Chapter 9

Water Pollution Burden and Techniques for Control

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ABSTRACT

The enhancements in the socio-economic status of many people has come from the expansion of agricultural and industrial production. But, some of the activities associated with this expansion have adversely affected water quality. This leads to a negative impact on public health, eminence of life, and environment. This chapter sets out to explain the various factors that lead to water contamination and different mitigation techniques to manage them. We need this knowledge so as to develop suitable solutions for a broad range of environmental problems.

INTRODUCTION

Water is the basic need for sustaining life as its availability both in quantity and quality are important. Earlier importance of the water was from the viewpoint of the quantity as civilization developed around the water bodies for the support of agriculture, transportation and domestic purposes. In the past, quality of water was judged through physical senses of sight, taste and smell. Recent development in medical sciences suggests some other methods for determination of water quality on

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the basis of biological, chemical and pathological pathways (Aggarwal, 2005). The relationship between human waste, drinking water and diseases (Halder et al, 2015) that are transmitted to humans through drinking contaminated water is found and is shown in Table 1. With the rapid increase in industrialisation and population, the demand for water is shooting up every day. Clean drinking water supply and basic sanitation are vital human needs for good health. Water performs several metabolic, physiological and other essential activities in human body and other living beings. It is used in our daily activities for various purposes such as drinking, cooking, bathing and in washing clothes and utensils.

Water is the most abundant compound found in the nature covering 70.9% of the earth surface and is vital for all known forms of life. Oceans hold 97% of surface water, polar ice caps contain 2.4% and land surface water such as rivers, lakes and ponds have 0.6% of the total water. Ground water makes up about 20% of the world’s fresh water supply, which is about 0.61% of the entire world’s water including ocean and ice. Global ground water storage is roughly equal to the total amount of fresh water stored in the snow and ice pack including the north and south poles. According to the UN, planet earth mean annual renewable volume of water is 43,000 cubic kilometres. This is about half of all the fresh water contained in all the earth natural lakes and about ten times the volume of all man-made reservoirs. Groundwater recharge accounts for about 10,000 cubic kilometres annually (i.e. 0.1% of all ground water resources). Thus, only a small proportion of the total volume of groundwater reserves is recharged every year as compared to the total large volume in stock. Some groundwater systems are non-renewable under current climatic conditions because they are formed under much wetter climates that prevailed perhaps 1000 or 10,000 years ago. Groundwater acts as a conduit which can transport water over long distances. It acts as a mechanical filter which improves water quality by removing suspended solids and bacterial contamination. The sources of groundwater (fresh water) are wells and springs which are also the basic source for rural domestic use. Groundwater reservoirs are being increasingly mined in the arid zones of the world. It is replenished by precipitation through rain, snow, sleet and hail.

Water present on earth is in the constant state of motion through a cycle of evaporation and transpiration (evapo-transpiration). The fresh water on the earth exists in surface water bodies such as river and lakes, glaciers and ground water. But these sources of fresh water are shrinking and majority of them are getting polluted by anthropogenic factors such as discharge of domestic wastes and industrial effluents (Mukherjee et al, nd). Excessive extraction of groundwater is also making the water a scarce commodity. The suitability of water in terms of public health is determined by physical, chemical, microbiological and radiological characteristics. Out of these, the most important are chemical and microbiological quality. There are many ways in which water pollution can be defined and usually it means the contamination of
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