عنوان مقاله:

A Neural Network Based Modeling and Sensitivity Analysis of Energy Inputs for Predicting Seed and Grain Corn Yields

محل انتشار:

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خلاصه مقاله:

In this study, several artificial neural networks (ANNs) were developed to estimate seed and grain corn yields in Parsabad Moghan, Iran. The data was collected by a face-to-face interview method from ۱۴۴ corn farms during ۲۰۱۱. The energy ratios for seed and grain corns were calculated as ۰.۸۹ and ۲.۶۵, respectively. Several multilayer perceptron ANNs with six neurons in the input layer and one to three hidden layers with different number of neurons in each layer and one neuron (seed or grain corn yield) in the output layer was developed and tested. Energy inputs including fertilizers, biocides, seeds, human labor, diesel fuel and machinery were considered as explanatory variables for the input layer. The best model for predicting seed and grain corn yields had ۶-۴-۸-۱ and ۶-۳-۹-۱ topologies, respectively. Model output value associated with the actual output had coefficient of determination (R۲) values of ۰.۹۹۹۸ and ۰.۹۹۷۸ for seed and grain corn, respectively. The corresponding regression models had R۲ values of ۰.۹۸۷ and ۰.۹۸۲, respectively. Sensitivity analysis showed that in seed corn production, diesel fuel and machinery, and in grain corn, diesel fuel and seeds consumption have the greatest effect on production yield.

کلمات کلیدی:

Artificial Neural Networks, Corn production, Energy input, Regression, Sensitivity analysis