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Water Conservation For Sustainable Future

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Abstract:

It is always easier to waste than to accumulate. The same principle works too when it comes to the issue of conservation of water resources. We all know how precious water is for everyone; still we do not take any initiative for the conservation of water resources and waste it in futility. Almost every country in the world is facing a growing challenge to meet the increasing demand for water that is driven by expanding population and economic growth. We depend upon fresh water that we require for our domestic, agriculture and industrial uses. Water supplies are affected by more industrialization, urbanization, mechanization and their polluting by products. As this water is quite limited, we must be very careful while using it and actively participate towards the conservation of water resources. This paper will help creating awareness among the readers about their contribution towards its scarcity and develop a consciousness about water conservation.

Keywords: Accumulate, conservation, domestic, industrialization, water resources, awareness, mulch, watershed

Introduction :

Today conservation of natural resources encircles the general idea of conserving the earth itself by protecting its capacity for self-renewal. The most fundamental and essential of all these natural resources is water. Without water, life on earth would not exist. Three-fourth of the earth's surface is covered with water but the fresh water accounts for a small proportion of that. Out of total volume of water present on earth in water resources such as oceans, seas, rivers, lakes, polar ice-caps, glaciers including ground water, only 1% is available as fresh water for human consumption and other uses. Clean fresh water resources are essential for drinking, bathing, cooking, irrigation, industry and for plants and animal survival. The sources of most fresh water supplies such as ground water, reservoirs and rivers are under severe and increasing environmental stress because of over use, water pollution and ecosystem degradation.

Water scarcity and causes:

Some scholars believe that in future, the wars will not be for land but will be for water. In such a state of affairs, we are forced to think as to what have led to scarcity of water.

1. Out of total volume of world's water, the fresh water available for human consumption and other uses is very small.
2. Ever growing population and consequent greater demands of water leads to scarcity of water.

An average Indian uses about 150 litres of water every day.

Use	Liter/person/day
Drinking	3
Cooking	4
Bathing	20
Flushing	40
Washing clothes	40
Washing utensils	20
Gardening	23
Total	150

3. To meet the increasing demand of food grain production, water reserves are being over-exploited which leads to scarcity of water.
4. The ever-increasing number of industries has made the matters worse by putting extra pressure on existing fresh water resources.
5. The ever-increasing number of urban areas, cities, and towns has further aggravated the problem of scarcity of water because thousands and thousands of resident units are required month after month.
6. Over 95% of urban sewage in developing countries is discharged untreated into surface waters such as rivers and harbours, making the water unfit for human use.

Need of water conservation and management of water resources:-

Water conservation is defined as those activities designed to reduce the demand for water, improve the efficiency of its use and reduce losses and waste. The purpose of conservation is to protect water resources and to achieve at lower costs, the benefits from its use. This is achieved through measures such as water saving devices, water efficient processes, water demand management and water rationing. Water being one of the most precious and indispensable resources needs to be conserved.

Strategies for conservation of water:

➤ Reducing Run-off Losses:

A huge amount of water loss is due to run-off, which can be reduced by making maximum water to infiltrate into the soil. This can be done by using terrace farming, water spreading, contour cultivation, chemical treatment or improved water storage system.

- I) Terrace farming involves construction of series of benches with inward slopes for catching runoff water.

- ii) Contour cultivation on small furrows and ridges across the slopes trap rainwater and allow more time for infiltration.
- iii) Water spreading is done by channeling or lagoon leveling. In channeling the water-flow is controlled by giving a series of diversions with vertical intervals. In lagoon leveling, small depressions are dug in the area so that there is temporary storage of water.
- iv) Chemical wetting agents called surfactants increase the water intake rates when added to normal irrigated soils.
- v) Surface crop residues, tillage, mulch, animal residues etc help reducing runoff by allowing more time for water to penetrate into the land.
- vi) Chemical conditions like gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) when applied to sodic (alkaline) soils improve the permeability of soil and reduce runoff. Another useful conditioner is HPAN (Hydrolyzed Polyacrylonitrile).

➤ **Reducing evaporation losses :**

Horizontal barriers of asphalt if placed under the soil surface, increase water availability and increase the crop production by 30-40%. A co-polymer of starch and acrylonitrile has been reported to absorb water 1400 times its weight. Layer of crop residue, mulch or animal residue also minimize the evaporation.

