

7th Standard- Science

Water- A Precious Resource

Water is one of the most common and useful substances around us. Water is essential for the existence of all forms of life.

After knowing the importance of water, awareness is being created by different organisations of the world. 22nd March is celebrated as World Water Day to attract the attention of everybody towards the importance of conserving water. The year 2003 was recognised as 'International year of freshwater'.

By doing such activities, we spread the message of conservation of natural resources of water and make people understand that there will be no life without water on the earth. We also believe that "if you have water, you can think of the future". Before we discuss why water is getting scarce, we must know how much water is available for use on our planet.

Water Available for Use

If we take a picture of earth from outer space, it appears blue because of presence of water in the form of sea and ocean. About 71% of surface of the earth is covered with water. Of the total water present on earth, 97.4% is in the seas and oceans but it is not fit for human consumption. Freshwater in a usable form is present in just a small fraction of all water present on the earth. Most of us assume that there is plenty of water all over the earth. But infact this all water is not suitable for human consumption, not even fit for plants and other forms of life.

Different Forms of Water

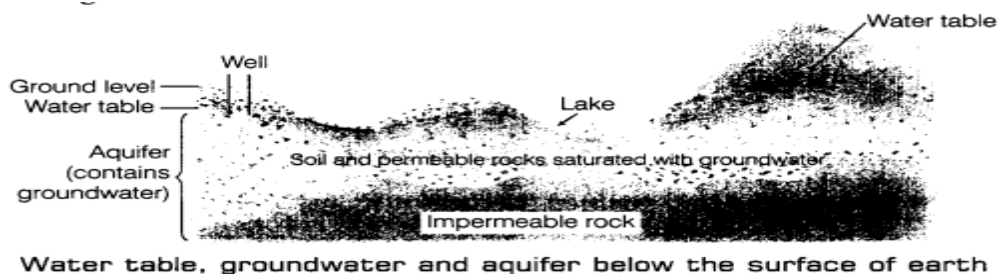
Water exists in three forms. These three forms of water are as follows:

- **Snow or ice (solid)** exists on the earth in the form of ice caps at the poles of the earth, glaciers and snow covered mountains. These are the main sources of water on earth.
- **Water (liquid)** is present in oceans, lakes, rivers and even underground water in the earth's upper layers.
- **Clouds (gas)** are found in the form of water vapour present in the atmosphere. On condensation, it turns into droplets and precipitates on earth's surface in the form of rain.

The continuous recycling of these forms of water takes place and the amount of water on the earth is maintained of constant. Most of the urban areas have a system of water supply whereas underdeveloped/undeveloped areas depend on resources like rivers, lakes, ponds, handpumps, etc.

Groundwater as an Important Source of Water

The wells, tubewells and handpumps are the main sources of water for many people. The water in these sources is the groundwater. It is the upper level of underground water which occupies all the spaces in the soil and rocks and form a water table as shown in the figure below:



The upper limit of groundwater is called water table. It represents the depth of water filled area at a given place. The water table rises and falls depending upon the amount of rainwater that seeps into the groundwater and how much groundwater is drawn out for irrigation and industry. The seeping down of rainwater into the groundwater is called infiltration. The groundwater thus gets recharged by this process.

At some places, the groundwater is stored between layers of hard rock below the water table. This is aquifer which contains the groundwater usable by tubewells and handpumps. These sources however, have limited sources of water and may get exhausted if used excessively.

Depletion of Water Table

Water drawn from underground water gets replenished by seepage of rainwater. The water table does not get affected as long as we draw the same amount of water as is replenished by natural resources like rain.

However, there is a number of factors which cause depletion of water table at a very fast rate which is really a matter of concern for every one of us.

Increase in population, industrial and agricultural activities are some common factors affecting water table. Scanty rainfall, deforestation and decrease in the effective area for seepage of water may also deplete the water table.

Increasing Population

As our population increases, we need more water for drinking, washing, cooking and cleaning. We also need more number of houses, offices, shops and roads.

This means more construction work and construction itself uses lots of water itself. Most of the time, it is the groundwater. Besides this, there is less open area which can seep in the rain water into the ground.

So, rise in population also increases use of water. This results in depletion of groundwater level to alarmingly low levels (in many cities).

Increased Industrialisation

Water is used by all industries. Almost everything that we use needs water somewhere in its production process. The number of industries is increasing continuously. Most of the water used in the industries is drawn from groundwater. This results in depletion of water.

