

Conservation of Natural Resources: WATER

Skumar S Kumbhalkar
Asst. Prof. Dept. of Mechanical
Engineering, K.D.K.College of
Engineering, Nagpur, India.

Dr. C. C. Handa
Head & Professor, Dept of
Mechanical Engineering,
K.D.K.College of Engineering,
Nagpur, India.

Dr. A. R. Bapat
Principal,
K.D.K.College of Engineering,
Nagpur, India

ABSTRACT

Nature provides the basic needs like food, shelter, clothes, etc. for human survival. Air, water, soil, minerals, coal, petroleum, etc. are used in daily life. But there is a need to think how long these precious materials of the nature will be available for use. The growing population, rapid industrialization and Urbanization have created heavy demand on all these materials. It is feared that unless proper steps are taken to conserve them in time, tremendous hardship will be faced in future.

The earth's total water volume is constant-none is gained or lost. Water goes through a continuous, hydrologic cycle of precipitation, infiltration, runoff, evaporation, and transpiration by plants. However, unequal distribution of rain at any given time or location can create shortages. Surface water storage is usually uneconomical for extreme droughts. Variation in precipitation affects surface water supplies immediately. Groundwater is affected more slowly, but will be reduced by extended drought. Water is one of the most important source of Renewable Energy.

Keywords

Water; Natural Resources; Conservation; Harvesting

1. INTRODUCTION

1.1 Natural Resources

The term "resource" means anything that is used from the environment to achieve the objective. For example, bricks, cement, iron, wood etc. are required to construct a building. All these items are called the resources for construction of building. A resource can be defined as 'any natural or artificial substance, energy or organism, which is used by human being for its welfare. These resources are of two types:

- (a) Natural resources and
- (b) Artificial resources.

All that the nature has provided such as water, soil, air, minerals, coal, sunlight, animals and plants, etc., are known as natural resources. Human being uses these directly or indirectly for survival and welfare. The resources, which have been developed by human being during the growth of civilization, are called artificial resources. For example, biogas, thermal electricity, plastics, etc are man-made resources. These man-made resources are generally derived from some other natural resources. For example, plastics and many other chemical products are ultimately derived from the natural resource of petroleum.

1.2 Classification of Natural Resources

A) Natural

- i) Exhaustible
 - a) Renewable(e.g. wind, water, forests)
 - b) Non-renewable (e.g. coal, petroleum, iron, biological species)
- ii) Inexhaustible(e.g. solar energy, wind, rainfall, tidal energy)

B) Artificial(e.g. electricity)

2. CONSERVATION OF NATURAL RESOURCES

As the human population is continuously growing the consumption of natural resources is also increasing. With the increasing industrialization and urbanization of the modern human society, the use of all the resources is rising. If they are not properly used and well managed, a serious scarcity will result. Therefore, need is felt to conserve the natural resources. This will also upset the ecological balance. Conservation is the proper management of a natural resource to prevent its exploitation, destruction or degradation. Conservation is the sum total of activities, which can derive benefits from natural resources but at the same time prevent excessive use leading to destruction or degradation.

2.1 Need for Conservation of Natural Resources

Nature provides all human basic needs but human tend to over exploit it. If this process of exploiting the nature is going on , there will be no more resources available in future. There is an urgent need to conserve the nature. Some of the needs are :

- To maintain ecological balance for supporting life.
- To preserve different kinds of species (biodiversity).
- To make the resources available for present and future generation.
- To ensure the survival of human race.

2.2 Conservation Of Natural Resources and Traditions Of India

The need for conservation of natural resources was felt by human predecessors and in India, there was a tradition of respecting and preserving the nature and natural resources. Natural resources were conserved in the form of sacred groves/forests, sacred pools and lakes, sacred species etc. In India the conservation of natural forests is known from the time of Lord Ashoka. Sacred forests are forest patches of different dimensions dedicated by the tribal to their deities and ancestral spirits. Cutting down trees, hunting and other human interferences were strictly prohibited in these forests. This practice is wide spread particularly in peninsular, central and eastern India and has resulted in the protection of a large number of plants and animals and. Similarly, several water bodies, e.g., Khecheopalri lake in Sikkim was declared sacred by people, thus, protecting aquatic flora and fauna. Worshipping certain plants like banyan, peepal, tulsi etc. has not only preserved them but also encouraged peoples for their plantation. History recalls numerous instances where people have laid down their lives in protecting the trees.