➤ **Storing Water in Soil :**

In humid regions when the soil is wetted to field capacity, the water is stored in soil root zone. By leaving the soil fallow for one season water can be made available to crops grown in next season.

➤ **Rain water harvesting :**

Rain water harvesting means capturing rain where it falls and making optimum use of the rain water at the place where it falls. Rainwater harvesting is a technique of increasing the recharge of ground water by capturing rain water. This is done by constructing special water harvesting structures like dug wells, percolation pits, lagoons, check dams etc. This technique is proving useful not only for poor and scanty rainfall regions but also for rich ones.

Objectives of rain water harvesting:

- a. It can provide drinking water to the local people.
- b. It can be used for irrigating the parched land.
- c. It helps in increasing the level of the ground water which can better be used in times of need through wells and tubewells.
- d. Such harvesting of water can reduce storm water discharges and check urban floods.
- e. Proper harvesting of rainwater can also reduce the overloading of sewage treatment plants.
- f. Harvesting of rainwater can reduce the inflow of water in the coastal areas and thus reduce the chances of over flooding the coastal areas.

Rainwater can be mainly harvested by any one of the following method:

- i) By storing tanks or reservoirs above or below ground.
- ii) By constructing pits, dug wells, lagoons, trench or check dams on small rivulets.
- iii) By recharging the ground water.

➤ **Watershed and watershed management :**

Watershed: Watershed is defined as the land area from which water drains under gravity to a common drainage channel.

Although, our country is considered to be falling in a high rainfall region, but seasonal and erratic rainfall distribution in the time and space leads conditions floods and droughts in some or other parts of the country year after year resulting in acute scarcity for drinking water and failure of crops. The peculiar situation calls for the need for conservation and storage of water for lean period. To overcome these problems the solution is watershed management planning.

Watershed Management: Rational utilization of land and water resources for maximum production and minimum damage to the natural resources is known as watershed management. It simply means that the collected water should be kept clean by not allowing any polluting activities either in the catchment area or at all such places from where the water has been collected.

Objectives of water shed management:

- a) To rehabilitate the watershed through proper land use adopting conservation strategies for minimizing soil erosion and moisture retention so as to ensure good productivity of the land for farmers.
- b) To manage the watershed for beneficial development activities like domestic water supply, irrigation, hydropower generation etc.
- c) To minimize the risk of floods, droughts, landslides etc.
- d) To develop rural areas in the region with clear plan for improving the economy of the region.

Various measures taken up for management :

- i) **Water harvesting:** Proper storage of water especially for use in dry seasons in low rainfall areas.
- ii) **Afforestation and Agroforestry:** Crop plantation and afforestation play an important role in development of watershed. They help in preventing soil erosion and retention of moisture reducing the runoff and loss of fertile soil.
- iii) **Mechanical measures for reducing soil erosion and runoff losses :** Like terrace farming, bunding, bench terracing, contour cropping, strip cropping etc. minimize runoff and soil erosion particularly on slopes of watershed.
- iv) **Public participation :** People's participation in watershed operation is a crucial feature in developing it as a holistic approach. It is key to success of any watershed management programme, particularly soil and water conservation. Properly educating the people about the campaign and its benefits or sometimes paying them certain incentives can help in effective people's participation.










A successful watershed management has been done at Sukhomajri, Panchkula, Chandigarh with active participation of local people and its main features are :-

1. **Social fencing:** People themselves are protecting hills.
2. Greenery returned to barren and denuded hills.
3. Farmers are getting water from the earthen dam through underground pipelines, thereby increasing the food and fodder production 3 to 4 times.
4. A big boost to dairy sector. So economic conditions improved.
5. Soil erosion, flood and sedimentation considerably reduced. Sedimentation in the Sukhna lake in Chandigarh has come down from 140 tonnes/ha per year to 14 tonnes/ha per year.
6. Safety against droughts.

