University of zabol

Graduate school

Faculty of Water and soil

Department of Water Engineering

The Thesis submitted for the Degree of M.Sc

(in the field of Water and Resource Engineering)

Title:

Prediction of Golestan Province's Groundwater Quality Parameters

Using Artificial Intelligence Moldels

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Abstract:

Water quality is one of the issues that is directly related to the health, personal and public health of the community. The importance of controlling surface and groundwater is not hidden from anyone. The necessity of water monitoring and the provision of hygienic and standard conditions for drinking make water quality control very important. In this study, using qualitative data of 96 observation wells located in Golestan province, which has a common statistical year of 19 years, to predict water quality parameters including sodium sorption ratio, total solubility ratio of TDS and EC electrical conductivity using qualitative data Sodium Na, PH, CL chloride, So4, Ca and Mg have been studied. Data calibration is evaluated by 70% of data (for training) and method performance using 30% of remaining data. Also in this study, three criteria of root mean square error, correlation coefficient and mean absolute error were used to evaluate the accuracy of the models. The results of this study show that, except for input 8, other models have high ability to estimate the groundwater quality parameters. The results also show that Na and Cl parameters have the greatest impact on the accuracy of the prediction results for all three models and all three parameters studied and in the combination of input 8 which lacks these two parameters, all three models perform poorly. Also, at most inputs, the neural network is more capable of predicting groundwater quality parameters than the other two models. The Ennis model also performed poorly in the test phase compared to the other two models. Although the accuracy and capability of all three models are almost comparable, all three models can be used in predicting qualitative parameters.

Keywords: Sodium adsorption ratio, Electrical Conductivity, Total soluble solids, Golestan province