Agricultural Activities

More food is needed to meet the requirement as there is an increase in population. This puts more pressure to the agriculture practices. In our country, farmers depend on rain, canal water or groundwater for irrigation. Canals are found only at a few places. Since rain is often erratic, canals also suffer frequently from lack of water. Therefore, farmers have to use groundwater for irrigation. This results in depletion of groundwater.

Deforestation

Large scale deforestation has occurred to accommodate the growing population to grow food for them and to provide space for industries. Overgrazing by our animals has also destroyed large amount of vegetation.

The green coverage of vegetation slows down the flow of water on land and increases the absorption of water by the soil. Cutting down of trees and vegetation, therefore interferes with the natural processes by which seepage takes place and the groundwater is recharged and causes depletion of water.

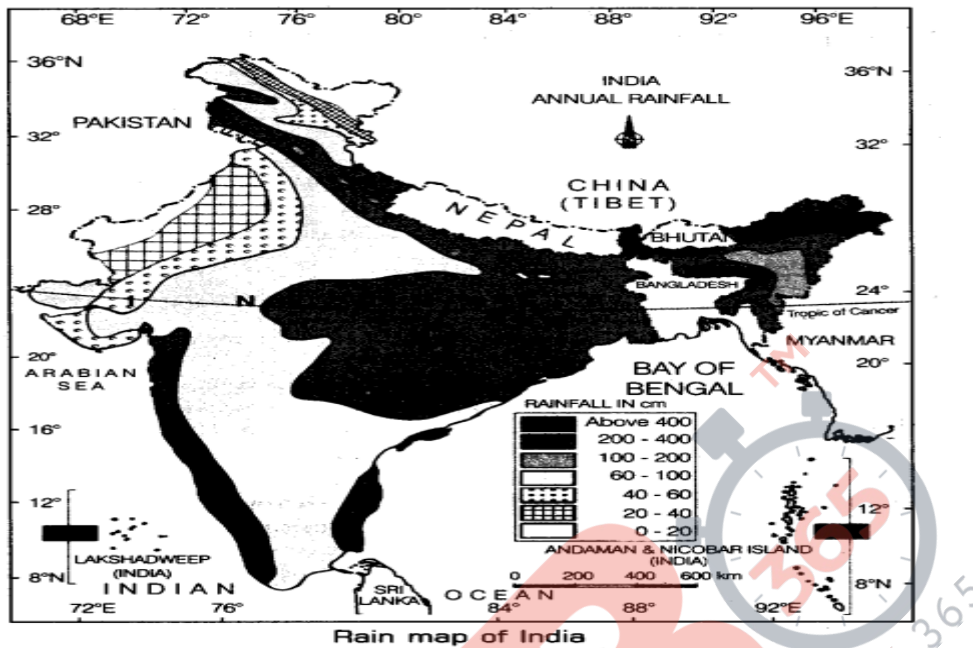
Distribution of Water

The distribution of water over the globe is quite uneven due to the number of factors. Some places have a good amount of rain. On the other hand, these are deserts which have scanty rainfall. Some regions have excessive rains which cause floods while some others have very little rainfall which causes drought. India is a vast country and the rainfall is not the same everywhere. Therefore, some regions in our country may have floods while others may suffer from droughts at the same time.

Water Resources in India

India receives a lot of precipitation (rain and snow) in comparison to the rest of the world. The average annual precipitation in India is 1170 mm as compared to the world's average of 700 mm.

The rain map of India showing average rainfall in the different parts of our country.



Note:

1. Government of India, Copyright 2007.
2. Based upon Survey of India map with the permission of the Surveyor General of India.
3. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate baseline.
4. The external boundaries and coastlines of India agree with the Record/Master Copy certified by Survey of India.

Water Management

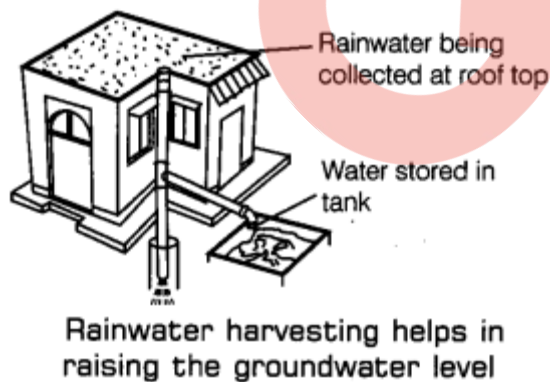
It is the activity of planning, developing, distribution and managing the optimum use of water resources. It is a subset of water cycle management.