3. WATER – A PRECIOUS RESOURCE

Another most important natural resource is Water. Water is very essential for survival of all living organisms. It is the most important component of all life forms and necessary for sustaining life. It regulates climate, generates electricity and is also useful in agriculture and industries. About 97% of the

water on earth is saline in nature, which is found in seas and oceans. The remaining 3% is fresh water, and most of which is stored in ice caps and glaciers, and just about 0.36% is distributed in lakes, rivers, ponds, etc. Sea water supports marine life and contributes to the production of fish and sea foods and several other commercial products (iodine, agar, coral, pearls, etc.). Fresh water is needed by humans for their personal use (drinking, cleaning, sewage disposal), It is also used by other animals, in agricultural, and for industrial purposes. Fresh water is a renewable resource as it is continuously being produced through hydrological cycle (evaporation, condensation and precipitation).

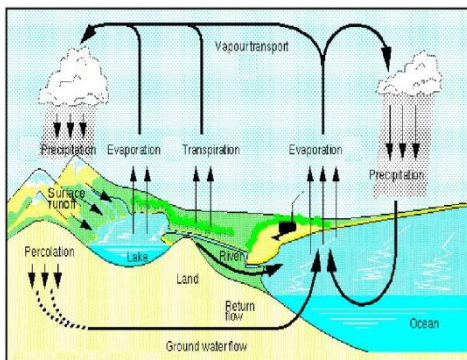


Fig.1: Hydrological cycle

3.1 Degradation of Water

Degradation of water is the decrease in quality and quantity of water on the earth surface. With increase in population and industrial growth, water is being degraded day by day. The main reasons for the degradation of water are:

- To meet the need of increasing population, surface water (water from ponds, lakes, rivers, etc) and ground water are overdrawn.
- Sewage i.e., wastes water from domestic and municipal use makes fresh water unfit for use by human beings and animals.
- Waste water, from all industries flow down the surface water bodies and ground water bodies and they get polluted.
- Agricultural wastes containing manures, fertilizers and pesticides enter the water bodies and degrade the quality of water.
- The continuous decrease of ground water level along coastal regions often cause movement of saline sea water into freshwater wells, thus, spoiling their water quality.

4. CONSERVATION OF WATER

Conservation and management of water are essential for the survival of mankind, plants and animals. This can be achieved adopting the following methods:

- Judicious use of water in a day-to-day life (Home Water-Saving Methods).
- Rainwater harvesting should be done by storing rainwater and recharging groundwater.
- Industrial wastes (effluents) should be treated to prevent chemical and thermal pollution of fresh water.
- Constructing dams and reservoirs to regulate supply of water to the fields, as well as to enable generating hydroelectricity.
- Sewage should be treated and only the clear water should be released into the rivers

- Growing vegetation in the catchments areas, which will hold water in the soil and allow it to percolate into deeper layers and contribute to formation of ground water.

4.1 Home Water-Saving Methods

Average home water use varies from 50 to 100 gallons per person per day. The greatest water use is in the bathroom; laundry use ranks second. Water conservation is important during drought periods, or whenever use strains the supply in an overpopulated area.

4.2 Water-Saving Devices and Appliances

By selecting and installing water-saving devices and appliances, waste of water will reduced in new homes. In existing homes by modifying the water fixtures in place to reduce water use. Following is a list of suggestions to reduce water use.

4.3 Faucets and showers

Most faucets and showerheads discharge more water than necessary under normal pressure. Adding a flow reducer in the water pipe, a low-flow fixture, or an attachment to the existing fixture reduces water use.

4.4 Toilet

Most older toilet tanks hold more water than necessary. Filling plastic bottles with water and placing them in the tank reduces volume of water while maintaining a depth necessary to provide proper flushing velocity. Do not use bricks, since they can crack the tank if dropped, or a brick may disintegrate and cause plumbing problems. Toilets are commercially available with modified bowls and traps that require less water. Current regulations require that new fixtures use 1.7 gallons per flush or less.

4.5 Hot water pipe insulation

Leaving a hot water faucet running to carry hot water to the tap wastes water and energy. Insulating hot water pipes reduces this waste.

4.6 Point-of-use water heaters (instantaneous)

Installing these separate units beneath the kitchen and bathroom sinks gives you instant hot water and also saves water and electricity. Because of this no need to run the tap to wait for the water to get warm. Sizes typically vary from 2 to 4 gallons. The heaters operate on normal house voltage (120V), propane, or natural gas.

4.7 Dishwashers and automatic clothes washers

Water-saving models substantially reduce water consumption. Modifying older appliances is usually not practical.

4.8 Important Suggestions for Water Conservation:

A) Conserving Water Indoors

- Avoid flushing the toilet unnecessarily. Use water efficient flushes, plumbing fixtures having sensors, low flow faucet aerators which require minimum water.
- Turn off water while brushing teeth.

