

## CHAPTER 1

### INTRODUCTION

#### 1.1 General

Groundwater is one of earth's most vital renewable and widely distributed resources as well as an important source of water supply throughout the world. The quality of water is a vital concern for mankind since it is directly linked with human welfare. In India, most of the population is dependent on groundwater as the only source of drinking water supply. The groundwater is believed to be comparatively much clean and free from pollution than surface water. Groundwater can become contaminated naturally or because of numerous types of human activities; residential, municipal, commercial, industrial, and agricultural activities can all affect groundwater quality. A wide variety of materials have been identified as contaminants found in groundwater.

Water is essential for the survival of all life. Humans depend on water to fulfil a variety of needs and wants. These include water for drinking, health and sanitation, recreation and as part of spiritual and cultural traditions. It is a resource that is often taken for granted, yet a large proportion of the world's population is facing a serious water crisis. Presently, more than 1 billion people lack access to clean drinking water and over 2.4 billion lack access to proper sanitary facilities (Journal of Environmental Science and Technology, Volume 10, 2014). The mismanagement of water resources has led to an increase in their degradation. Therefore improving management of water resources in poorer, developing countries is essential for the enhancement of quality of life and for further development in these regions.

Assessing the quality of water resources is an essential process in the development of water resources. Water quality may be defined in terms of specific characteristics of water that are important with regards to a certain services. These characteristics are usually defined as physical, chemical and biological parameters.

All biological reactions occur in water and it is the integrated system of biological metabolic reactions in an aqueous solution that is essential for the maintenance of life. Most human activities involve the use of water in one way or other. It may be noted that man's early habitation and civilization sprang up along the banks of rivers. Although the surface of our planet is nearly 71% water, only 3% of it is fresh. Of these 3% about 75%

## Characterisation of Groundwater quality and spatial variation analysis, by using GIS tools, of Kunigal Taluk.

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is tied up in glaciers and polar icebergs, 24% in groundwater and 1% is available in the form of fresh water in rivers, lakes and ponds suitable for human consumption (Dugan, 1972). Due to increasing industrialization on one hand and exploding population on the other, the demands of water supply have been increasing tremendously. Moreover considerable part of this limited quality of water is polluted by sewage, industrial waste and a wide range of synthetic chemicals. Fresh water which is a precious and limited vital resource needs to be protected, conserved and used wisely by man. But unfortunately such has not been the case, as the polluted lakes, rivers and streams throughout the world testify. According to the scientists of National Environmental Engineering Research Institute, Nagpur, India, about 70 % of the available water in India is polluted. Contamination of groundwater can result in poor drinking water quality, loss of water supply, high clean-up costs, high costs for alternative water supplies, and/or potential health problems. The presence of heavy metals in water is widespread, affecting hundreds of cities. In high dosages, these heavy metals are highly toxic to human, even deadly. The study was therefore aimed at evaluating the quality of the groundwater (Ground Water Hydrology, D K Todd, Second Edition 2008).

Geographic information systems (GIS) have many applications in hydrology that use spatial analytic tools to a greater extent. The use of Geographic information systems GIS technology has greatly simplified the assessment of natural resources and environmental concerns, including groundwater. In groundwater studies, GIS is commonly used for site suitability analyses, managing site inventory data, estimation of groundwater vulnerability to contamination, groundwater flow modelling, modelling solute transport and leaching, and integrating groundwater quality assessment models with spatial data to create spatial decision support systems. In present study we used GIS as a database system in order to prepare maps of water quality according to concentration values of different chemical constituents. In such studies, GIS is utilized to locate groundwater quality zones suitable for different usages such as irrigation and domestic. GIS is used to prepare Thematic maps to locate promising well sites based on water quality and availability (Source: Wikipedia).