Water supply pipes leaking and a lot of water gushing out of the pipes are the wastage of water. It is the responsibility of the civic authorities to prevent such wastage of precious water. Mismanagement or wastage may also take place at the level of individuals also. All of us knowingly or unknowingly waste water, we should also take care for it. Some of the steps which can be taken for the proper management of water are given below:

1. Rainwater harvesting
2. Bawris
3. Drip irrigation

1. Rainwater Harvesting

Most of the rainwater just flows away. This can be skillfully used to recharge the groundwater. The modern buildings of schools, offices, homes can install a rainwater harvesting system, so as to store rainwater in their own premises for future use.



A Case Study

Bhujpur in the Kutch area of Gujarat has a very erratic rainfall.

The only source of freshwater lies underground because rivers in this area do not have water throughout the year. Over the years, demand for water has grown. As a result, the water table has gone down alarmingly.

In 1989, the villagers along with a non-governmental organisation, decided to harvest rainwater.

Eighteen check-dams were built on Ruhmavati river and its tributaries where water percolates through the soil and recharge the aquifers. ^ According to farmers, the wells have water now and the water that flowed into the sea and was wasted has become available for irrigation.

2. Bawris

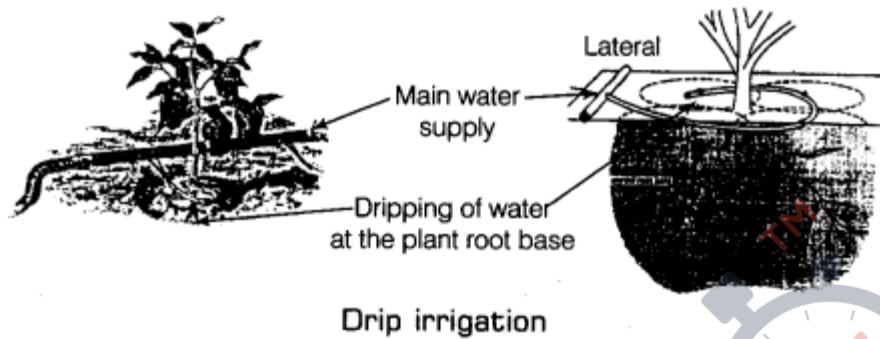
The bawris is age old method of collecting water. These structures are still found in old buildings, palaces and forts. With time, the bawris fell into disuse and garbage started piling in these reservoirs. However, because of the acute shortage of water, the bawris are being revived. Today the situation is that inspite of scanty rains those places are managing their water needs well.



Bawris stores rainwater and recharges groundwater

3. Drip Irrigation

It is a method of watering plants by use of narrow tubings which deliver water directly to the base of a plant. This minimises wastage of water. The mechanism of drip irrigation is shown in the figure given below:



Role for Saving Water

You can be a leader to show people about water management skills. If any pipeline and tap water is leaking there, immediately report to authorities like 'JAL BOARD' (in Delhi) to prevent water loss. Educate people about water wise habits which can be developed gradually and will last life long once developed.

Water-wise Habits

- Turn off the tap while brushing, shaving and washing hand. Open when need. This will check the excess flow of water into drains.
- Use mug and water in the bucket for bathing instead of using showers.
- Mop the floor instead of washing.
- Irrigate potted plants with used water for washing rice and dal in the kitchen while cooking.
- Check no tap or pipe is leaking.

Effect of Water Scarcity on Plants

We grow many plants in pots in our homes. These are called potted plants. The potted plants are watered regularly. If the potted plants are not watered even for a few days, the plants will 'wilt' (become limp) and ultimately 'dry up'. If potted plants are not given water for a considerable time, they will die. Thus, sufficient water is essential for maintaining the life of plants. Plants need water to obtain nutrients from the soil and to make food by the process of photosynthesis.

The various effects of water scarcity on plants are

- Water scarcity will affect nutrient uptake from soil by the plants.
- The rate of photosynthesis will decline, so oxygen evolved will be less.
- Rate of transpiration will also decline, so water vapours released in the atmosphere by transpiration will be less, it will disturb the water cycle.

So, in brief, we can say the shortage of water will lead to a shortage of food, shortage of oxygen and shortage of rain also.