- For shaving, use mug rather than using running water.
- Close faucets while soaping and rinsing clothes.
- Keep overflow valve in the over head tanks so as not to waste water.
- Use waste water of cloth cleaning to clean the floor.
- Use waste water in flush.
- Don't use running water for releasing ice from tray.
- Don't use extra detergent in washing clothes.
- Don't use running water while hand-washing clothes.
- Operate automatic washing machine when it is fully loaded.
- Don't use shower/big bath tubs in bathrooms.
- While going out door, turn off the main valve for water.
- Develop habit of monitoring water meters.
- Verify that the home is leak free. Repair dripping tap by replacing washers.

B) Conserving Water Outdoors.

- Minimize grass lawns in yard because less grass means water demand.
- Don't over-water the lawns. A good rain eliminates the need watering for more than a week.
- Water the lawns during early morning hours when winds and speeds are the lowest. This reduces losses from evaporation.
- Try to use waste of dish washing/cloth cleaning for gardening and cleaning the floor.
- Check leaks in hose, pipes etc.
- Use sprinkler/drip irrigation systems.
- Don't allow water to flow into gutter.
- Don't wash floors with a hose. Use a broom.
- Avoid over fertilizing the lawn. The application of excess fertilizer increases the need of water.

4.9 Rainwater harvesting

In urban areas, the construction of houses, footpaths and roads has left little exposed earth for water to soak in. In parts of the rural areas of India, floodwater quickly flows to the rivers, which then dry up soon after the rains stop. If this water can be held back, it can seep into the ground and recharge the groundwater supply. This has become a very popular method of conserving water especially in the urban areas. Rainwater harvesting essentially means collecting rainwater on the roofs of building and storing it underground for later use. Not only does this recharging arrest groundwater depletion, it also raises the declining water table and can help augment water supply. Rainwater harvesting and artificial recharging are becoming very important issues. It is essential to stop the decline in groundwater levels, arrest sea-water ingress, i.e. prevent sea-water from moving landward, and conserve surface water run-off during the rainy season.

Town planners and civic authority in many cities in India are introducing bylaws making rainwater harvesting compulsory in all new structures. No water or sewage connection would be given if a new building did not have provisions for rainwater harvesting. Such rules should also be implemented in all the other cities to ensure a rise in the groundwater level.

Realizing the importance of recharging groundwater, the CGWB (Central Ground Water Board) is taking steps to encourage it through rainwater harvesting in the capital and elsewhere. A number of government buildings have been asked to go in for water harvesting in Delhi and other cities of India.



Fig. 2: For Building

All need for a water harvesting system is rain, and a place to collect it! Typically, rain is collected on rooftops and other surfaces, and the water is carried down to where it can be used immediately or stored. Direct this water run-off from this surface to plants, trees or lawns or even to the aquifer.

Some of the benefits of rainwater harvesting are as follows

- Increases water availability
- Checks the declining water table
- Is environmentally friendly
- Improves the quality of groundwater through the dilution of fluoride, nitrate, and salinity Prevents soil erosion and flooding especially in urban areas

5. WATER CONSERVATION & MANAGEMENT BY INDIAN INDUSTRIES

Saint Gobain Glass, Sriperumbudur

- Collection of rooftop rain water in reservoir
 - Water harvested 1,50,000 m³/year
 - Fresh water cost savings Rs 5 million
 - Investment Rs 20 million
 - Payback period 48 months
 - Waste water recycling –RO plant
 - Water saving : 37,450 m³/year
 - Investment : Rs.3.4 million
 - Air cooled condensers
 - Water saving : 21,900 m³/year
 - Investment : Rs.11.7 million

Tata Chemicals Limited

- Utilization of service boiler flue gas for neutralizing alkaline effluent of DM plant
- Annual Water saving 10,000 M³
- Investment Rs 5.0 Lakhs)
- Replacement of drinking water header with UPVC in township
- Annual Water saving 75,000M³
- Recycling of Gas Turbine air condensate to cooling tower make up water
- Annual water saving 80,000M³
- Investment Rs 3.0 Lakhs)

Wipro Limited:

- Water savings method adopted are:
- Installation of auto sensors for urinals and wash basins
- Monitoring water leakage on daily basis
- Adjustment of water pressure through control knobs
- Sewage treatment plant & reuse of treated water for gardening/landscaping and toilet flushing
- Implementation of rain water harvesting
- Drip irrigation system in the office gardens

6. CONCLUSION

To ensure that opportunities of future generations are limited, there is a need to use this valuable water more efficiently. This can be best achieved through combining best technology as well as management practices. Save Water Save Earth.

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