

MODULE II

3.2 WATER RESOURCES

3.2.1 Types of water

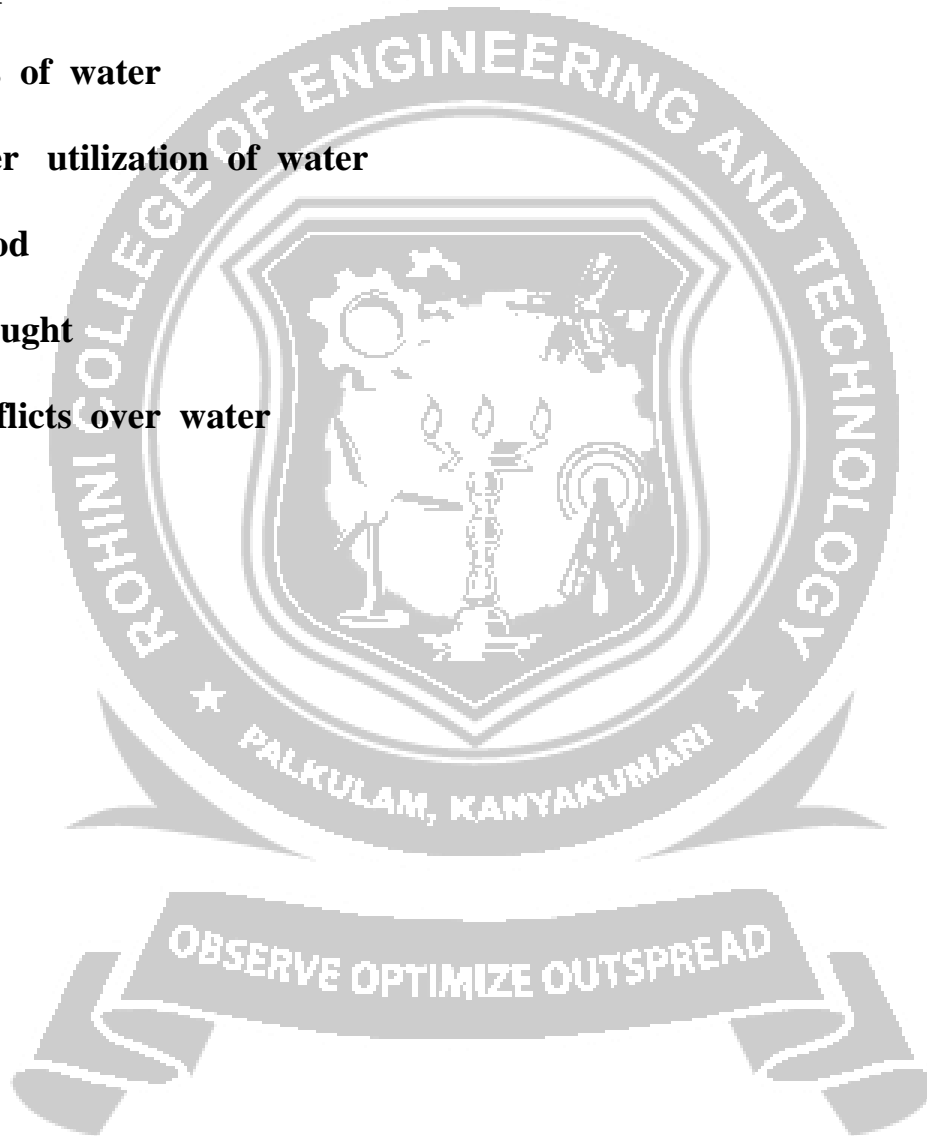
3.2.2 Uses of water

3.2.3 Over utilization of water

3.2.4 Flood

3.2.5 Drought

3.2.6 Conflicts over water



