ECOSYSTEM

ECOSYSTEM–STRUCTURE AND FUNCTION

INTRODUCTION

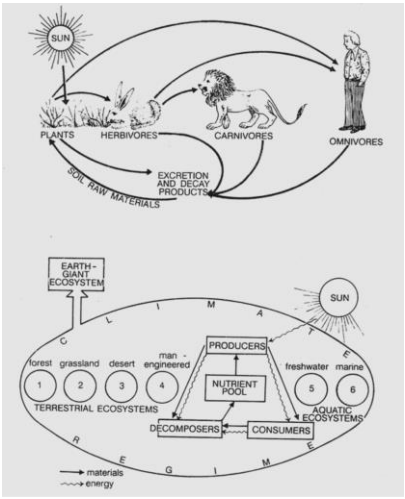
- **A.G.Tansley -** The term **"Ecosystem"** first of all coined by A.G. Tansley.

  According to Tansley - Ecosystem is **symbol** of **structure and function** of nature.

- **E.P.Odum -** Father of ecosystem ecology.

  According to E.P.Odum - Ecosystem is the **smallest structural and functional unit of nature** or environment.

- **Karl Mobius -** Used term **Biocoenosis** for ecosystem.
- **Thienmann -** Used term **Biosystem** for ecosystem.
- **Sukhachov -** Used term **Biogeocoenosis** for ecology.
- **Misra -** Used term **Ecosom** for ecosystem.
- **Forbes -** Used term **Microcosom** for ecosystem. For artificial ecosystem in laboratory.



Diagrammatic representation of the basic types of ecosystems, all of which together constitute the giant ecosystem- the biosphere. Note, in the centre, the generalised scheme of the structure and function of any unit ecosystem of the biosphere.

ECOSYSTEM

- It is the sum total of interacting biotic & abiotic factors that are capable of independent existence.
- **Ecosystems are of two types.**

(i) Terrestrial ecosystem : e.g. Forest, Grassland, Desert.

(ii) Aquatic ecosystem : e.g. Sea, freshwater ecosystem.

- **On the basis development, ecosystem involves two types :**

(a) Natural ecosystem : It is formed naturally with out human interfare : **e.g. forest, ocean.**

(b) Anthropogenic or man made ecosystem or Artificial–ecosystem : It is formed by human activities. **e.g. Agriculture land, Garden, Aquarium.**

- **Ecosystems are of four types on the basis of size:**

(a) Megaecosystem : Large sized – **e.g. sea.**

(b) Mesoecosystem (Macroecosystem) : Medium sized **e.g. forest Grassland, Desert.**

(c) Microecosystem : Small sized **e.g. Pond, Lake.**

(d) Nano ecosystem : very small sized– **e.g. Kitchen graden, Log of wood, Aquarium**

- **Ecosystem – open system :**

- **Ecosystem is open system :** It receives input of solar energy and nutrients from external source that are distributed in various components.
- Either ecosystem/individual performs out put of waste substance & energy in the external environment.

- **COMPONENTS OF ECOSYSTEM :**

(1) Biotic (2) Abiotic

(1) BIOTIC COMPONENTS :

It involves living beings that can be differentiated into three categories.

(a) Producers (b) Consumers (c) Decomposers.

(a) Producers (Autotrophs) :

- They are able to synthesize their own food by photosynthesis in the presence of sunlight. **e.g. Green plant, photosynthetic bacteria, Blue green algae**
- **Koromondy** coined the term **Transducer's** for **producers** because the latter convert radiant energy of sunlight in to chemical energy.
- **Phytoplanktons are main producers in aquatic ecosystems whereas rooted plants in terrestrial ecosystem.**
- Rooted plants of shallow water are called macrophytes.

(b) Consumers (Heterotrophs) :

- They are unable to synthesize their own food directly or indirectly.
- They depend upon producers for obtaining nourishment.
- Consumers can be differentiated into following catagories.

(i) Primary consumers / Herbivores :

- They obtain their nutrition from producers. **e.g. Cow, Goat, Sheep, Horse, Deer, Rat, Rabbit, Grasshopper, Buffalo, Zebra, Elephant, Zooplanktons.**
- They are also known as **key industry animals** because they convert plant material into animal material.

