

Ecosystems – Concept & Structure



By:

Dr. Parveen Kumar

Asst. Professor



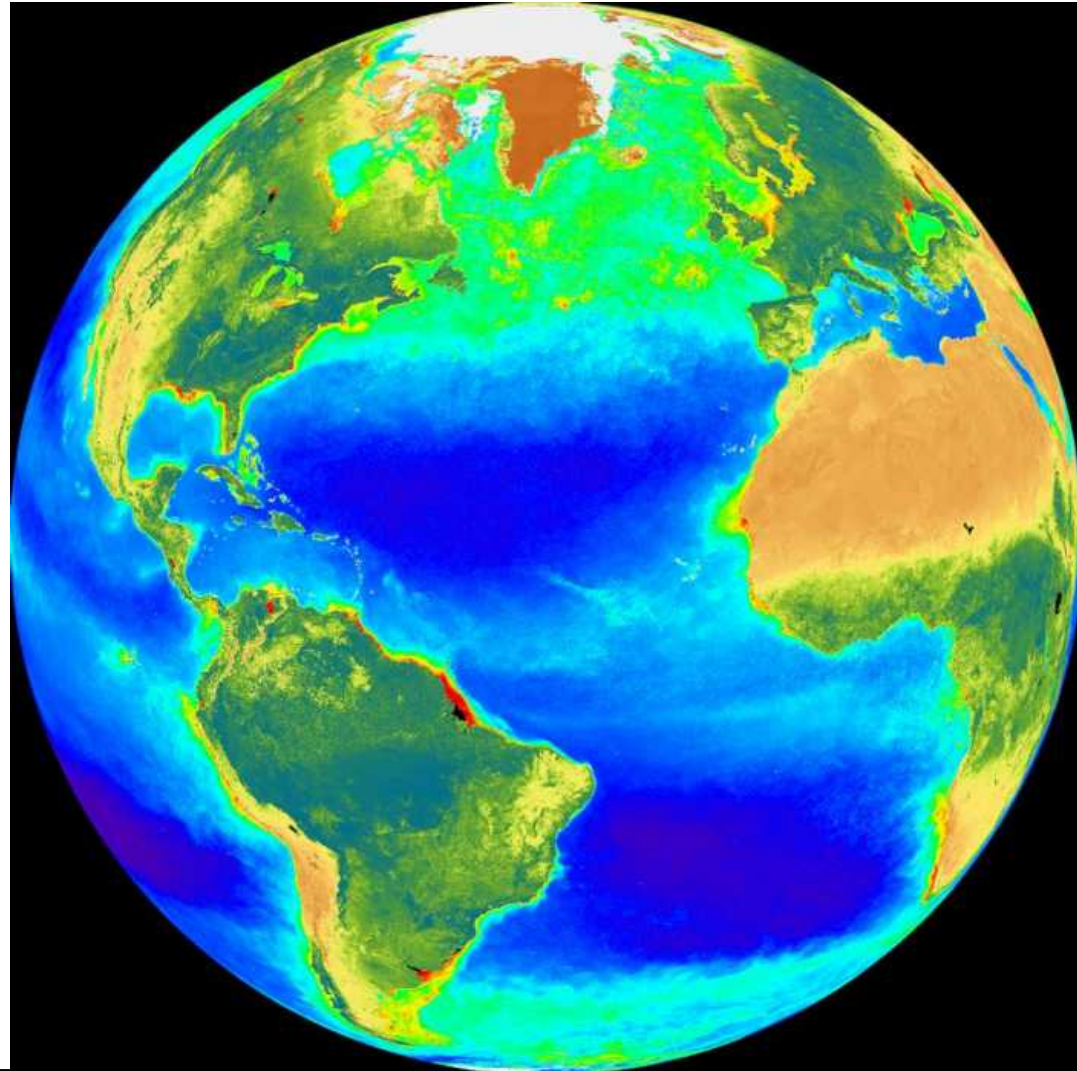
What is an Ecosystem?

