Abstract - Cotton constitutes a significant commercial crop and a widely traded commodity around the world. The accurate prediction of its yield quantity could lead to high economic benefits for farmers as well as for the rural national economy. In this research, we propose a multiple-input neural network model for the prediction of cotton's production. The proposed model utilizes as inputs three different kind of data (soil data, cultivation management data and yield management data) which are treated and handled independently. The significant advantages of the selected architecture is that it is able to efficiently exploit mixed data, which usually require to be processed separately, reduces overfitting, and provides more flexibility and adaptivity for low computational cost compared to a classical fully-connected neural network. An empirical study was performed utilizing data from three consecutively years from cotton farms in Central Greece (Thessaly) in which the prediction performance of the proposed model was evaluated against that of traditional neural network-based and state-of-the-art models. The numerical experiments revealed the superiority of the proposed approach.