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### IMPLICATIONS OF AGRICULTURAL DRAINAGE WATER REUSE: II. SOIL PROPERTIES

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**Abstract** Reuse of agricultural drainage water is applying worldwide in many regions in the world, in order to alleviate the water crisis, as well as to control the environmental pollution. The overall goal of this study was to explore the impacts of using agricultural drainage water on the chemical and physical properties of soil. Moreover, to study the possibility of saving water and fertilizer by 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)). Laboratory analysis for all soil samples was carried out for measuring the pH, electrical conductivity (EC), cations, anions, heavy metals (Cu, Cd, Pb and Zn) before planting and after harvesting of Egyptian clover and wheat. NPK fertilizers and hydraulic conductivity were measured, as well. The results concluded that, with increasing the percentage of drainage water in irrigation seemed to be harmful on chemical properties of the cultivated soil, especially on increasing the EC in the soil, therefore, it is recommended to add more irrigation water than required by consumptive use of crops to meet leaching requirements. Apparently, mixing fresh water with drainage water may overcome the problem of the irrigation water shortage. However, a proper mixing ratio is the preminent practice to avoid the hazards of soil salinity.

**Keywords:** Drainage water, Egyptian clover, fertilizers, heavy metals, mixing ratio, NPK, reuse, wheat