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A Theoretical Approach View On Water And Their Chemistry

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Abstract -The origin of water on the earth is not clear so far. However, the current presumption is the primordial earth had no oceans and perhaps the very little atmosphere. It is believed that the volatile constituents bound in the earth crust, oozing to the surface through volcanoes, rock movements and hot springs, condensed to form the ocean, atmosphere and mountains. This way perhaps this remarkable combination of hydrogen and oxygen called water come into being and eventually become an indispensable component of earth's environments.

Chemically, water is the mono-oxide of Hydrogen i.e. (H.O.H). It freely disassociated into hydrogen and hydroxyl ions. The ionization product (H+) and (OH-) is about 10-4. Water is a colourless liquid and possesses a high dielectric constant (81), and therefore salts get highly ionized when dissolved in water but not so in the other solvents. Due to this property, water is known as the universal solvent present on the earth that is why natural water contains many salts in dissolved form. Based on the amount of these salts dissolved in the earth only 3% of the total water (approximately 1.4 billion cubic kilometre) is fresh and suitable for human consumption of this, less than 0.01% is associated with rivers and streams.

Keyword- Water Theory, Chemistry of Water , Guideline of water Consumption.

Introduction

Today India is not the only country which is facing crisis but there are 26 another countries, collective home of 230 million people, in this category. The lack of water becomes a severe constraint in food production, economic development and protection of natural system. In many reasons as demand continue to rise and water supply projects get more difficult to built, water budgets are becoming badly imbalanced. Water that reliably available to the human population is about 9000 cubic kilometres per year or about 1800 cubic meter per person. This may sound like a lot of water but the available resource are neither distributed evenly nor used efficiently. More than 600 million people live in the world arid and semi-

arid areas where they face chronic water scarcity. It is a serious problem in these areas because about 47% of rain fed crop land is affected by desertification.
As it is necessary to plan and develop this prime natural resource carefully under the given national perspective, the Ministry of Water Resources drafted the National Water Policy in 1987. A brief outline of the chief contents of the policy is as follows:

1. A standard national information system should be established with a network of data banks to collect information about resource's availability and their utilization.
2. Comprehensive and reliable projections of future demand for water for diverse purposes.
3. Maximum utilization of water resources with the help of conservation augmentation and prevention of losses.
4. Transfers of surplus water from one river basin in another having shortage of the same.
5. Recycling and reuse of water.
6. Appropriate provision should be made for periodic maintenance of the system and structures created.
7. Continuous surveillance and monitoring of the system created.
8. Periodic reassessment of groundwater resources.
9. Periodic quality monitoring in the case of surface water and groundwater.
10. Integrated and coordinated development of surface and groundwater their conjunctive uses.
11. Strict control of groundwater exploitation to ensure social equity and to avoid adverse effects like salinity ingress.
12. Efforts should be made to involve people in various aspects of management especially the distribution of water and collection water rates.
13. Water zoning: industrial, agricultural and urban development should be planned based on water availability in the particular zone.
14. Water rates should be such as to convey the scarcity value of the resources to the users and to foster the motivation for the economy in water use.
15. Adequate training facilities for personnel engaged / involved in the discipline of water management.

