

WATER MOVEMENT AND SOME SOIL PHYSICAL PROPERTIES IN SOME SOILS OF KAFR EL- SHIEKH IRRIGATED WITH DRAINAGE WATER

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ABSTRACT

The study included six different soil profiles having clay textures. The irrigation drainage water reused from the main El-Gharbia drain. Undisturbed and disturbed soil samples were taken at soil depths 0 – 30, 30 – 60, 60 – 90 and > 90 cm. The obtained results indicated that values of soil bulk density increased with reuse of drainage water in irrigation, but decreased the values of total porosity. The wet sieving resulted in breaking down of the large aggregates specially which have 10 - 2 mm to small aggregates, and the values of water stable aggregates (W.S.A) decreased due to the reuse of drainage water. Values of soil structure parameters have no clear trend. Values of pore size of large drainable pores were decreased, while the fine capillary pores (F.C.P) increased. Values of both saturated hydraulic conductivity and drainable pores were decreased due to dominant of clay and increasing soil salinity and alkalinity, and accordingly available water was decreased.

INTRODUCTION

In the last few years, reuse of low quality water became part of the extension program for maximizing the use of water resources. However, the uncontrolled application of such water must have unfavorable effects on both soils and grown plants, especially in the long term use. The hazard effects are mainly related to the soil properties and water quality beside the type of growing crops. In many regions where irrigation water is scarce, drainage water is used to meet crop water requirements. Due to rapid increase of irrigation water demand, the available water supply in Egypt is supplemental by the reuse of agricultural drainage water which is often of low quality. The quality of the drainage water determines which crops can be irrigated. However, precautions should be taken to ensure that the quality of the drainage water does not harm the grown crops or causes environmental hazard. As a general view, Nabulsi (2001) found that use of saline drainage water for irrigation causes decrease in total porosity. Abdel -Mawgoud *et al.* (2006) stated that using drainage water for irrigation decreased both drainable pores (quickly + slow) and water holding pores, and consequently increased the fine capillary pores compared to that in the soil irrigated by canal water. Chang *et al.* (2002) stated that the aggregates stability of the soil was generally adversely affected by the more saline and sodic irrigation water. Ghadiri *et al.* (2007) stated that less values of EC of the clay soil with high ESP led to weakening of its stable aggregates and increased erosion. Slavich *et al.* (2002) stated that hydraulic conductivity of soil may be decreased when a saline sodic soil is leached with low salinity water. Walker and Lin (2008) studied soil property changes after four decades of waste water irrigation and results showed that depression areas had the highest