

Modelling Fluoride Pollution of Groundwater Using Artificial Neural Network in the Western Parts of Jharkhand

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Abstract : Artificial neural network has been proved to be an efficient tool for non-parametric modeling of data in various applications where output is non-linearly associated with input. It is a preferred tool for many predictive data mining applications because of its power, flexibility, and ease of use. A standard feed forward networks (FFN) is used to predict the groundwater fluoride content. The ANN model is trained using back propagated algorithm, Tansig and Logsig activation function having varying number of neurons. The models are evaluated on the basis of statistical performance criteria like Root Mean Squared Error (RMSE) and Regression coefficient (R²), bias (mean error), Coefficient of variation (CV), Nash-Sutcliffe efficiency (NSE), and the index of agreement (IOA). The results of the study indicate that Artificial neural network (ANN) can be used for groundwater fluoride prediction in the limited data situation in the hard rock region like western parts of Jharkhand with sufficiently good accuracy.

Keywords : Artificial neural network (ANN), FFN (Feed-forward network), backpropagation algorithm, Levenberg-Marquardt algorithm, groundwater fluoride contamination

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