Unit -6

ENVIRONMENT

Main contents of the chapter

1. Ecosystem
2. Biological association
3. The physical factors of the Ecosystem

What is Ecology?

- **Ecology** is the study of the interaction of organisms with each other and with non-living parts of the earth
- **Biosphere** is part of the earth that supports life.
- **Ecosystem** is the divided units of biosphere.

1. Ecosystem

What is an ecosystem?

- Ecosystem is a given area where biotic factor where interact with abiotic factors.
- The biotic factors refer to all living things in the ecosystem which is a community of living things.

- The abiotic factors refer to all non- living things of the ecosystem including climatic and soil factors, which includes
    - Temperature
    - Light
    - Water and
    - Nutrients

How big is an ecosystem?

- ✓ An ecosystem can be as small as a single tree, and an aquarium, a pond, a forest or the whole planet earth.
- ✓ Therefore you conclude tree is an ecosystem.

Where does one ecosystem end and another begin?

- ❖ Ecosystem boundaries are not always clearly defined.
- ❖ Ecosystem varies greatly in size and the elements that make them up but, each is functioning unit of nature.
- ❖ Ecosystems are defined based on the dominant plants, animals, land forms, and climatic condition found within a particular geographical area.

- ❖ Generally, all ecosystems on earth can be categorized in to two main types. Those are
    1. Aquatic(water) ecosystem
    2. Terrestrial (land) ecosystem
    - ☝ To get more info refer the given table in page 123 and 124

2. **<u>Biological Associations</u>**

- ♣ All living organism are directly or indirectly related for survival.
- ♣ Some relationship are helpful and some are not (harmful).
- ♣ In some relationship one organism provide food or habit for other.
- ♣ The general biological term of living together in a close association of two or more organisms of different species is called **symbiosis**.

A. Parasitism

Parasitism is a symbiotic relationship between organisms of different species in which one organism benefits (the parasite) while the other is harmed (the host).

- In such relationship the host is the victim of the relationship by providing food and shelter to the parasite.
- There are two types of parasites depending where they live either in or on the host's body. Those are
    1. Ectoparasites (Example: fleas, bugs, ticks, etc.)
    2. Endoparasites (Example: ascaris, tapeworms, amoeba, hookworm etc.)

B. Predation

Predation is a feeding relationship between two animals, in which one is killer (predator) and the other is a killed (prey).

- Predators are skillful and strong.
- Some of these predators are strictly carnivorous such as lions, tigers.
- Some other is omnivores such as bears, and the like.

C. Mutualism

Mutualism is a form of symbiosis where two organisms mutually benefit from each other.

- Refer the given table in page 128 to get more information

D. Commensalism

Commensalism is a form of symbiotic relationship between organisms of different species in which one organism benefit but the other neither benefits nor is harmed.

Other forms of survival are

- **Decomposers** are microorganism mainly fungi and bacteria that live on a dead organic matter.
- **Scavengers** are animal that are dependent on the remnant of the primary predators. Example voltures, hyena, etc.

3. Physical Factors of the Ecosystem

A. Soil

Soil is an important abiotic (physical) factor of the ecosystems. Soil is the basis for the sustenance of life. Soil contains air, water, organic materials and minerals salts that accumulated over time.

How soil is formed?

- The formation of soil takes place over a long period of time. It can take several years before it becomes a soil.
- Soil is formed from the weathering of rocks and minerals. Soil is formed as a result of the interaction of five factors. Those are

    1. Parent material
    2. Climate
    3. Biotic factors (living organisms)
    4. Time
    5. Relief (landforms and topography)

Process in soil formation

Soil formation is a complex process and doesn't merely consist of random collection of particles. This complex system requires various processes such as weathering, decomposition, and humification.

1. Weathering: refer to the break down and decomposition of rocks and minerals by factors including air, water and forest.

    There are two types of weathering. Those are

a. Physical weathering

b. Chemical weathering

2. Decomposition: is the process of break down organic matters such as plant derived materials into its simpler organic constituents.
3. Humification: is the breakdown of plant remains leading to the formation of different types of humus.

Types of soil

There are three basic types of soil: Loam (silt), sand, and clay

1. Clay soil: is a very fine particle which is less than 0.002 mm in diameter.
    - It is difficult for cultivation during rainy seasons due to sticky nature of holding highest water capacity.
    - It is good for making pottery.
2. Sandy soil: it is light and dry soil and its particle size is between 0.002 mm and 2.00 mm in diameter.
    - It contains less than 10% of clay and consists of very small particles of silica and quartz.

- The amount of humus percent will alter the color and texture.
- Comparatively, it is easy to cultivate but poor in plant nutrients, coarse, grained and doesn’t retain moisture.

3. Loam soil: it is an ideal blend of sand and clay soil.
    - ⇩ It considered as the best soil for large number of plants because it is formed from idea and decayed bodies of organisms. This is called humus.
    - ⇩ The ideal loam has all the advantages of sandy and clay soil, and none of their disadvantages.

Soil Erosion

Soil Erosion: is the process by which soil and rock are removed from the land surface by physical factors.

The agents of soil erosion are water, wind, and rainfall.

There are different types of erosion: Splash, rill gully and sheet erosion, tunnel and wind erosion.

Causes of soil erosion

1. **Natural factors**: for soil erosion such as rainfall, wind and gravity are the main natural reasons for soil erosion.
2. **Man-made factors**: inappropriate land use; deforestation, overgrazing, faulty farming systems, high crop intensity, housing construction and mining are some of the major cause of soil erosion.

Conservation

For an effective soil erosion controls

- ❖ Maintain good soil structure
- ❖ Protect the soil surface by adequate crop and residue cover, and
- ❖ Use special structural erosion control practices where necessary.

Soil erosion can be improved by several ways. Some of these are

1. Plant and crop residue cover
2. Afforestation
3. Terracing
4. Contour plowing
5.

B. Water

- Water is an important abiotic factor in any ecosystem.
- It is precondition for existence of human, animal and plants life.
- It also plays fundamental roles in climate regulation and country's economic growth.
- The main processes involved in water cycle are:
    - Evaporation: the process of becoming a vapor or gas.
    - Transpiration: loss of water vapor from plants
    - Condensation: change of water vapor to liquid water.
    - Precipitation: any forms of water such as rain, snow, sleet, or hail.

What is water conservation?

The amount of water with in any environment varies from season to season.

Different methods of water conservation

- Build dam and reservoirs on the rivers

- Collect much of rain in rainy season
- Eliminate leakage from pipes
- Washing under running water rather than in a bowl of water
- Eliminate unnecessary washing