

Chapter – 14

Natural Resources

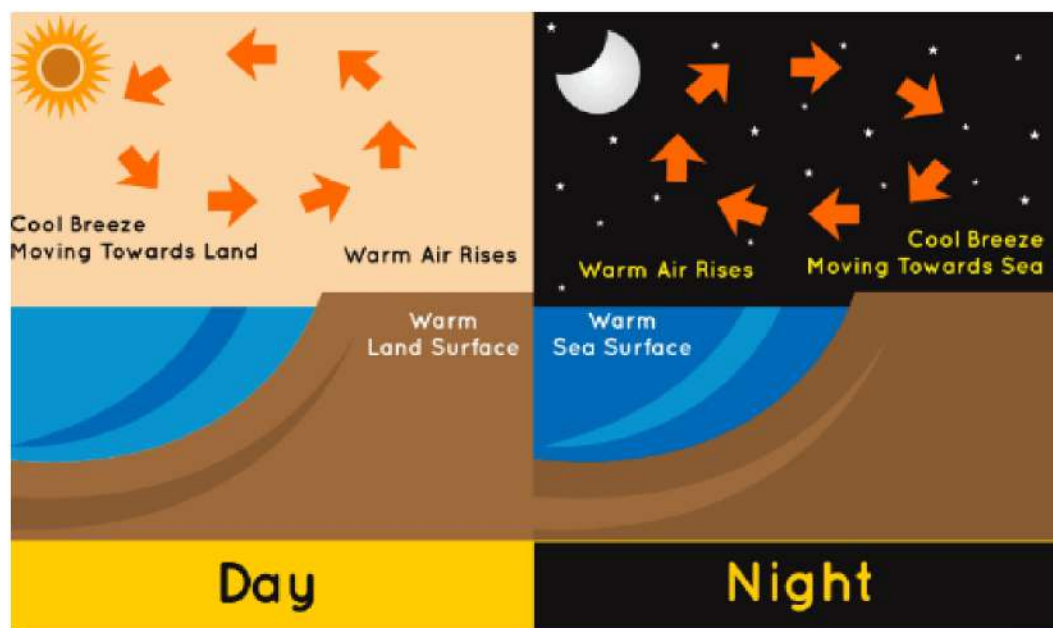
Air-The Breathe of Life

- ⇒ The atmosphere covers the Earth like a blanket.
 - ⇒ Air is a bad conductor of heat.
 - ⇒ The atmosphere keeps the average temperature of the Earth fairly steady during the day and even the whole year.
 - ⇒ It prevents the sudden increase in temperature during the daytime and slows down the escape of heat into outer space during the night.
 - ⇒ If there were no atmosphere around Earth, the temperature increase during the day and decrease during the night.
 - ⇒ The movement of air from one region to the other creates winds.
 - ⇒ The atmosphere of the Earth is heated by radiations which are mainly re-radiated by land and water.
- *Tip:** The temperature on Moon rises during the daytime to about 110°C and cools to -190°C during the night due to lack of atmosphere.

Sea Breeze and Land Breeze

◆ Sea Breeze:

The movement of air from sea to land is called sea breeze. In coastal areas, during the day the air above the land gets heated faster and starts rising, creating a region of low pressure below. Sea water is not heated so rapidly as compared to land. Therefore, the air above sea remains comparatively cool. As a result, the air over the sea moves into the region of low pressure. This movement of air from sea to land is called sea breeze.



◆ Land Breeze:

The movement of air from land to sea is called the land breeze. At night, both the land and the sea start to cool. Since, water cools down slower than land, the air above water would be warmer than the air above land. Thus, during the night, the direction of the wind is from land to sea (high pressure to low pressure). This movement of air from land to sea is called the land breeze.

◆ Rain:

Water vapor goes into the atmosphere by evaporation from water bodies and transpiration by plants. The water vapor condenses to form tiny droplets by the process of condensation. These droplets grow bigger and bigger and fall down in the form of rain (precipitation). When the temperature of the air is low the precipitation occurs in the form of snow, sleet, or hail.

Air Pollution

⇒ Human made source of air pollution is the burning of fossil fuels in industries, mining, processing, and stone crushing.

⇒ Natural sources of air pollution are forest fires, dust storms, and pollens.

⇒ When fossils fuels like coal and petroleum are burnt different oxides of nitrogen and sulphur are produced. These oxides react with water and form sulphuric acid. This sulphuric acid is washed down into the soil by rain called

acid rain. Acid rain causes a lot of damage to monuments, buildings and vegetations.

Soil

⇒ Soil is formed from the rocks by the following two processes:

⇒ The breakdown of bigger rocks into smaller mineral particles is called weathering.

⇒ Paedogenesis – This process concludes the decomposition by bacteria and fungi, during which organic materials are broken down, leading to humification and mineralization.

⇒ The factors which make soil are Sun, wind, water, and living organisms.

⇒ The major source of minerals in the soil is the parent rock from which soil is formed.

