for boron and pH factors. The least salinity was observed in cultivated areas due to the leaching process. The boron range was between 0.07 and 1.6 mg kg⁻¹. Salinity and soil boron were significantly correlated at 99 % confidence level. Based on the Spearman and Pearson tests, there was a positive correlation between SAR and salinity at 99 % confidence level, which shows the region has more sodic salts than others. Also, pH of the region did not present any problem for growing crops.

Keywords: Boron, Spatial variability, Geostatistics, Salinity.

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