CHAPTER 1
INTRODUCTION

Introduction

Water quality issues are at the forefront of the national agenda in most countries worldwide. It is evident that pollution is affecting the use of water and in some instances, limiting the utilization of important water supply sources. This situation has highlighted the need to protect the quality of water resources.

The fresh water resources of our planet are under severe and increasing environmental stress. The main source of freshwater in Egypt is the Nile River. A number of publications on the limnology of the Nile River have been published since the beginning of the 20th century .The early information about the chemistry of the Nile water was given by Beam (1908)[1] and Lucns (1908).[2] Golterman (1975) [3] and Talling (1976) [4] reviewed in detail the water chemistry of the Nile River. Also basic data about the geomorphology, morphometry, limnology and biology of the river have been given by Rzos ka (1976).[5] The co-operation between the university of Michigan (USA) and Egyptian Academy of scientific Research and Technology resulted in comprehensive water quality data covering the whole Nile system in Egypt (Hafez, 1978) [6].

The populations of Egypt are concentrated on only 4% of the land area, in the Nile valley and the Delta. This unbalanced distribution of the population is creating stress on the water quality of the Nile system in Egypt.

Many canals and drains are suffering from an alarming increase in the discharge rates of municipal and rural domestic wastes. The expansion of water supply networks in villages, towns and cities without the parallel construction of new sewer systems or the rehabilitation of existing system has led to serious water pollution problems. Discharge of untreated or partially treated wastewater is a major cause of water pollution.

The continued industrial expansion has caused deterioration of water quality due to the proliferation of hazardous residues and the inadequate treatment of processing effluents prior to discharge into water bodies. Urban growth and increased

recycling of irrigation water have also, complicated water pollution problems in Egypt. [7]

Some industries located along the river banks discharge their effluents into Nile. Surface run-off and domestic wastewater contribute to the deterioration of the water quality (Steele & McGhee).[8] Example of organic pollutants include oxygen consuming compounds, surfactants, hydrocarbons and oil & grease (Gledhill & Saeger[9]; Kreuk & Hansveit[10]; and Swisher[11]). Other factors such as dissolved oxygen (DO) also affect the concentration of these pollutants in aquatic systems (Lamp & Messerve).[12]

Cooling water discharged from electric power stations can lead to an increase in the temperature of the receiving water by several degrees above the normal and affect aquatic organisms both directly or indirectly, for example by affecting the solubility of dissolved oxygen, consequently the rate of oxidation (Alabaster & Lloyd).[13] Dissolved Oxygen is essential and in some cases is the limiting factor for maintaining the aquatic life. Its depletion in water is probably the most frequent general results of certain forms of water pollution. Its effects on aquatic organisms especially at low concentrations have therefore been extensively studied (Plimmer).[14]

Increased phosphate results in elevated phytoplankton activities (Lee et., al.).[15] The effect is an increase in primary productivity leading to eutrophication (Heckman).[16] Azov et al.(1982)[17] have reported a reversible inhibitory effect of alkyl benzen sulfonate detergents (surfactants) on photo-assimilation of carbon by algae. Contamination of water bodies by pathogenic bacteria is a serious problem.[8] According to ORSANCO (1963),[18] this poses a number of health and economic problems in terms of prevalence of water-born diseases and procurement of water purification equipment.

Water quality monitoring is an important issue in various environmental programs. It is considered an important risk tool to detect, control, or evaluate the impact on human health and the environment. It is the first step in any water quality management program. It may be defined as continuous, long-term, standardized measurement, observation, evaluation, and reporting of the environment in order to

define status, trends, and violations. Lack of appropriate water quality monitoring activities limits many governmental and private efforts in accomplishing specific water quality management goals. However, in developing countries there is always shortage in financial and technical resources to design and implement an appropriate water quality-monitoring program to achieve specific water quality levels.

It is conceivable that failure to conserve water resources through effective management, will not only affect the health and livelihood of the citizens but may eventually exert negative impact on socio-economic development.

The Nile River is the main source of fresh water in Egypt. At the same time, it is subjected to violation from different sources Consequently investigation of the water quality is very important to assess the present status and predict future trends. Therefore, the aim of the present study is to assess the impact of waste discharge on the quality of the Nile River water with special emphasis on organic pollutants.