IMPACT OF LONG – TERM MANAGEMENT PRACTICES ON SOIL PROPERTIES UNDER THE CONDITIONS OF EGYPT

By

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B. Sc. Agri. Sc. (Soil Science), Benha University, 2003.
M. Sc. Agric. Sc. (Soil Science), Benha University, 2011.

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ABSTRACT

Omnia Mohamed Mohamed Abdou Wassif: Impact of Long – Term Management Practices on Soil Properties Under the Conditions of Egypt. Unpublished Ph.D. Thesis, Department of Soil Science, Faculty of Agriculture, Ain Shams University, 2017.

The objectives of the current study were to evaluate the changes of soil quality indices as a result of long term organic and conventional management systems and to assess quantitatively soil sustainability of such management system and selecting the most appropriate procedure for evaluating sustainability. El-Sharqia and El-Ismailia governorates were selected as study areas situated in arid climatic conditions in Egypt. Two types of indices i.e., sustainability index (SI) and cumulative rating approach (CR) were used to compare between conventional and organic farming systems concerning sustainability. The study included 12 farms at El-Sharqia governorate and 9 farms at El-Ismailia governorate were subjected to conventional and organic farming. The farms were varied in cultivation period and land use.

Multivariate statistical techniques were used to select minimum data set (MDS) for each soil depth for evaluating soil quality and sustainability. This MDS was used to assess soil sustainability by SI and CR methods. The results of principal component analysis (PCA) showed that within each PC, the variable with the highest factor loading was selected as the most important contributor to the PC for MDS.

The results obtained for comparison between two approaches for assessing sustainability status was carried out. The higher SI indicated soil quality improvement and higher CR indicated poor soil quality and the CR procedure indicated more efficiency than SI approach for assessing sustainable. Moreover, comparing between conventional and organic farming systems concerning sustainability status; the organic farming was more sustainability than conventional farms. The results

obtained in El-Sharqia and El-Ismailia farms were also represented by the relationship between biomass yield and MDS with one, two and three parameters models. Such models were used for predicting biomass yield and the best models was the three parameters model associated with high R^2 under both conditions. Moreover, there was inverse relationship between CR and biomass yield as a dependent variable and CR as independent variables in both farming systems of El-Sharqia and EL-Ismailia farms with one and two parameters models and it can also be used in the prediction of biomass yield.

Keywords: Long term farming system, Minimum data set (MDS), Soil quality, Soil quality indicators, Soil properties, Soil sustainability, Soil sustainability indicators.

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