EFFECT OF DIFFERENT WATER SOURCES UNDER DIFFERENT SOIL MOISTURE DEPLETIONS ON SOIL SALINITY, ALKALINITY AND SUGAR BEET AND SUNFLOWER YIELDS

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ABSTRACT

Lysimeter experiments were carried out at Sakha Agric. Research Station in two growing seasons (2007 and 2008) to assess a new technique of irrigation using different water sources: fresh (Nile) water – drainage water – wastewater – well water. This technique is alternating irrigation between those different water sources and fresh water under soil moistures depletion (50% and 70%). Crop yield, water Use efficiency (WUE), soil salinity (ECe) and alkalinity (ESP) were recorded.

Sugar beet yield significantly influenced by Water sources, soil moisture depletion and application technique. Elemental content (macro nutrients and heavy metals) was increased as a result of irrigation by sewage water either directly or blended with well water. The alternative technique increased the WUE and frustrated the saline effect of sewage water as compared to continuous one. The lowest values of soil salinity and alkalinity were achieved under the irrigation with fresh water and blending sewage water with well water under alternative irrigation technique.

Regarding sunflower, seeds yield was significantly affected by the three factors (water source, application technique and soil moisture depletion). Fresh water with soil moisture depletion at 50% of available soil moisture induced the highest value of seed yield. The highest values of WUE were subjected to the treatment irrigated with sewage water alternated with fresh water and depletion at 70%. Using fresh water and well water induced the lowest and the highest values of ECe respectively. Blending sewage water with well water decreased soil alkalinity (ESP) under alternative technique compared with irrigation by well water or sewage water separately.

INTRODUCTION

Agricultural expansion in addition to increasing population in Egypt requires incrementally more amount of irrigation water. The annual Nile water supply is 55.5 milliard cubic meters of fresh water, while the annual demand is estimated to be 71.5 milliard cubic meters of water in 2000(Abd El-Dayem, 1994). This circumstance makes that increasing water a source is tremendously needed. This gap could be accomplished through two means: namely, increasing the usable supply of water and improving the efficiency of water utilization. Reusing of drainage, sewage and/or well water is an attractive solution that hopefully helps in facing this gap between demand and supply of water.

It was recommended in Dublin Conference (ICWE, 1992) that the scarcity and misuse of fresh water pose a serious and growing threat to sustainable development and protection of the environment. Human health