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Hydrological Cycle

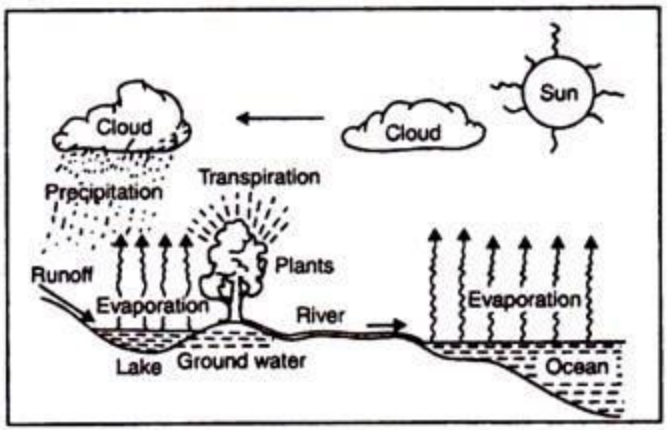
Water covers about 73 per cent of the earth's surface entirely, and it is a major constituent of the lithosphere and the atmosphere.

Water is also the most abundant component of the protoplasm, and therefore it is the major requirement of all living organisms.

In metabolism, water is the only source of hydrogen and one of the several sources of oxygen. The major pools of water occur in the oceans – 97.3% of the total for the biosphere (Bener and Bemer, 1987), the ice of the polar ice – caps and glaciers (2.06%), groundwater (0.67%) and in rivers and lakes (0.01%).

Hydrological Cycle:

Water or Hydrological cycle is defined as the movement of water from ocean, by evaporation, to atmosphere and by precipitation to land and back via river flow, to ocean (Begon et al, 1996). It is a balanced continuous process of evaporation, transpiration, precipitation, surface runoff and ground water movements. Each year about 507 Tm^3 (one tetra cubic metre = one million cubic metres) are evaporated and the same quantity of water is precipitated over the whole surface of the earth, including the land and oceans.
The amount of water, which flows from the land to the sea in rivers and streams is about 44.5 Tm^3 per year and is available for the needs of man. Solar energy evaporates water from the soil, ground surface, vegetation, water surfaces and oceans into the atmosphere



Subsequent cooling and condensation of water vapour at higher altitudes produces clouds; and precipitation as rain, hail or snow returns the water to the hydrosphere. Natural evaporation from the seas exceeds precipitation by rain into the oceans by about 9%. The latter is eventually moved as water vapour over to the land surface, and so balances the hydrological cycle and provides additional water for man's needs. Thus water as rain, hail or snow is precipitated over land and water surfaces (Fig. 6.8).

Water on land surfaces eventually percolates into the soil as soil or ground water. Within the ground there is always a natural water table or water level. The soil below the water table level is saturated, and water is sustained by the underlying clay and rock strata. However, ground water does not remain static but moves in various directions. It can move up above the water table by capillary, thus providing a continuous supply of water to the surface layers of soil, where it is absorbed by plant roots during the dry season.

Some ground water moves by filtering through the interstices of the soil or substratum in any direction. Water also emerges from the ground at lower altitude levels, and flows into streams, rivers and lakes, and helps to provide man's water supplies.

In some regions of the earth water percolates through the porous rocks and forms underground reservoirs. These underground water bearing layers of porous rock, situated above impermeable rock strata, are called aquifers. They are important source of water, which can be extracted by sinking wells or boreholes and pumping it to the surface.

All the water precipitated on land does not percolate into the soil. Surface water or run-off flows into streams, rivers, lakes and catchment storage areas or reservoirs. Some of the ground water that is absorbed by plants passes out the leaf surfaces as water vapour by transpiration. This is an important process helping in conduction of water and dissolved minerals throughout the plant. Thus, through the natural process of hydrological cycle, water is exchanged between die atmosphere (troposphere), land, sea, all living plants and animals, and industrial plants.

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