

Review Paper

Management of Water Resources for Sustainable Development: A Preliminary Review

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Abstract

Water is a source of life and a vital resource, necessary for all aspects of human and ecosystem survival and health. Water is potentially useful and plays an important role in world's economy. Its usage includes agricultural, industrial, household, recreational and environmental activities. Humans need mainly freshwater for use. But, freshwater is available in very low quantity to us. A reckless use of water in the last few decades has caused an emergence of water depletion problem. Humans are depleting water at a tremendously high rate which is due to increase in human population. Climate is also changing due to human activities, so there is an urgency to manage water. Water management is the activity of planning, developing, distributing and managing the optimum use of water resources. Many efforts are taken by the government to manage water efficiently like making of several laws to control water loss (depletion). Many multi-purpose river valley projects have been undertaken like, Damodar River Valley Project, Bhakra Nangal Project and many more. These management strategies will help us conserve water resources for us and our future generation. This is sustainability. Sustainability is the ability of Earth to survive and adapt to changing environmental conditions and sustainable development is the development that meets the needs of the present without compromising the need of future generations. So, in accordance with the changing climate, we need to bring certain changes in our habits so as to conserve the water resources for sustainable development.

Keywords: *Water Resources, Management, Sustainable Development.*

Introduction

Water is a source of life and a vital resource, necessary for all aspects of human and ecosystem survival and health. Water usage includes agricultural, industrial, household, recreational and environmental activities. Humans need mainly freshwater for his use but freshwater is available in very less amount to us. Here is the distribution of water on Earth. 97% of the water is salt water. Only 3% is fresh water. Of this, slightly 2/3rd is frozen in glaciers and polar ice caps. The remaining water is found under the ground, with only a small fraction above the ground or in air. Most of the freshwater needs of humans are filled by water present above ground. But, in places where surface water are scarce or inaccessible, groundwater supplies fulfill the needs for freshwater. But, a reckless use of water in the last few decades has caused an emergence of water depletion problem. Humans are depleting water at a tremendously high rate. Water depletion is the water depleted or water unfit or unapproachable for human use. Water depletion may be either of surface water or ground water. Depletion of water is in the sense that it becomes unfit for drinking or other uses and depletion due to its excessive use.

Surface water becomes unfit or unapproachable by its excessive use by humans or by water pollution i.e. addition of unwanted and harmful substances in water, which may adversely affect the water. Ground water depletion is the lowering of ground water table. It is done due to excessive use of water for agricultural purposes, excessive pumping etc. So, there is an urgency to manage water. Water management is the activity of planning, developing, distributing and managing the optimum use of water resources. But, the pace at which we humans are depleting our water resources, there will be less or no water left for our future generations. So, there is a need for sustainable use of water and its management. By this way we can conserve water for our future generations. This is known as sustainable development i.e. development that meets the needs of the present without compromising the need of future generations. And sustainability is the ability of earth to survive and adapt to changing environmental conditions.

Sustainability criteria for water:

- *A minimum water requirement to all humans to maintain human health.*
- *Sufficient water to restore and maintain the health of ecosystems.*
- *Water quality to be maintained to meet certain minimum standards.*

- *Institutional mechanism to be set to prevent and resolve conflicts over water.*
- *Cleaning of major polluted rivers.*
- *Drinking water access to all the villages.*
- *Control of population growth.*

We humans can conserve water at basic level.

- *Conservation of water in agriculture – by certain methods like sprinklers for irrigation, using stored water, dry farming, use of drought resistant crops, etc.*
- *Conservation of water at our homes – by rainwater harvesting, avoiding wastage of water, using stored water instead of running tap water, etc.*
- *Conservation of water in industries – by water treatment, recycling, reuse, etc.*
- *Pollution control – by treating water before releasing into large water bodies, etc.*

Government has made various projects and laws for efficient management of water.

- *Multipurpose river valley projects*

Objectives

Dams built on river serves as manmade lake which helps in flood control. Stored water is used for power generation and also for irrigation during dry periods. Catchment areas of dams are afforested, so, it helps to preserve ecosystems.

- *In India first such project was – Damodar river valley project. It has a series of dams on tributaries Damodar flowing in Chota Nagpur in south Bihar to West Bengal.*
- *Bhakra Nangal project – It is built where two hills are present, on either side of Sutlej. This project serves the states of Himanchal Pradesh, Punjab, Haryana, Uttar Pradesh and Rajasthan.*
- *Hirkund dam in Orissa.*
- *Nagarjuna Sagar Project is built on river Krishna in Andhra Pradesh.*
- *Chambal Project is in the parts of Rajasthan and Madhya Pradesh.*

Other projects are also there like Kosi Project, Indira Gandhi Rajasthan Canal project, etc.

- *Laws to control water pollution (related to surface water crisis)*
- *The Environment Protection Act 1986 – It was promulgated for protection and improvement of environment including water. The act provides general powers to the Central Government to take all necessary measures for the purpose of – protecting and improving the quality of environment and preventing, controlling and abating environmental pollution, etc.*
- *The Water Prevention and Control Act, 1974 – The Central Pollution Control Board (CPCB) has been given powers to close or stop supply of water and electricity to offending establishments.*
- *Major activities*
- *Ganga Action Plan (GAP) – There is a separate Ganga Project Directorate (GPD) in the Ministry of Environment and Forests for regeneration and development work on this major river basin of country. The GAP was launched in 1986.*

Objective

- *To improve the water quality of Ganga to acceptable standards (bathing standards) by preventing the pollution load reaching the river.*
- *Yamuna Action Plan (YAP) – It is the part of the National River Conservation Plan (NRCP). It was launched in April 1993.*
- *Objective –*
- *To built Sewage Treatment Plants (STP) to treat domestic waste.*
- *To built common effluent treatment plants to treat industrial effluents.*
- *Repair sewage treatment of drains, pumps, pipes.*
- *To built electric crematorium.*
- *Assessment of Water Quality – Under the National water quality monitoring programme, the water quality of rivers is measured.*
- *Assessment of Coastal Water Quality – The CPCB in association with department of Ocean Development has identified 173 monitoring stations all along the Indian Coast to assess the water quality.*
- *Preparation of Environmental Standards – Based on the standards of CPCB and the Bureau of Indian Standards (BIS), effluent and emission standards for different kinds of industries have been notified. The industries covered are thermal power plants, caustic soda, oil refineries, textile, etc.*
- *Enforcement of Standards – this is very helpful to control pollution at source. Minimum National Standards (MNS) are being evolved by the CPCB for major categories of water.*

Conclusion: So, as our climate is changing day by day it is necessary for us to conserve our natural resources by bringing certain changes in our habits. to make it possible there is the need for sustainable development so that the fast depleting natural resources are conserved for our use as well as the use of our next generations.

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