Abstract

In this study, using geostatistical and computational intelligence methods in Miankangi, spatial variations of usable phosphorus and potassium is examined. For this purpose, 189 soil samples at intervals of 500 to 500 meters from a depth of 0 to 30 cm were taken. After sampling operation and transfer soil samples to the laboratory, First the samples air dried and then sift through a 2 mm mesh sieve, physico-chemical properties of the soil samples of the study area was measured. The results of the study showed that the best geostatistical model among geostatistical methods is using cokriging to estimate the available phosphorus and potassium. In addition, the results of computational intelligence methods to predict the amount of phosphorus and potassium in model 1 (with input x and y) and Model 2 (with inputs x, y and clay) indicate that computational Intelligence methods (MLP neural network and neuro-fuzzy system), provides greater performance and accuracy. However, according to the root mean square error (RMSE) and correlation coefficient (R), the MLP neural network provides more accuracy and performance in model 1 and model 2 then the neuro-fuzzy system for modeling available phosphorus and potassium in Miankangi Zone. About the training of neural network model , the triangular function (Tribas) is the most efficient transfer function in the hidden layer. In general, optimum results of the MLP neural network for Model 1 (with input x and y) and Model 2 (with inputs x, y and clay), clearly indicates that importing third parameter (in this study , clay), has a great effect in training of Model 2 and the proper functioning of all methods used in this study.

Keywords: modeling, phosphorus and potassium, computational intelligence, geostatistics

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Modeling and estimation of spatial variability of soil available phosphorus and potassium by geostatistical and computational intelligence methods

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