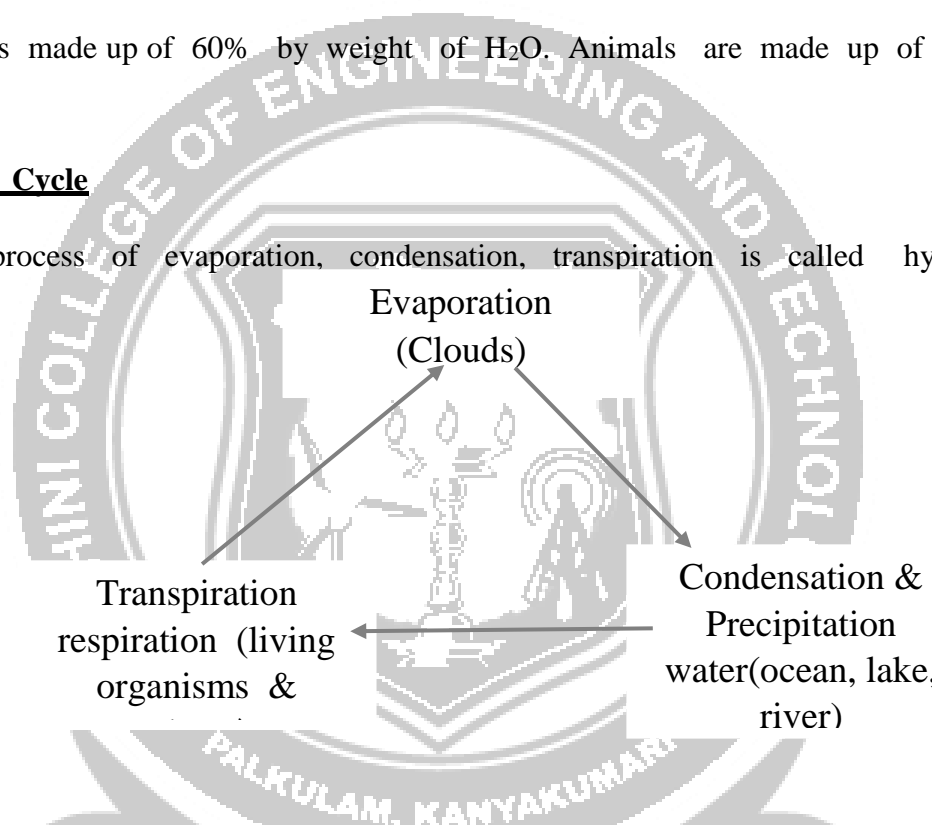
3.2 WATER RESOURCES

H₂O is an important component of all the living beings. Nearly 80% of earth surface is covered with water. All organisms are made up of water.

