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## Data Article

# Data on estimation for sodium absorption ratio: Using artificial neural network and multiple linear regressions



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## ABSTRACT

In this article the data of the groundwater quality of Aras catchment area were investigated for estimating the sodium absorption ratio (SAR) in the years 2010–2014. The artificial neural network (ANN) is defined as a system of processor elements, called neurons, which create a network by a set of weights. In the present data article, a 3-layer MLP neural network including a hidden layer, an input layer and an output layer had been designed. The number of neurons in the input and output layers of network was considered to be 4 and 1, respectively, due to having four input variables (including: pH, sulfate, chloride and electrical conductivity (EC)) and only one output variable (sodium absorption ratio). The impact of pH, sulfate, chloride and EC were estimated to be 11.34%, 72.22%, 94% and 91%, respectively. ANN and multiple linear regression methods were used to estimate the rate of sodium absorption ratio of groundwater resources of the Aras catchment area. The data of both methods were compared with the model's performance evaluation criteria, namely root mean square error (RMSE), mean absolute error (%) and

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correlation coefficient. The data showed that ANN is a helpful and exact tool for predicting the amount SAR in groundwater resources of Aras catchment area and these results are not comparable with the results of multiple linear regressions.

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## Specifications table

Subject area	Chemistry
More specific subject area	Water quality and monitoring
Type of data	Tables, Figures
How data was acquired	Data on groundwater resources quality in the Aras catchment area was obtained from West Azerbaijan Water and Wastewater Company during the years 2010–2014 and was studied for estimation of sodium absorption ratio (SAR).
Data format	Raw, Analyzed
Experimental factors	The sodium absorption ratio (SAR), were analyzed according to the standards for water and wastewater treatment handbook.
Experimental features	The levels of physical and chemical parameters were determined.
Data source location	Aras, West Azerbaijan province, Iran.
Data accessibility	Data are included in this article
Related research article	A.Takdastana, M. Mirzabeygi (Radfard), M.Yousefi, A. Abbasnia, R. Khodadadia, A.H.Mahvi, D.Jalili Naghan, Neuro-fuzzy inference system Prediction of stability indices and Sodium absorption ratio in Lordegan rural drinking water resources in west Iran, Data in Breif 18(2018) 255–261.

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## Value of the data

- The data of this article can be used to environmental management and better exploitation of groundwater resources.
  - Considering the present data, many of the sampling drinking water supply reservoirs need to pay attention to achieve Iran national water quality standards.
  - The results clearly indicate that with appropriate selection of input variables, artificial neural network and multiple linear regressions as a soft computing approach can be used to estimate water quality indices properly and reliability.
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## 1. Data

Two algorithms, including seven Back-propagation algorithms and Lewenberg-Markow, have been used in this data article. The Comparison of the performance of seven Back-propagation algorithms in estimating the sodium absorption ratio with the number of neurons 10 in the hidden layer has been shown in Tables 1 and 2, indicating the comparison of the different neurons performance in the hidden layer in estimating the sodium absorption ratio using the Lewenberg-Markow algorithm. The optimized output of neural network and data performance criteria for has been shown in Figs. 1 and 2. Also, Fig. 3 indicates the actual SAR values in groundwater resources and their predicted values via multiple linear regression.

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