1. INTRODUCTION

India faces a turbulent water future. Unless water management practices are changed - and changed soon - India will face a severe water crisis within the next two decades and will have neither the cash to build new infrastructure nor the water needed by its growing economy and rising population. Water is one of the critical inputs for the sustenance of mankind. It is used both terrestrial and aquatic environment for various activities, balancing the ecological system of global environment. Water is the important natural source, which is abundant in nature and cover about 2/3 of earth surface. However, only 1% of the water resource is available as fresh water (i.e., surface water-rivers, lakes, reams, and ground water) for human consumption and other activities. The major uses of water are for irrigation (30%), thermal power plants (50%), while other uses are domestic (7%) and industrial consumption (~12%). The United Nation's report on "Water for People, Water for Life" (the first ever UN system wide evaluation on global water resources-2003) has put India a poor 120th for water quality among 122 nations covered. Only Belgium and Morocco are ranked worse than India. The quality indicator value was based on quality and quantity of fresh water (especially ground water), waste water treatment facilities, legalities like application of pollution regulations, India's quality indicator value stood at -3.1 while for based ranked country Finland it was 1.85. The UN evaluation also ranked India 133 in a list of 180 countries for its poor water availability (1880m$^3$ per person per year). Urbanization has given rise to a number of environmental problems such as water supply, wastewater generation and its collection, treatment and disposal in urban areas. In most cases wastewater is let out untreated and it either percolates into the ground and in turn contaminates the groundwater or is discharged into the natural drainage system causing pollution in downstream areas. Sewage and not the industrial pollution accounts for more than 75 per cent of the surface water contamination in India. Due to negligence, groundwater is also increasingly getting contaminated. In India less than 50% of the urban population has access to sewage disposal system. Most of the existing collecting systems discharge directly to the receiving water without treatment. Garbage, domestic and other wastes, is directly dumped into water bodies or roadside, which can often be washed into streams and lakes. Pathogens occurring in the sewage water directly affect the mammals causing severe diseases. About 60 per cent of urban deaths in India are due to lack of safe drinking water facilities. Further deaths due to water borne diseases are second only to malnutrition. Sewage water
contains pathogenic microorganisms like bacteria, viruses, fungi, algae etc., having the potential risks to causes diseases can causes immense harm to public health. The water borne diseases are typhoid, paratyphoid fevers, dysentery and cholera, polio and infectious hepatitis. Sewage water also contains soluble salts that may accumulate in the root zone with possible harmful effect on soil health and crop yield. The quality of irrigation water is of particular importance in arid zones where extremes of temperature and low relative humidity result in high rates of evaporation, with consequent deposition of salt which tends to accumulate in the soil profile. The physical and mechanical properties of the soil, such as dispersion of particles, stability of aggregates, soil structure and permeability, are very sensitive to the type of exchangeable ions present in irrigation water. Thus, when effluent use is being planned, several factors related to soil properties must be taken into consideration. Another aspect of agricultural concern is the effect of dissolved solids (TDS) in the sewage water used for irrigation on the growth of plants. Dissolved salts increase the osmotic potential of soil water and an increase in osmotic pressure of the soil solution increases the amount of energy which plants must expend to take up water from the soil. As a result, respiration is increased and the growth and yield of most plants decline progressively as osmotic pressure increases. The most common phytotoxic ions that may be present in sewage water in concentrations such as to cause toxicity are: boron (B), chloride (Cl) and sodium (Na). Hence, the concentration of these ions will have to be determined to assess the suitability of waste-water quality for probable use in agriculture. A number of elements are normally present in relatively low concentrations, usually less than a few mg/l, in conventional irrigation waters and are called trace elements. They are not normally included in routine analysis of regular irrigation water, but attention should be paid to them when using sewage effluents, particularly if contamination with industrial wastewater discharges is suspected. These include Aluminium (Al), Beryllium (Be), Cobalt (Co), Fluoride (F), Iron (Fe), Lithium (Li), Manganese (Mn), Molybdenum (Mo), Selenium (Se), Tin (Sn), Titanium (Ti), Tungsten (W) and Vanadium (V). Heavy metals are a special group of trace elements which have been shown to create definite health hazards when taken up by plants. Under this group are included, Arsenic (As), Cadmium (Cd), Chromium (Cr), Copper (Cu), Lead (Pb), Mercury (Hg) and Zinc (Zn). These are called heavy metals because in their metallic form, their densities are greater than 4g/cc. The increasing trend in concentration of heavy metals is another
environmental problem which has attracted considerable attention amongst ecologists globally during the last decades. Studies show that the aquatic ecosystem in India has significant amount of mercury [2-5]. Apart from mercury, untreated or allegedly treated industrial effluents and sewage water discharged in the water bodies also contains other toxic heavy metals such as arsenic, lead, nickel, cadmium, copper, iron, zinc and chromium. These toxic heavy metals entering in aquatic environment are adsorbed onto particulate matter, although they can form free metal ions and soluble complexes that are available for uptake by biological organisms [6]. The metals associated with particulate material are also available for biological uptake [7], and are deposited in estuarine sediments [8]. Once deposited, binding by sulfides and/or iron hydroxides immobilizes trace metals until a change in redox or pH occurs [9, 10]. Thus, surfical sediments, particularly the fine fraction, accumulate trace metals and provide a means for evaluating the long term accumulation of heavy metal contaminants [11, 12]. These heavy metals have a marked effect on the aquatic flora and fauna which through bio magnification enter the food chain and ultimately affect the human beings as well. Food chain contamination by heavy metals has become a burning issue in recent years because of their potential accumulation in biosystems through contaminated water, soil and air [13, 14]. In view of the possible accumulation of certain toxic elements in plants (for example, cadmium and selenium) the intake of toxic materials through eating the crops irrigated with contaminated wastewater must be carefully assessed. Although measurements have been made about pollution due to heavy metals in European and Americans countries, not many studies have been carried out in India and there is no much past metal load data available. Hence for better understanding of heavy metal sources, their accumulation in water bodies and sediments seem to be particularly important issues of present day research on risk assessments [15]. The present day by day increasing pollution level have prompted us to conduct the systematic study of environmental pollution along the Bhavan’s College campus of Andheri city of Mumbai.