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## WATER RESOURCES

Water is most important for life of living organisms such as plants and animals and man. It is also essential for agriculture, industries, drinking and many other purposes. The water of atmosphere reaches the Earth surface through precipitation and from earth surface it reaches the atmosphere through evaporation and transpiration. This continuous circulation of water from Earth to atmosphere and vice versa is maintained by nature. This is called water cycle. It is not continuously moving but remains either within the earth crust or on its surface or in the atmosphere. Water occurs in three forms liquid, solid and gas. It has been calculated that if the earth were smooth, the ocean would be sufficient to submerge the entire world to a depth of 800 feet. According to Kalinin and Bykov (1969), total water on Earth is  $1.46 \times 10^9$  cubic kilometers. 93% in the ocean and 4.1 % in the earth, 2% in the glaciers and 0.052% in lakes rivers and atmospheric moisture. Water is the most important component of our ecosystem. Washing, cleaning, extinguishing and flushing and important functions performed by the water. It is most important component for power industry. It is raw material for photosynthesis and numerous purposes. Man needs water for survival, drinking and many other commercial purposes. Man can live few days without food but cannot live without water. Our body contains 100 pounds of water. There are many functions of water in the body, it serves as a solvent, it promotes chemical activity, it serves as transportation medium for nutrients, hormones and enzymes. Man will die if he loses more than 12% water content from his body. Most organisms regardless of body size, food habits or habitat have a high water content. The water content in corn is 70%. Water can be sub divided on the basis of their sources mainly into freshwater and marine water. Two types of aquatic ecosystems are found one is **lentic ecosystem** which includes lakes and ponds and **lotic ecosystem** which includes streams and rivers.



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## Fresh water

Fresh water is obtained from the following sources-

### 1. River

A river is a stream of water that flows through a channel in the surface of the ground. The passage where the river flows is called the river bed and the earth on each side is called a river bank. A river begins on high grounds or in hills or mountains and flows down from the high ground to the lower ground because of gravity. River begins as a small stream and gets bigger the farther it flows. A river has three parts the beginning, the middle and the end .

The beginning of a river

The part of the river that is near the source is called a young river. A young river is often in "V" shaped riverbed and flows quickly downhill, over stones and around big rocks. Young rivers often have lots of small waterfalls and rapids and the rivers travel downhill. They begin to erode the ground taking small bits of rock and soil.

The middle part of a river

The middle part of a river is called a mature river. A mature river makes a river bed that is U shaped. It may be very deep and run fast. It sweeps over small rocks and boulders and makes big turns around hills and mountains. It is much wider than a young river but not as wide as an old river.

The last part of a river

A river usually ends by flowing into an ocean or a bigger river. The place where the river flows out into a bigger body of water is called the mouth of the river.



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### THE DIFFERENT PARTS OF A RIVER

#### Underground rivers

Some rivers flow underground through caves. Underground rivers form in places where there are lots of cracks in the rocks above, so that in rainy weather, the water runs down and collapse in small underground streams. Sometimes the underground water trickles out of the ground to form a small spring of water in other places, where there are caves. The small underground streams run together to form a river. The river can sometimes run through deep wide underground caverns. While many underground rivers flow gently, some underground rivers flow fast and have rapids. Particularly after heavy rain, many underground rivers flow out through a cave mouth to become an ordinary river.



### UNDERGROUND RIVER



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## 2. Lakes

A lake is an area filled with water localized in a basin, surrounded by land apart from any river or other outlet that serves to feed or drain the lake. Lakes lie on land that are not part of the ocean. Although like the much larger oceans they form part of Earth's water cycle. Natural lakes are generally found in mountainous areas and areas with ongoing glaciations. Many lakes are artificial and are constructed for industrial or agricultural, and used for hydroelectric power generation, for domestic water supply, for static recreational purposes or other activities.

