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## Building a Predictive Model for Tobacco Production in Syria Using the Multi-layer Neural Network(perceptron MLP)

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### Abstract

The research aimed to build a predictive model for tobacco production at the level of the Syrian Arab Republic using neural networks technology, based on the statistics of the World Food and Agriculture Organisation (FAO) for the period between (1975–2017), where the relationship between independent variables (year of production, area planted with tobacco was studied). Productivity per hectare of tobacco crop) and its effect on the amount of production of the crop as a dependent variable based on the descriptive approach and the analytical statistical approach and building a multilayer neural network model (Perceptron MLP) and training it with a back propagation algorithm using statistical software (SPSS20).

The neural network consisted of three layers (the input layer, the processing layer or the invisible layer, in addition to the output layer), where the input layer consisted of three units (the number of independent variables), while the output and hidden layers consisted of one unit. The input layer received the information from the time series data, the hidden layer processed the information and produced the output layer. The values from the input layer entering the hidden node are multiplied by weights, which is the set of pre-determined numbers and products are then added to produce a single number. She passed this number as a parameter to a nonlinear mathematical function (activation function) using the Hyperbolic function as an activation function in the hidden layer, and the Identity function was used in the output layer.

34-year data was used in the training of the chosen neural network, and 9 years in the process of network testing and comparison of network outputs with actual outputs.

The neural network showed the relative importance of the independent variables in the impact on agricultural production of the tobacco crop, where productivity per hectare occupied the first rank in the influence according to the predictive model by (100)%, while the cultivated area affected production by (77.2 %), while the productive year was its effect Little by (4.7)%.

**Keywords:** Multi-layer neural network, production, Syria, tobacco