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Commentary

Avoiding Water Scarcity - Water Conservation Strategies and Goals

Moses Matron*

Researcher and professor at Nature Safety, Tamil Nadu University, Chennai, India.

Introduction

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 (thus avoiding water scarcity). 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. Common strategies include public outreach campaigns, tiered water rates (charging progressively higher prices as water use increases), or restrictions on outdoor water use such as lawn watering and car washing.

Goals

The goals of water conservation efforts include:

Ensuring the availability of water for future generations where the withdrawal of freshwater from an ecosystem does not exceed its natural replacement rate.

Energy conservation as water pumping, delivery, and wastewater treatment facilities consume a significant amount of energy. In some regions of the world, over 15% of the total electricity consumption is devoted to water management.

Habitat conservation where minimizing human water usage helps to preserve freshwater habitats for local wildlife and migrating waterfowl, but also water quality.

Strategies

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.

Improving water management practices that reduce the use or enhance the beneficial use of water.

One of the strategies in water conservation is rain water harvesting. Digging ponds, lakes, canals, expanding the water reservoir, and installing rain water catching ducts and filtration systems on homes are different methods of harvesting rain water. Many people in many countries keep clean containers so they can boil it and drink it, which is useful to supply water to the needy. Harvested and filtered rain water can be used for toilets, home gardening, lawn irrigation, and small scale agriculture.

Social solutions

Water conservation programs involved in social solutions are typically initiated at the local level, by either municipal water utilities or regional governments. Common strategies include public outreach campaigns, tiered water rates (charging progressively higher prices as water use increases), or restrictions on outdoor water use such as lawn watering and car washing. Cities in dry climates often require or encourage the installation of xeriscaping or natural landscaping in new homes to reduce outdoor water usage. Most urban outdoor water use in California is residential, illustrating a reason for outreach to households as well as businesses.

One fundamental conservation goal is universal water metering. The prevalence of residential water metering varies significantly worldwide. Recent studies have estimated that water supplies are metered in less than 30% of UK households. Although individual water meters have often been considered impractical in homes with private wells or in multifamily buildings, the US Environmental Protection Agency estimates that metering alone can reduce consumption by 20 to 40 percent. In addition to raising consumer awareness of their water use, metering is also an important way to identify and localize water leakage. Water metering would benefit society, in the long run, it is proven that water metering increases the efficiency of the entire water system, as well as help unnecessary expenses for

***Correspondence to:** Dr **Moses M**, Department of Geology, KANA University, Bangladesh, India.E-mail: mosesmartintnu@gmail.com.com

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individuals for years to come. One would be unable to waste water unless they are willing to pay the extra charges, this way the water department would be able to monitor water usage by the public, domestic and manufacturing services.

Another strategy in water conservation is protecting groundwater resources. When precipitation occurs, some infiltrates the soil and goes underground. Water in this saturation zone is called groundwater. Contamination of groundwater causes the groundwater water supply to not be able to be used as a resource of fresh drinking water and the natural regeneration of contaminated groundwater can take years to replenish. Some examples of potential sources of groundwater contamination include storage tanks, septic systems, uncontrolled hazardous waste, landfills, atmospheric contaminants, chemicals, and road salts. Contamination of groundwater decreases the replenishment of available freshwater so taking preventative measures by protecting groundwater resources from contamination is an important aspect of water conservation.

Water shortage has become an increasingly difficult problem to manage. More than 40% of the world's population lives in a region where the demand for water exceeds its supply. The imbalance between supply and demand, along with persisting issues such as climate change and population growth, has made water reuse a necessary method for conserving water. There are a variety of methods used in the treatment of waste water to ensure that it is safe to use for irrigation of food crops and/or drinking water.

Seawater desalination requires more energy than the desalination of fresh water. Despite this, many seawater desalination plants have been built in response to water shortages around the world. This makes it necessary to evaluate the impacts of seawater desalination and to find ways to improve desalination technology. Current research involves the use of experiments to determine the most effective and least energy intensive methods of desalination.