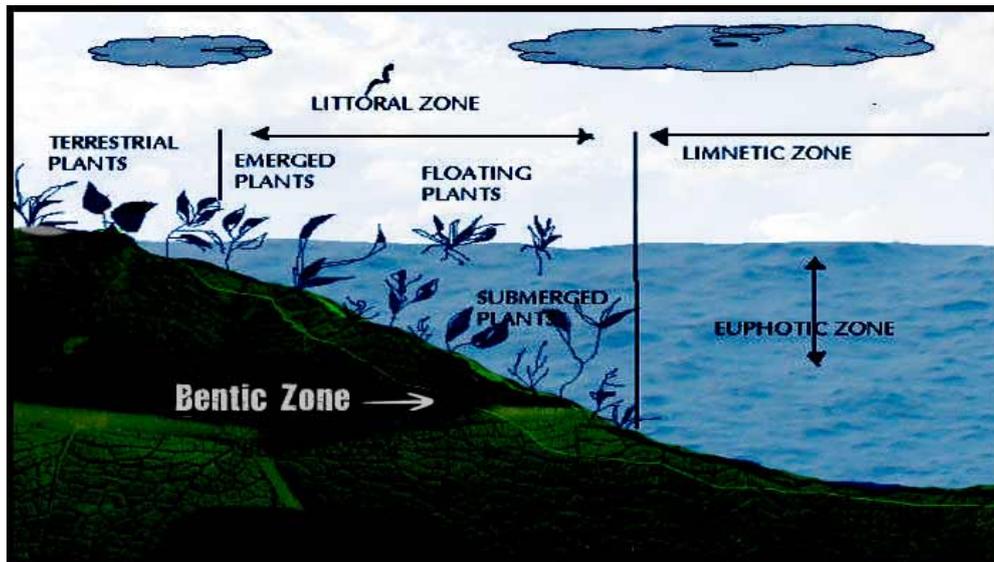


JALHARI AT NARAJOLE IN PASCHIM MEDINIPURE.

In the lakes we can distinguish a **littoral zone** containing rooted vegetation along the shore line. This zone of open water is dominated by plankton. A deep water **profundal zone** containing only heterotrophs and a **benthic zone** dominated by bottom dwelling organisms. The upper part of the lake is called epilimnion. It becomes temporarily isolated from the cooler deeper water or hypolimnion by a thermocline that acts as a barrier to the exchange of materials. The photic zone is the lighted portion of a lake inhabited by phytoplankton.



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ZONES OF A LAKE

There are 11 major types of lakes that are divided into 76 subtypes. The 11 major lake types are tectonic lakes, volcanic lakes, landslide lakes, glacial lakes, solution lakes, fluvial lakes, aeolian lakes, shore line lakes, organic lakes, anthropogenic lakes and meteorite lakes.

Some of them are described as follows:

#### Tectonic lakes

Tectonic lakes are lakes formed by the deformation and resulting lateral and vertical movements of the earth's crust.

#### Volcanic lakes

Volcanic lakes are lakes that occupy either local depressions, which fill up which precipitation more rapidly than they empty via either evaporation or groundwater discharge or combination of both.

#### Fluvial lakes

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Fluvial lakes are formed where sediment from a tributary blocks the main river.

#### Landslide lakes

Landslide lakes are lakes created by mud flows blockage or rock slides.

#### Shoreline lakes

Shore line lakes are generally lakes created by blockage of estuaries.

#### Anthropogenic lakes

Anthropogenic lakes are artificially created lakes formed by human activity. They can be the result of intentional damming of rivers and streams or subsequent filling of abandoned excavations by either groundwater precipitation or a combination of both. Construction of artificial lakes is termed as impoundments.

#### Meteorite lakes

Meteorite lakes which are also known as crater lakes are lakes created by catastrophic extra-terrestrial impacts by other materials or asteroids.

Lakes can also be categorized on the basis of the richness in nutrients which typically affect plant growth. Nutrient deficient lakes are said to be oligotrophic and are generally clear, having a low concentration of plant life. Mesotrophic lakes have good clarity and an average level of nutrients. Eutrophic lakes are enriched with nutrients, resulting in good plant growth and possible algal blooms. Hypertrophic lakes are bodies of water that have been extensively enriched with nutrients. These lakes typically have far less clarity and are subject to algal blooms. Lakes generally reach this condition due to human activities, such as, heavy use of fertilizers in the lake catchment area. Such lakes are of little use to humans and have a poor ecosystem due to decreased dissolved oxygen.

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