

Lesson- 1

Water

Man has through the ages sought in vain for an imaginary elixir of life, the divine Amrita, a draught of which was thought to confer immortality. But the true elixir of life lies near to our hands. For it is the commonest of all liquids, plain water! I remember one day standing on the line which separates the Libyan Desert from the valley of the Nile in Egypt. On one side was visible a sea of billowing sand - without a speck of green or a single living thing anywhere visible on it. On the other side lay one of the greenest, most fertile and densely populated areas to be found anywhere on the earth, teeming with life and vegetation. What made this wonderful difference? Why, it is the water of the River Nile, flowing down to the Mediterranean from its sources a couple of thousands of miles away. Geologists tell us that the entire soil of the Nile valley is the creation of the river itself, brought down as the finest silt in its flood waters, from the highlands of Abyssinia and from remote Central Africa and laid down through the ages in the trough through which the Nile flows into the sea. Egypt, in fact, was made by its river. Its ancient civilization was created and is sustained by the life-giving waters which come down year after year - with unfailing regularity.

I give this example and could give many others to emphasize that this common substance which we take for granted in our everyday life is the most potent and the most wonderful thing on the face of our earth. It has played a role of vast significance in shaping the course of the earth's history and continues to play the leading role in the drama of life on the surface of our planet.

There is nothing which adds so much to the beauty of the countryside as water, be it just a little stream trickling over the rocks, or a little pond by the wayside where the cattle quench their thirst of an evening. The rain fed tanks that are so common in South India-alas! often so sadly neglected in their maintenance are a cheering sight when they are full. They are of course, shallow, but this is less evident since the water is silt-laden and throws the light back, and the bottom does not therefore show up. These tanks play a vital role in South Indian agriculture. In Mysore, for example, much of the rice is grown in them. Some of these tanks are surprisingly large and it is a beautiful sight to see the sunrise or set over one of them. Water in a landscape may be compared to the eyes in a human face. It reflects the mood of the hour, being bright and gay when the sun shines, turning to dark and gloomy when the sky is overcast.

One of the most remarkable facts about water is its power to carry silt or finely divided soil in suspension. This is the origin of the characteristic colour of the water in rain fed tanks. This colour varies with the nature of the earth in the catchment area and is most vivid immediately after a fresh inflow following rain. Swiftly flowing water can carry fairly large and heavy particles. The finest particles, however, remain floating within the liquid in spite of their greater density and are carried to

great distances. Such particles are of course, extremely small, but their number is great and incredibly large amounts of solid matter can be transported in this way. When silt-laden water mixes with the salt water of the sea, there is a rapid precipitation of the suspended matter. This can be readily seen when one travels by steamer down a great river to the deep sea. The colour of the water changes successively from the muddy red or brown of silt through varying shades of yellow and green finally to the blue of the deep sea. Those great tracts of land have been formed by silt thus deposited is evident on an examination of the soil in alluvial areas. Such land, consisting as it does of finely divided matter, is usually very fertile.

The flow of water has undoubtedly played a great part and a beneficial one in the geological processes by which the soil on the earth's surface has been formed from the rocks of its crust. The same agency, however, under appropriate conditions, can also play a destructive part and wash away the soil which is the foundation of all agriculture and if allowed to proceed unchecked can have the most disastrous effects on the life of the country. The problem of soil erosion is one of serious import in various countries especially in many parts of India. The conditions under which it occurs and the measures by which it can be checked are deserving of the closest study. Soil erosion occurs in successive steps, the earliest of which may easily pass unnoticed. In the later stages, the cutting up and washing away of the earth is only too painfully apparent in the formation of deep gullies and ravines which make all agriculture impossible. Sudden bursts of excessively heavy rain resulting in a large run-off of surplus water is the principal factor in causing soil erosion. Contributory causes are the slope of the land, removal of the protective coat of vegetation, the existence of ruts along which the water can flow with rapidly gathering momentum, and the absence of any checks to such flow. Incredibly large quantities of precious soil can be washed away if such conditions exist, as is unhappily too often the case. The menace which soil erosion presents to the continuance of successful agriculture is an alarming one in many parts of India, calling urgently for attention and preventive action. The terracing of the land, the construction of bunds to check the flow of water, the practice of contour cultivation and the planting of appropriate types of vegetation are amongst the measures that have been suggested. It is obvious that the aim should be to check the flow of water at the earliest possible stage before it has acquired any appreciable momentum and corresponding large destructive power.

Water is the basis of life. Every animal and every plant contains a substantial proportion of free or combined water in its body and no kind of physiological activity is possible in which the fluid does not play an essential part. Water is, of course, necessary for animal life, while moisture in the soil is equally imperative for the life and growth of plants and trees though the quantity necessarily varies enormously with the species. The conservation and utilization of water is thus fundamental for human welfare. Apart from artesian water, the ultimate source in all cases, is rain or snowfall. Much of Indian agriculture depends on seasonal rainfall and is therefore

very sensitive to any failure or irregularity of the same. The problems of soil erosion and of inadequate or irregular rainfall are closely connected with each other. It is clear that the adoption of techniques preventing soil erosion would also help to conserve and keep the water where it is wanted, in other words on and in the soil, and such techniques therefore serve a double purpose. It is evident, however, that in a country having only seasonal rainfall, an immense quantity of rain water must necessarily run off the ground. The collection and utilization of this water is therefore of vital importance. Much of it flows down into the streams and rivers and ultimately finds its way to the sea. Incredibly large quantities of the precious fluid are thus lost to the country.

