IMPLICATIONS OF AGRICULTURAL DRAINAGE WATER REUSE: I. CROP YIELD AND WATER PRODUCTIVITY

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CSBE100253 – Presented at ASABE's 9th International Drainage Symposium (IDS)

ABSTRACT Global water scarcity and crisis, especially in arid and semi-arid regions, necessitate reuse of agricultural drainage water for irrigation as a non-conventional water source. Egypt is one of the leading countries in the reuse of drainage water for irrigation. This study aims to assess the impacts of agricultural drainage water reuse for irrigation on the quantity and quality of crop yield and water productivity. In addition, to investigate the suitable ratios of mixing fresh with drainage water that will be safe in using agricultural drainage water for irrigating field crops. The study was carried out at King Maryout, Egypt on Egyptian clover and wheat crops, these crops were irrigated by different mixing ratios of Fresh Water (FW) and Drainage Water (DW) (100: 0 (T1), 75: 25 (T2), 50: 50 (T3), 25: 75 (T4) and 0: 100 (T5)). The results revealed that the germination percentages of clover and wheat were decreased from 100% to 85% and 100% to 78%, respectively, with increasing DW ratio in the mixed irrigation water from 0% to 100%, respectively. Furthermore, water productivity (Wp) of clover decreased with increasing DW with exception to T2 and T3. The decreasing of Wp was (13.64, 20.74, 25.66, and 36.15 % for wheat plant as a whole), (7.05, 10.97, 16.48, and 30.96% for wheat grains) and (8.88, 16.83, 20.95, 28.26 % for wheat straw) for T2, T3, T4, T5 compared with T1.

Keywords: Drainage water, Egyptian clover, mixing ratio, reuse, wheat, water use efficiency.