Abstract

Considering the great extent of salinity and sodium soils in Iran and the fact that its agricultural lands have constantly been salty followed by shortage of land resources suitable for agriculture, various methods are required to improve the soils. Today, the use of artificial neural network methods is very common in predicting soil properties. ESP and SAR are two components indicating salinity and sodium contents of soils. The present study was carried out to evaluate the properties of sodium absorption ratio and exchangeable sodium percentage using artificial neural network and regression method in Qorqori region, Hirmand, Sistan and Baluchestan. For this purpose, ١٣٠ soil samples were collected from the region as regular grids for thorough evaluation of their physicochemical properties. To predict these two properties using the MLP neural network and the regression method, EC and PH were used which had the highest correlation with ESP and SAR. Finally, the best network was selected by $R^{٢}$ and RMSE. For ESP, the MLP neural network with ١٠ neurons in the hidden layer, the maximum value of $R^{٢} = ٠.٩٣$, and the root mean square error of RMSE= ٠.٠٢٤٥ provided a better estimate. For SAR, the MLP neural network with ٨ neurons in the hidden layer, the maximum value of $R^{٢} = ٠.٩١$ and the lowest root mean square error of $٠.٠١٨٧ = ٠$ RMSE, offered a better estimate. The results of regression analysis and artificial neural network showed that the regression method with $R^{٢} = ٠.٧٠$ and RMSE = ١.٧٥ had a weaker performance than the neural network and only ٧٠٪ of the variations in SAR and ESP were justified in the region. Since measuring SAR and ESP features has a high cost and is time- consuming, the artificial neural networks can be used to identification, determination, prediction, and modeling of the sites sensitive to salinity and sodium.

Key words: ESP, SAR, Artificial Neural Network, Qorqori region

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