The harnessing of our rivers, the water of which now mostly runs to waste is a great national problem which must be considered and dealt with on national lines. Vast areas of land which at present are mere scrub jungles could be turned into fertile and prosperous country by courageous and well-planned action.

Closely connected with the conservation of water supplies is the problem of afforestation. The systematic planting of suitable trees in every possible or even in impossible areas, and the development of what one can call civilized forests, as distinguished from wild and untamed jungles, is one of the most urgent needs of India. Such plantations would directly and indirectly prove a source of untold wealth to the country. They would check soil erosion and conserve the rainfall of the country from flowing away to waste, and would provide the necessary supplies of cheap fuel, and thus render unnecessary the wasteful conversion of farmyard manure into a form of fuel.

The measures necessary to control the movement of water and conserve its supplies can also serve subsidiary purposes of value to the life of the countryside. By far the cheapest form of internal transport in a country is by boats and barges through canals and rivers. We hear much about programmes of rail and road construction, but far too little about the development of internal waterways in India. Then again, the harnessing of water supplies also makes possible the development of hydroelectric power. The availability of electric power would make a tremendous difference to the life of the countryside and enable the rural economy to be improved in various directions. In particular, it would enable underground water to be tapped to a greater extent than at present and thus help to overcome the difficulties arising from irregularity or inadequacy of other source of supply.

In one sense, water is the commonest of liquids. In another sense, it is the most uncommon of liquids with amazing properties which are responsible for its unique power of maintaining animal and plant life. The investigation of the nature and properties of water is therefore of the highest scientific interest and is far from

being an exhausted field of research.

- Prof. C.V. Raman

About the Lesson:

Chandrasekhara Venkata Raman (1888-1970), popularly known as Prof. C.V. Raman was born in Southern India and devoted his life to the cause of science and research. He was awarded the Nobel Prize in Physics. The theory he expounded is called "The Raman Effect". He worked to popularize science by using an easy, charming and witty style which is free from scientific jargon. He is deeply rooted in the beauty of Nature, Indian art and ancient traditions.

The essay 'Water' is a genuine appeal for conservation of water for the welfare of India in particular as our agriculture is based on this natural resource. This essay presents water as the basis of life

GLOSSARY:

elixir (n)	- in Hindi Amrit, a liquid which is considered essential for immortality
draught (n)	- an amount of liquid drunk at one time without stopping
Libyan desert (n)	- a large desert in North-Eastern Africa
valley of Nile (n)	- the valley of the Nile is the vast area watered by river Nile in Eastern Africa
sea of billowing sand (n)	- large windy desert
teeming (adj.)	- full of, brimming with
the Mediterranean (n)	- a large body of water surrounded by Europe, Africa and Asia
silt (n)	- earthly material made of fine particles of soil or sand, deposited by water
Abyssinia(n)	- modern Ethiopia
potent (adj)	- powerful
trickling (u)	- flowing in small amount
crust (n)	- a hard outside coating/surface
soil erosion (n)	- washing or wearing away of the surface of land by water or wind
gullies and ravines(n)	- narrow deep channels formed by rainwater
ruts (n)	- narrow grooves or furrows
terracing (n)	- the act of levelling
bunds (n)	- dams

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| artesian water (n) | - | water from deep wells |
| scrub (n) | - | small trees or bushes |

ACTIVITY 1: COMPREHENSION:

A. State whether the following statements are true or false. Write 'T' for true and 'F' for false:

1. Water has power to carry silt.
2. Water has played an important role in shaping the course of the earth's history.
3. Water is not the basis of life.
4. Conservation of water and afforestation are not connected with each other.
5. Soil erosion is harmful to successful agriculture.

B. Tick (✓) the correct alternative:

1. What is the true Elixir ?
a. honey b. desi ghee c. medicine d. water
2. What is the cheapest form of internal transport?
a. roadways b. railways c. waterways d. airways
3. Water in a landscape may be compared to the in a human face. (fill in the blank)
a. head b. eyes c. nose d. mouth
4. Much of Indian agriculture depends on seasonal..... (fill in the blank)
a. snowfall b. rainfall c. freefall d. windfall

C. Answer the following questions in about 20-30 words each:

1. How was Egypt made by the river Nile?
2. What made the wonderful difference between the Libyan Desert and the Valley of the Nile?
3. How does water add to the beauty of the countryside?
4. What role do water tanks play in South Indian agriculture?
5. Describe the formation of silt by river water.
6. What are the successive steps in the process of soil erosion?
7. What are the various measures suggested to check soil erosion?

D. Answer the following questions in about 60-80 words each:

1. Why does the writer compare water with elixir?
2. Why is water conservation necessary for our country?
3. Water is the basis of life. Elaborate with reference to human, animal and plant life..
4. What are the major uses of water for the development of modern age?

ACTIVITY 2: COMPOSITION:

1. Rajasthan has a vast stretch of desert. What are the major causes of soil erosion and how can it be checked? Based on the above clues, write an article for the Indian Express on Soil Conservation.
2. What is the role of CAZRI (Central Arid Zone Research Institute, Jodhpur) in checking the expanding desert in our state?
3. Atal Bihari Vajpai planned to connect rivers of India which C.V. Raman also mentions in this essay. How will the project benefit India?
4. Delta formation takes place in most of the rivers in India. How does it affect the agriculture productivity and life of human beings in those areas?
5. What are our daily activities in which we need water from dawn to dusk? How can we save water and how much water can be saved in a month in a family if we use it carefully? Make a chart and calculate.