*Tip: Lichens are very sensitive to Sulphur dioxide (SO_2) pollution. If the air is badly polluted with SO_2 there may be no lichens present, only blue-green algae may be found. Thus, they are used as an air pollution indicator.

Biogeochemical Cycles

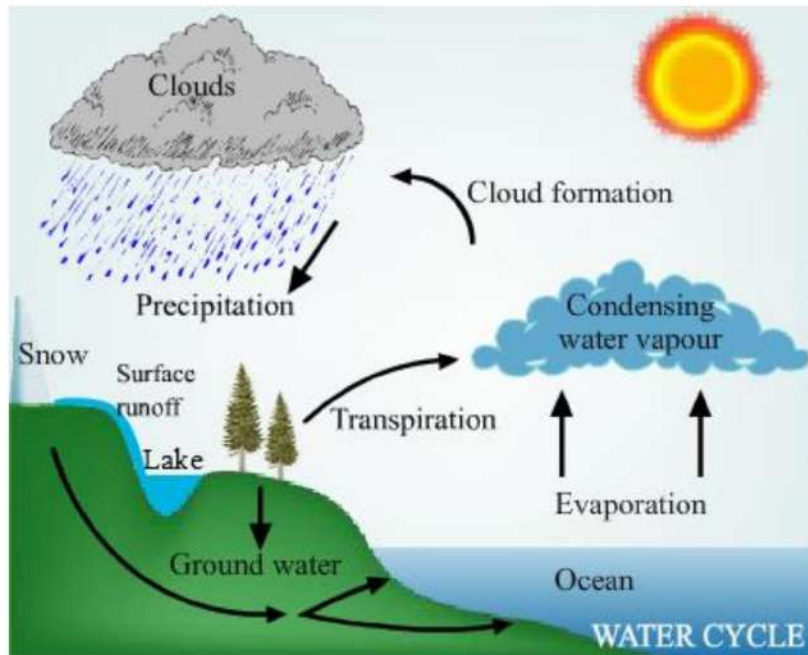
⇒ The nutrient elements derived from the Earth by the living organisms, for their growth and metabolism, are called biogeochemical.

⇒ These include carbon, hydrogen, oxygen, nitrogen, sulphur, phosphorus, potassium, and calcium.

⇒ These are continuously recycled. The movement of nutrient elements through the living and non-living components of the biosphere is called the biogeochemical cycle.

◆ Water Cycle:

The water cycle involves Evaporation/transpiration, condensation and precipitation.



♦ Nitrogen Cycle:

⇒ Nitrogen is the most abundant component of air (78%) but it cannot be used in its pure form by the majority of organisms. It needs to be converted into nitrates for the use of plants.

⇒ The conversion can be done either by industrial nitrogen fixation or by nitrogen-fixing bacteria.

⇒ The process of converting atmospheric nitrogen into nitrates is called nitrogen fixation.

⇒ The nitrogen gas is converted into a compound of nitrogen (by Rhizobium bacteria present in the root nodules of leguminous plants) and utilized by the plants for the synthesis of protein.

⇒ When plants and animals die, bacteria and fungi present in the soil convert the nitrogenous wastes into compounds of nitrogen which is again used by the plants.

⇒ There are some bacteria that convert some part of nitrogenous waste into nitrogen gas which goes back into the atmosphere. As a result, the percentage of nitrogen in the atmosphere remains more or less constant.

♦ Carbon Cycle:

- ⇒ Carbon dioxide is a form of carbon is present in the environment.
- ⇒ It is an important component of protein, carbohydrates, fats, nucleic acid and vitamins.
- ⇒ Carbon cycle involves both photosynthesis and respiration.
- ⇒ Photosynthesis fixes carbon in green plants as glucose.

The Ozone Layer

⇒ The greenhouse is a house of glass constructed for delicate plants that need warm weather. The walls of the greenhouse allow sun rays and heat to pass through them. But the heat which enters into the glass is not allowed to escape out and the gas inside the glasshouse makes it warm and suitable for the growth of plants.

◆ Greenhouse Effect:

The atmosphere cover around the Earth acts similar to the glass walls of a greenhouse. The air cover allows solar radiation to pass through it to the Earth's surface but prevents the long-wave infrared radiation to escape into space. Gases such as carbon dioxide (CO₂), methane (CH₄), ozone (O₃), nitrogen oxide (N₃), and chlorofluorocarbons (CFCs) are called greenhouse gases. CO₂ is the most important greenhouse gas and it traps the heat (infrared radiation) reflected by the Earth. This heating up of the atmosphere leads to an increase in Earth's temperature. This is called global warming or the greenhouse effect.

◆ Ozone Depletion:

Reduction in the concentration of the ozone layer is called ozone depletion. It is caused by certain chemicals chlorofluorocarbon. The ozone layer had thinned out over Antarctica. It is called an ozone hole. The hole is more prominent during the spring season.