

WATER POLLUTION AND MANAGEMENT

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1. Introduction

Water is a cyclical resource that is widely available worldwide. Aquifers, reservoirs, lakes, rivers, seas, and groundwater are all examples of bodies of water. India makes up around 2.45% of the world's surface area, 4% of the water resources, and roughly 16% of the world's population. Surface water comes from four main sources. These include tanks, ponds, lakes, and rivers. About 10,360 rivers and their tributaries with an average length of 1.6 km exist in the nation. India's river basins collectively have an estimated mean annual flow of 1,869 cubic km. Punjab, Haryana, Rajasthan, and Tamil Nadu are states that use a lot of groundwater. But certain States, including Chhattisgarh, Odisha, Kerala, and others, only use a small percentage of their groundwater potential. State ground water resources are being used moderately by states like Gujarat, Uttar Pradesh, Bihar, Tripura, and Maharashtra. Historically, India has had an agrarian economy, with around two thirds of its people relying on agriculture. Water is mostly used for irrigation in agriculture. Due to the country's rainfall's spatiotemporal fluctuation, irrigation is required. Water is necessary for human civilization, living things, and the environment. It generates electricity for household, commercial, industrial, and agricultural usage as well as for drinking, cleaning, agriculture, transportation, industry, recreation, and animal husbandry.

The per capita availability of water is dwindling day by day due to increase in population. Additionally, industrial, agricultural, and home effluents are polluting the existing water resources, which is further reducing the amount of usable water resources. Water purity, or the absence of undesired foreign contaminants, is referred to as water quality. Foreign substances including germs, chemicals, industrial waste, and other wastes cause water to become contaminated. Such things degrade water quality and make it unfit for human usage. Toxic compounds dissolve or are suspended in water when they enter lakes, streams, rivers, the ocean, and other bodies of water. This causes water pollution, which degrades water quality and affects aquatic systems.

2. Water Pollution

Available water resources are degrading rapidly. The major rivers of the country generally retain better water quality in less densely populated upper stretches in hilly areas. In plains, river water is used intensively for irrigation, drinking, domestic and industrial purposes. The drains carrying agricultural (fertilizers and insecticides), domestic (solid and liquid wastes), and industrial effluents join the rivers. The concentration of pollutants in rivers especially remains very high during the summer season

when flow of water is low. Another way through which we can improve fresh water availability is by recycle and reuse. Use of water of lesser quality such as reclaimed waste-water would be an attractive option for industries for cooling and firefighting to reduce their water cost. Similarly, in urban areas water after bathing and washing utensils can be used for gardening. Water used for washing vehicle can also be used for gardening. This would conserve better quality of water for drinking purposes. Currently, recycling of water is practiced on a limited scale. However, there is enormous scope for replenishing.

The main problems with water are water shortage, shortages of clean water, and waterborne diseases. Many people will have difficulty accessing enough water to meet their basic needs. Increasing populations, growing agriculture, industrialization, and high living standards have boosted water demand.

3. Water conservation

Water conservation includes all the policies, strategies and activities to sustainably manage the natural resource of fresh water, to protect the hydrosphere, and to meet the current and future human demand. Population, household size and growth and affluence all affect how much water is used. Factors such as climate change have increased pressures on natural water

resources especially in manufacturing and agricultural irrigation. Many countries have already implemented policies aimed at water conservation, with much success. The key activities to conserve water are as follows: any beneficial reduction in water loss, use and waste of resources, avoiding any damage to water quality; and improving water management practices that reduce the use or enhance the beneficial use of water. Technology solutions exist for households, commercial and agricultural applications. Water conservation programs involved in social solutions are typically initiated at the local level, by either municipal water utilities or regional governments.

4. Watershed management

Watershed management refers to basic concepts of efficient management and conservation of surface and groundwater resources. A variety of techniques, including percolation tanks, recharge wells, etc., involves preventing runoff and storing and recharging groundwater. But in a broad sense, watershed management entails the preservation, renewal, and wise use of all-natural (such as land, water, plants, and animals) and human resources within a watershed.

Water distribution is uneven and therefore, large parts of India remain deficient in rain, as well as groundwater. This unequal distribution across the country makes most of the population face water scarcity. The requirement of water in urban areas is higher than the availability. Moreover, water conservation will ensure availability of clean for future generations. The Effective watershed management methods are the following:

1. Contour bonding / graded bunding
Contour bunding is a land management practice for marginal, sloping, and hilly land where the soil productivity is very low. It involves the placement of lines of stones along the natural rises of a landscape. This technique helps to capture and hold rainfall before it can become runoff.
2. Check dams and gully control structures
In gully control, temporary structural measures such as woven-wire, brushwood, logs, loose stone and boulder check dams are used to facilitate the growth of permanent vegetative cover. Check dams are constructed across the gully bed to stop, as already described, channel and lateral erosion.

3. Bench terracing
The original bench terrace system consists of a series of flat shelf-like areas that convert a steep slope of 20 to 30 percent to a series of level, or nearly level benches. In other words; bench terracing consists of construction of series of platforms along contours cut into hill slope in a step like formation.
4. Farm ponds
Farm Pond is a dug out structure with definite shape and size having proper inlet and outlet structures for collecting the surface runoff flowing from the farm area. It is one of the most important rain water harvesting structures constructed at the lowest portion of the farm area.
5. Percolation ponds
A percolation pond is a small water storage structure constructed across a water body to harvest the runoff from the catchment and impounded for a longer time thereby recharging ground water storage in the zone of influence of pond.

Reference

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