Literature Survey

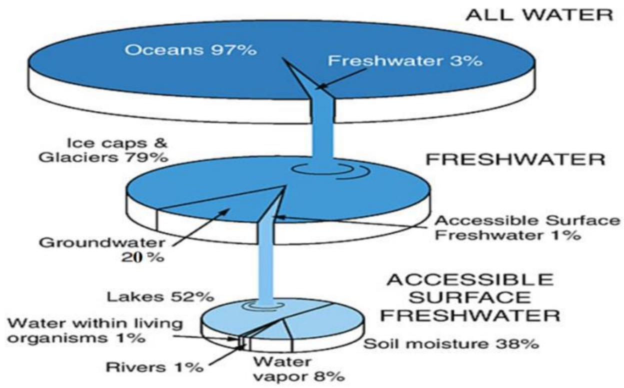

Figure 1.0: Global Distribution of Water

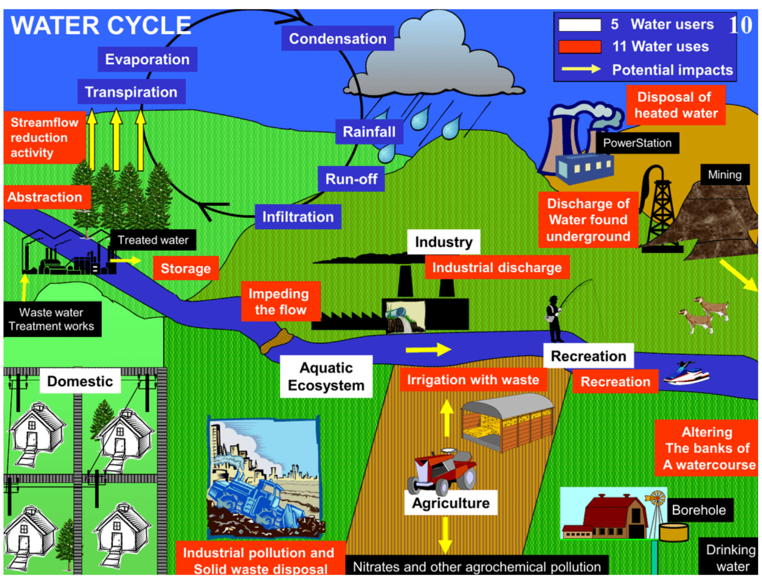

Figure 1.2: Water Uses and Water Cycle

The sediments at the bottom of the water column play a significant part in the heavy metal contamination scheme of an aquatic system (Fostner, 1985). They represent the current state of the water system and can be used to detect pollutants that do not remain soluble in surface water after discharge. A significant portion of heavy metals (contributed naturally as well as through different human activities) is discovered to be linked with bottom sediments as a result of complicated physical, chemical, and biological processes. (Baruah et al., 1996). As a result, surface water bed sediments serve as both a sink and a cause of metals. Metal deposition in sediments serves as a record of pollution's geographical and chronological history (Martin and Whitfield, 1983). As a result, sediment monitoring can give critical information on a variety of contamination incidents.

Various techniques for groundwater recharging have been employed in the states of Maharashtra, Gujarat, Kerala, and Tamil Nadu. In Maharashtra, studies were carried out on seven percolation tanks in the Sina and Main River basins. The average recharge volume of these tanks was 50 percentage points of the capacity of the tank, provided the tank bottom was maintained by removing accumulated sediment and debris before the annual monsoon. Best results were obtained from system locates in areas of vesicular or fractured basalt. Canal barriers, where the recharge structure was situated within the course of the canal, were found to be most effective and economical as the surface area exposed to evaporation was, on average, 10 percentage points of that of an average-sized percolation tank. Within canal barriers, the rate of infiltration varied from 50 percentage points to 70 percentage points of the capacity of the reservoir. Infiltration was aided by a connector well linking the phreatic, alluvial aquifer at 6-meter depth with the deeper, confined basaltic aquifer at 63-meter depth, allowing the free flow of water by gravity from a phreatic aquifer to the confined aquifer, which was saturated due to infiltration from the surface reservoir, was 3 meter below ground level, and the piezometric level in the confined aquifer was 30 meter below ground level (Bhattacharya, 2010). The fast expansion of industrialization and urbanization over the previous two decades has had significant environmental consequences. Groundwater has been polluted as a result of industrial, municipal, and agricultural wastes comprising pesticides, insecticides, fertilizer residues, and heavy metals with water (Shastri et al., 1999).

Methodology

The effects of toxic substances are frequently magnified by environmental conditions; for example, the temperature has a direct influence on morbidity. At any given concentration of a toxic substance, a rise of 100C generally halves the survival time of fish. Poisons, therefore, become more lethal in rivers during the summer and periods of normal fish migration up the river. During spawning, even slight pollution and increases in temperature can cause damage to salmon and trout. Also, the rate of oxygen consumption of fish is altered by the presence of poisons, and their resistance to low oxygen levels can be impaired. The pH of water within the allowable range of 6.5 to 9 can influence some poisons. The dissolved salt content can also influence toxicity, particularly the presence of calcium, which reduces the adverse effect of some heavy metals. For example, cadmium, copper, lead, nickel, and zinc decrease and toxicity with increased water hardness. Acute toxic effects (16 to 24-hour exposure) have been studied for most toxic pollutants. In contrast, few data are available on chronic toxicity. Applying a safety factor to the median lethal concentration can result in a criterion that is either too conservative or unsafe for long-term exposure. Chronic effects often occur in the species population rather than in the individual. If eggs fail to develop or the sperm does not remain viable, the species would be eliminated from an ecosystem because of reproductive failure. Physiologic stress can make a species less competitive, resulting in a gradual population decline or absence from an area. The same phenomenon could occur if a crustacean that serves as a vital food during the larval period of a fish's life does not survive. Chemicals, hormones, pesticides, and chemicals used in the manufacturing of plastics are all examples of endocrine disruptive substances. These substances, even at trace levels, can disrupt reproduction and development. Reproductive problems decreased immunological function, and a skewed male-female sex ratio is all negative impacts of fees, all of which have a negative influence on the fish population. Finally, the intake of both wild and farm-raised fish might result in the biological build-up of certain fat-soluble hazardous chemicals, which can enter the human food chain.

Conclusion

In most regions of the globe, groundwater is exploited for home supplies, industry, and agriculture since it is a responsible resource with inherent advantages over surface water. In the water cycle, rainfall is the main source of the provides waterfall for all living organisms in different ecosystems. Water from rain enters into the soil and then flows vertically and downslope through the soil profile. Water flow varies from place to place according to the physical conditions of the soil of a particular area. The flow of heavy metals and groundwater movement beneath the earth may be measured by using various forms of formulas according to the physicochemical and geographical conditions of soil and soil profile of the particular area.

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