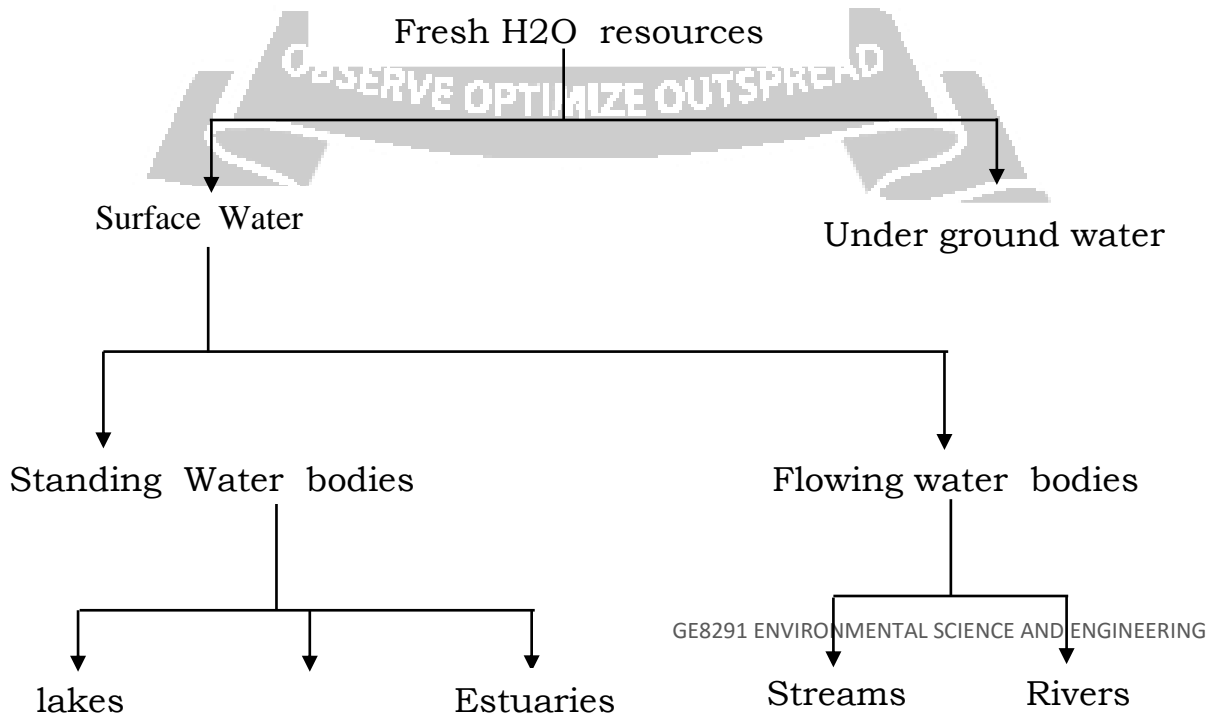
Ex) A tree is made up of 60% by weight of H₂O. Animals are made up of 50 – 65% of H₂O.

Hydrological Cycle

The process of evaporation, condensation, transpiration is called hydrological cycle.



3.2.1 Types of water (fresh H₂O) resources



Surface Water:

The water stored on the surface of earth is called surface water.

(or). The water, which is coming out directly through precipitation and does not percolate down into the ground (or) does not return to the atmosphere by evaporation is known as surface water.

Underground water

The water, which is found available deep in the ground due to percolation of surface water is called underground water.

3.2.2 Uses of water

- i) Water is used for domestic purposes like drinking, cooking, bathing, washing etc.
- ii) It is used for commercial purposes like hotels, theaters, educational institutions, offices.
- iii) Almost 60 – 70% of fresh H₂O is used for irrigation.
- iv) 20 – 30% of fresh H₂O is used for industrial operations like refineries, iron, steel, paper & pulp industries.
- v) It is used to moderate the climate change and dilute the pollutants.

3.2.3 Over utilization of water

The demand for water resources have increased due to rapid increase in population & industrial growth.

Consequences of over utilization of water**1. Decrease of ground water**

- a. Due to increased usage of ground H₂O'
- b. The erratic & inadequate rainfall.

- c. Due to industrial activity reduces the area for percolation of rain H_2O and increase in surface run off.
2. **Earthquake & landslides** are formed due to over utilization of water.
 3. Drying up of wells.
 4. **Pollution of water :**
 due to the usage of fertilizers in the agricultural area, the chemical components enter into the ground and pollute the water.
 5. **Intrusion of salt water :**
 In coastal area, over usage of water leads to rapid intrusion of salt water from sea. This water is not used for drinking & agricultural purpose.
 6. **Lowering of water table:**
 Due to over utilization of water in arid & semi arid regions for agriculture, disturb the state of equilibrium of the reservoir (disturb the hydrological cycle) in the region.

3.2.4 Flood

A flood is an overflow of water, whenever the magnitude of flow of water exceeds the carrying capacity of the channel within its bank.

Causes of flood

- i) Heavy rainfall, melting of snow, sudden release of water from dams causes flood.
- ii) Deforestation, mining, grazing increases runoff from rains and hence the level of flood raises.

- iii) The removal of dense and uniform forest cover over the hilly zones leads to flood.
- iv) Reduction in the carrying capacity of the channel, due to accumulation of sediments (or) obstructions built on flood ways.