(ii) Secondary consumers / Primary carnivores:

They obtain their nutrition from primary consumers. **e.g. Frog, Fox, jackel, Hyaena, Wolf, Wild cat, Snake, Small fishes.**

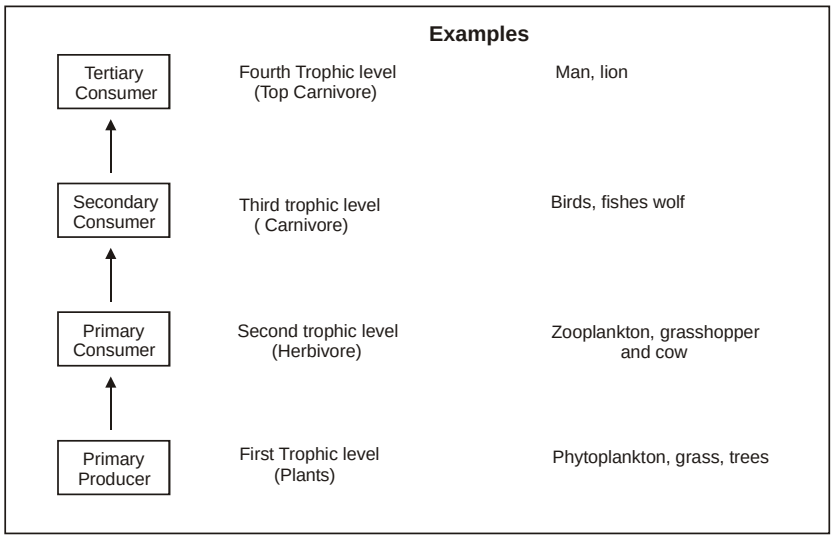
(iii) Tertiary consumers / secondary carnivores:

They obtain their nutrition from secondary consumers or primary consumers.

- They can not be prayed by other animals hence they are also called **top consumers e.g. Eagle (hawk), Kite, Vulture, Peacock, Lion, Tiger, Crocodile shark.**

(c) Decomposers :

- These are microscopic organisms like Bacteria and fungi that degrade or decompose dead organic matter or Dead parts of animals and plants they are also called **reducers**.
- They are also called **microconsumers**. They are also called **osmotrophs**.



Vulture is a **scavenger not predator** because it never kills any animal. Vulture is also a decomposer. In Vulture, the break down of the food material takes place inside the body and then released into the soil in the form of waste material and minerals.

- **Plant parasites** are known as **primary consumers** while **animals parasites** (E.coli bateria, Entamoeba hisotlitica, liver fluke, tapeworm) are known as **secondary consumers.**
- **All the insectivorous** plants play the **double role** i.e., **producer** as well as **secondary consumer** because they sythesise their own food through photosynthesis and they eat insects simultaneously.
- **Man and peacock** are **omnivores.**
- Organisms which use **milk** or **curd** are known as **secondary consumer.**
- Sparrow occupy 2 trophic level - (i) Primary consumer-as eating seeds, (ii) Secondary consumer-as eating insects.
- Frog - (i) Larva - Herbivore, (ii) Adult - carnivore

STRUCTURE AND FUNCTION OF ECOSYSTEM

Structure of Ecosystem :

- Biotic and abiotic components are physically organized to provide characteristic structure to a ecosystem
- It is species composition and stratification (lake stratification, forest stratification, ocean stratification).
- Another way to represent the structure of ecosystem is through food relationship of producers and consumers constituting the **Standing Crop.**
- The nutrients necessary for growth of living organisms, accumulated in biomass and in abiotic componants like soil called **Standing State.**

Function of Ecosystem :

- Ecosystem posses a natural tendency to persist, which is due to it's variety of functions (activities under taken to ensure persistance).
- For example leaves carryout photosynthesis, root absorb nutrients from soil, herbivores utilize plant production and serve as food for carnivores, decomposers carryout decompositions and product used by producers. All these functions are came out in ecosystem in balanced and control manner called **Processes**.
- So key aspect of function of ecosystem are -

(A) Productivity

(B) Decomposition

(C) Energy flow

(D) Nutrient cycling