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WATER RESOURCES IN INDIA: ITS DEMAND, DEGRADATION AND MANAGEMENT

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ABSTRACT

Water is a prime natural stockpile, a basic human need and a treasured national asset. Planning, development and management of water maneuver need to be governed by national perspectives. We are all too familiar with the problems of water on earth in both qualitative and quantitative aspects. India receives annual precipitation of about 4000km^3, including snowfall. Out of this, monsoon rainfall is of the order of 3000km^3. Rainfall in India is relying on the south west and north-east monsoons, on shallow cyclonic depressions and disturbances and on local storms. The latest estimate of total water resources of India as assessed by NCIWRDP is 1952.87 BCM. The (NCIWRD) estimated the total basin wise average annual flow in Indian River systems as 1953 km$^{3.}$

The total utilizable water resources of India, according to the CWC are 1110 BCM. According to NCIWRD, the population of India is expected to be 1333 million and 1581 million in high growth scenario by the year 2025 and 2050 respectively. This eventually would be major cause of water crisis and water quality deterioration. An ideal water management technique and awareness of people could help to save the life on earth.

Keywords: prime natural stockpile , basic human , ideal water management technique.

INTRODUCTION

Water bedaubs more than two-thirds of the Earth's surface. But fresh water represents less than 0.5% of the total water on Earth. The rest is either in the form of seawater or locked up in icecaps or the soil, which is why one often hears of water sparseness in many areas. There are about 97 percent of all water is in the oceans and three percent of all Earth's water that is freshwater. The majority, about 69 percent, is locked up in glaciers and icecaps, mainly in Greenland and Antarctica. It might be surprised that of the remaining freshwater is remained as ground water. No matter where on Earth you are standing, chances are that, at some depth, the ground below you is saturated with water. Of all the freshwater on Earth, only about 0.3 percent is contained in rivers and lakes-yet rivers and lakes are not only the water we are most familiar with, it is also where most of the water we use in our everyday lives exists .Water is finite in quantity, tangible in nature, and un-equally distributed throughout the world. Only 2.5% of 1386 million cubic kilometers of water available on earth is fresh water and one-third of this smaller quantity is available for human use. The per capita annual water resource (AWR) has been used to classify countries with respect to the water scarcity. According to

international norms ,countries with an AWR per capita of 1700 cu m and above have been termed as countries where shortage will be rare; if per capita water availability is less than 1700 cu m per year then the country is categorized as water stressed , if it is less than 1000 cu m per capita per year, then the country is classified as water-scarce; and those with an AWR per capita of 500 cu m and below as countries where availability of water is a primary constraint to life [5**]**. Water is essential for sustaining all forms of life, food production, and economic development and for general well being. It is impossible to substitutes for most of its uses, difficult to de-pollute, expensive to transport and it is truly a unique gift to mankind from nature [**6]**. In India, per capita surface water availability in 1991 and2001 was 2309 and 1902m^3 respectively and these are projected to reduce further to 1401 and 1191m^3 by the years 2025 and 2050 respectively [**7]**. India receives annual precipitation of about 4000km^3, including snowfall. Out of this, monsoon rainfall is of the order of 3000km^3. Rainfall in India is reliant on the south west and north- east monsoons, on shallow cyclonic depressions and disturbances and on local storms (Figure-1).