Consequence of flood

- a. Due to flood, water spreads in the surroundings area and submerges them.
- b. The plain surface become eroded and silted with mud and sand, thus the cultivate land area gets affected.
- c. Extinction of civilization in some coastal areas also occur.

Flood management

- 1. It can be controlled by constructing dam (or) reservoirs.
- 2. Controlled by channel management and embankments.
- 3. Encroachment of flood ways should be banned.
- 4. Flood hazard may be reduced by forecasting (or) flood warning.
- 5. It can be reduced by reduction of runoff by increasing infiltration through afforestation in the catchment area.

3.2.5 Drought

Drought is nothing but scarcity of water, which occurs due to inadequate rainfall, late arrival of rains and excessive with drawl of ground water.

Causes of drought

- 1. When annual rainfall is below normal.
- 2. High population leads to poor land use.
- 3. Intensive cropping pattern and over exploitation of water resources.

4. Due to deforestation, soil erosion become caused, the removal of thin top layer of soil takes away the nutrients and the soil becomes useless.
5. The eroded soils exhibit droughty tendency.

Consequence of drought

1. It causes hunger malnutrition, scarcity of drinking H₂O changes of quality of water.
2. It causes widespread crop failure leading to acute shortage of food affects human & livestock population.
3. Raw materials for agro based industries are affected during drought time. ‡ It retards the industrial & commercial growth.
4. It induces the degradation of natural resources.
5. It enhances the migration of people & urbanization.

Drought management

1. To conserve more water and control drought Rain water harvesting system should be implemented.
2. To construct the reservoirs in the drought area.
3. Use the modern irrigation technology.
4. Improves the afforestation activity.
5. Mixed cropping & dry farming methods are used to minimize the crop failure in dry area.

3.2.6 Conflicts over water

Water is so essential for our existence and is fast becoming a scarce resource. Fresh water is considered to be the most environmental issue of this century.

Nearly 1.2 billion people do not have access to safe drinking water. Due to increase in population, and decrease in water resources, conflicts over water starts.

Causes of water conflicts

1. Conflicts through use:

Unequal distribution of water has often led to inter – state (or) international disputes.

Ex. International conflict – India & Pakistan fight over National conflicts - sharing of Cauvery water between Tamil Nadu & Karnataka.

2. Construction of dams (or) power stations:

For hydro electric power generation dams are built across the rivers, which initiates conflicts between the states.

3. Conflict through pollution

The water resources like lake, river, ponds are used for industrial purpose. Now a day they are polluted by disposing the waste water and industrial rubbish. Thus the water become polluted. The problem of cleaning the water takes on an international conflict.

Management of conflicts over water

1. Efforts should be taken to implement and follow the water conservation act for control the water pollution.
2. The interlinking of rivers between state to state country to country reduces the conflicts over water.

Big dams – benefits and problems:

Dams are built across the river in order to store water for irrigation, hydro electric power generation and flood control. Most of the dams are built to serve for more than one purpose is called “Multi Purpose dam”.

Benefits of constructing dams

- i. Dams are used for drinking & agricultural purpose.
- ii. It is used to produce electricity.
- iii. It is used to control flood and store flood water.
- iv. It is used for recreational purpose.
- v. Navigation & fishery can be developed in the dam areas.

Problems of constructing dams

i. By upstream problems

- a. Displacement of tribal people.
- b. Loss of non forest land
- c. Loss of forest, flora & fauna.
- d. Landslides, sedimentation, siltation occur.
- e. Stagnation & water logging around reservoirs prevent plant growth.
- f. Reservoir induced seismicity causes earthquake.

ii. By down stream problem

- a. Water logging and salinity due to over irrigation.
- b. Reduced water flow and silt deposition in rivers.
- c. Salt water intrusion at river mouth.
- d. The sediments carrying nutrients get deposited in the reservoir, the fertility of the land along the river gets reduced.
- e. Sometimes, due to structural defects the dam may collapse suddenly and destroy many living organisms.