Even storing water cannot be a good solution for water crisis in India, because of many reasons, - storage dams loss their capacity because of sedimentation. The chances of infection can be there which can increase the diseases. So, it is better not to waste water and conserve it for present and future generations. The conservation of water resources can be practiced, therefore, in all the sectors of water usage. The major sectors of water usage where the conservation of water resources can be implemented are domestic, irrigation and industrial sector. About 65% of the global fresh water is used in agriculture and 25% in industry. Fresh water conservation therefore, requires a reduction in wasteful practices like inefficient irrigation, reforms in agriculture and industry, and strict pollution controls worldwide.

Conservation of water in house: The domestic sector is such a sector where an effective conservation of water resources can take place even with a little care. Only rain water harvesting cannot offer a permanent solution to an age old problem of water shortage of rural India, particularly in the drought prone areas and in the dry seasons. Conservation of water resources must be done in the domestic level too.

Ways to conserve water at home.

-  Turn off taps while shaving and brushing teeth.
-  Chill drinking water in refrigerator rather than running the tap until water cools.
-  Clean fruits and vegetables in water basin rather than under running tap water.
-  Avoid toxic cleaning materials which can pollute water.
-  Get the leaking pipes and taps repaired immediately.
-  Use bucket for bathing instead of showers and also for car wash, use a bucket instead of running water pipe.
-  The waste water used in bathing and cooking is not polluted, so can be used in urinals.
-  The effluents from bathrooms can be used for gardening.
-  Toilet flushing is the largest indoor household use of water. Replacing an older toilet with water saving one is a good investment.

Conservation of water in irrigation: The conservation of water resources in the agriculture sector must effectively take place in order to save water in the large scale. Here too, rainwater harvesting can offer a good solution but not a permanent solution and therefore, conservation of water resources must be taken care of.

Ways for reducing irrigation losses:

- ✚ Use of lined or covered canals to reduce seepage.
- ✚ Irrigation in early morning or late evening to reduce evaporation losses.
- ✚ Sprinkling irrigation or drip irrigation to conserve water.
- ✚ Growing hybrid crop varieties with less water requirements and tolerance to saline water help conserve water.
- ✚ Do not over irrigate crop.
- ✚ Do not allow weeds to grow as they will compete for water needs with the crop.
- ✚ Spreading mulch can reduce the evapo-transpiration.

Conservation of water in industry:

The conservation of water resources in the industry is important because the water requirement in the industrial sector is second to only the water usage in agriculture sector. Several things can be done to conserve water in the industrial areas.

- ✚ Review of alternative technologies and procedures to encourage conservation of water resources :
- ✚ Ensure sound plant maintenance practices and good housekeeping to minimize spills and leaks.
- ✚ Treatment of waste water should be optimized to achieve maximum recycling and reuse.

A key to water conservation is getting people to recognize the value of water and making them understand to not using it as if it were a free good.

Public education programme :

Public information will inform citizens of opportunities to reduce the use of water, give them reasons why they should choose to practice conservation and publicize the conservation options being promoted. Nearly all users can be affected by public information efforts and social acceptability to water conservation can be made. Public has already developed established used patterns and may be resistant to changing those patterns. To change the social consciousness about water resources, an understanding of all the issues is of greatest importance. Drought situations often highlight the need for conservation measures and increase social acceptability.

Benefits: Water conservation has financial advantages:-

- ✚ The consumers benefits from the efforts at reducing water use through lower bills.
- ✚ It also reduces the magnitude of, and delays the need for, costly infrastructure development projects.
- ✚ For society and environment as whole, water conservation efforts can minimize the alteration of natural landscape, thereby benefitting recreational activities, the aesthetic quality of surroundings, as well as the preservation of wetlands and wild life habitat.

Conclusion:

Our ancestors were wise enough to harvest the rainwater in a number of ways. They harvested the raindrops directly from the roof tops and then stored it in tanks built in their courtyards or in the artificial wells dug in community lands. During drought, this harvested water could be used both for drinking and irrigation purposes. We should follow the footsteps of our ancestors and conserve and preserve rainwater. It can play a great role in water resources planning due to the difficulties of developing new water sources, trends of increasing frequencies of droughts, increased environmental concerns and legislative mandate such as safe drinking act. Water conservation is too badly required if in future we still hope to use it so it is every individual's duty to share their responsibility to conserve water resources.

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