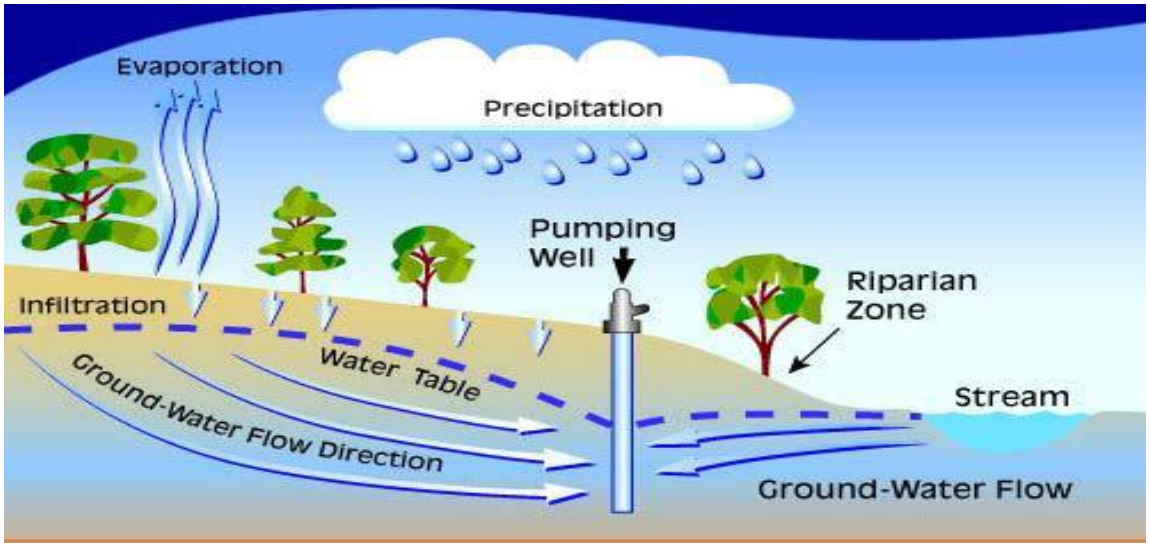

Figure-1: Ground water Direction, Flow and Availability

Population of our country is increasing with an alarming rate. It has an adverse impact on water resources in our country. In order to fulfill water demands in the future, we will need to rationalize on various means of capturing and storing water. A good management system may save the quality of water and protect it from deterioration.

WATER AVAILABILITY AND WATER DEMAND IN INDIA

According to the National Water Policy of India. "Out of the total precipitation, including snowfall, of around 4000 billion cubic meters(BCM) from surface water and replenish able ground water is put at 1869 billion cubic meters. Because of topographical and other constraints, about 60% of this, i.e.690 billion cubic meter from surface water and 432 billion cubic meters from ground water, can be put to beneficial use. (Table-1). "The latest estimate of total water resources of India as assessed by NCIWRDP is 1952.87 BCM, but this cannot be fully put to beneficial use because of topographical and other constraints.

There are four main sources of water:

(i) Surface water
(ii) Underground water
(iii) Atmospheric water, and
(iv) Oceanic water.

TOTAL WATER DEMAND OF INDIA

The population of the country has already crossed the 1 billion mark and is expected to reach 1.64 billion by the year 2050. Towns and villages are expanding rapidly, new hamlets are coming up and existing ones are turning into villages – all requiring and demanding drinking water for sustenance of life. India has been traditionally an agriculture based economy. Hence, development of irrigation to increase crop production for making the country self sufficient and for poverty elevation has been the crucial importance for the planners. At present, available statistics on water demand shows that the agriculture sector is the largest consumer of water in India. About 83% of the available water is utilized in agriculture alone. The quantity of water required for agriculture has increased progressively through the years as more and more areas were brought under irrigation. Since 1947 the irrigated area in India rose from 22.60 to 80.76 mha up to June 1997.Contribution of surface water and ground water resources for irrigation has played a significant role in India attaining self-sufficiency in food production during the past three decades, but it is likely to become more critical in future in the context of national food security. The population of India is growing day by day. According to NCIWRD the population of India is expected to be 1333 million and 1581 million in high growth scenario by the year 2025 and 2050 respectively. Keeping in view the level of consumption, losses in storage and transport, seed requirement and buffer stock, the projected food grain and feed demand for 2025 and 2050 would be 320 million tons and 494 million tons respectively (high demand scenario).So, the annual water demand for irrigation purposes, domestic use, hydro-electric power sector, industrial sectors and for others purposes are mentioned in table 3.Much of the future demand needs to be met from the ground water resources.

WATER BUDGET

Water Budget means – the balance between the available water in the country and the water under use. There is a great variation in the distribution of water resources in space and time. Water is available in sufficient quantity during rainy season. As the dry season sets in, there is a shortage of water. The reserves of our surface and underground water are about 23840 billion cubic metres. Out of this only 10860 billion cubic metre water is required for use. The unit of measurement of amount of water is cubic metre or hectare metre. If water standing one metre deep on a perfectly level area of one square metre, then the total volume of whole of that water would be one cubic metre. In the same way, if water standing one metre deep on a perfectly level area of one hectare then the total volume of water would be one hectare meter.

CONCLUSION

Water is life on earth. It is one of the most essential natural resources for sustaining life and it is likely to become critically scarce in the coming decades, due to continuous increase in

its demands, rapid increase in population and expanding economy of the country. Variations in climatic characteristics both in space and time are responsible for uneven distribution of precipitation in India. It is posing a challenge to the existing water resources and to those who are responsible for the management of water resources. Hydrological studies are required to be taken up for assessment of water resources under changing climatic scenarios. For safe drinking water it is essential to generate reliable and accurate information about water quality. To sustain life on earth in all its totality, water should be carefully managed in its natural habitats.

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