# 1. INTRODUCTION

Management of water resources in its best means the capability of maintaining a good balance between the supply and demand that help to keep the good water quality. In Egypt, it is a well known fact that, the major source of water comes mainly from the River Nile. However, this quantity of water is not sufficient for some old cultivated lands which suffer from irrigation water shortage as well as short and long term programs of land expansion and reclamation which depend mainly on two main schemes, firstly, raising the productivity of the cultivated areas and, secondly increasing the area of reclaimed soils. The latter goal could be realized by means of cultivation of desert lands adjacent to the Delta and Nile valley which cover an extensive area.

To solve this urgent problem, of the increasing demands of water, it is necessary to use the alternative water sources that have less suitability for irrigation such as ground water (brackish and saline well water) drainage water, sewage water and polluted water (Nile water mixed with industrial wastes), in order to cover the increasing irrigation demands.

Quality of irrigation water is of particular importance specially in arid and semi-arid regions such as Egypt. Salts formed in situ by chemical weathering of soil minerals or resulted from applied irrigation water may accumulate in the soil profile since water use for irrigation may contain up to 3000g of salt per cubic meter compared to 5-40g/cubic meter of rainwater.

In addition, treated sewage water may be used for irrigation and its content of both mineral nutrients and organic materials makes it an available fertilizer source.

However, care should be taken in regard to polluting materials. The liquid industrial waste which is mainly loaded with major and trace metals are either drained into the River Nile and irrigation canals or directly into surrounding soils. These pollutants and metals, undoubtedly, affect the quality of irrigation water and consequently the properties of soils on which these waters are used.

For this reason among others, studying the effect of these low quality waters on physical, chemical and mineralogical properties as well as plant growth and nutrients uptake by plant is considered the aim of this work.