- **Ecology** – Oikos (Habitat) + Logos (Study)
 - *‘Study of organisms at home i.e. natural habitat’.*
 - *‘Study of relationship between organism and environment’.*
 - Ernst Haeckel (1869) – Ist used this term.
- **Ecosystem** – Eco (Environment) + System (Interacting & interdependent complex)
 - AG Tansley (1935) - Ist used this term.
 - *‘System resulting from integration of all living and non-living factors of environment’.*
 - **Micro-ecosystem** – a drop of pond water
 - **Mega-ecosystem** - Ocean

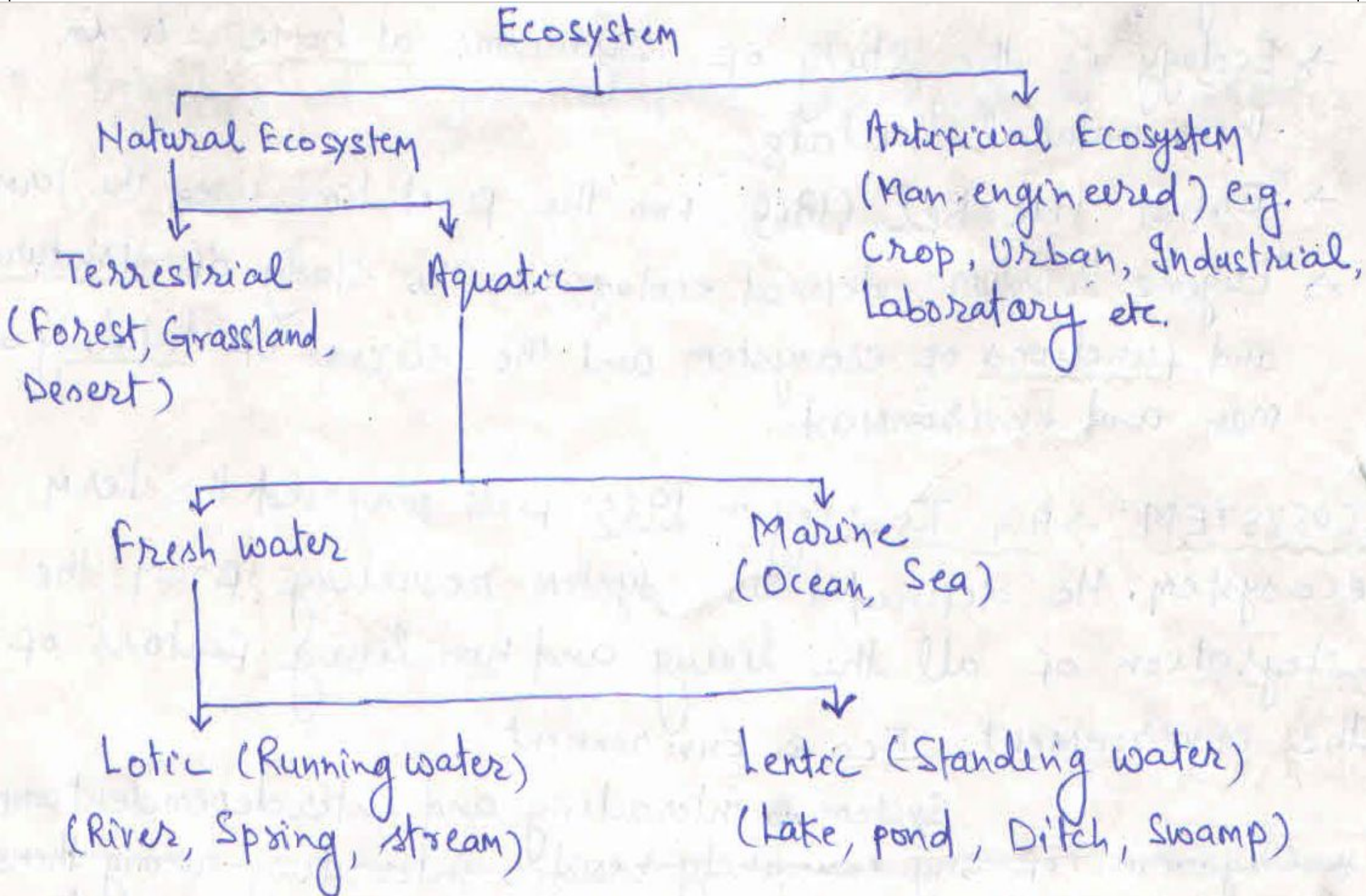


The Biosphere

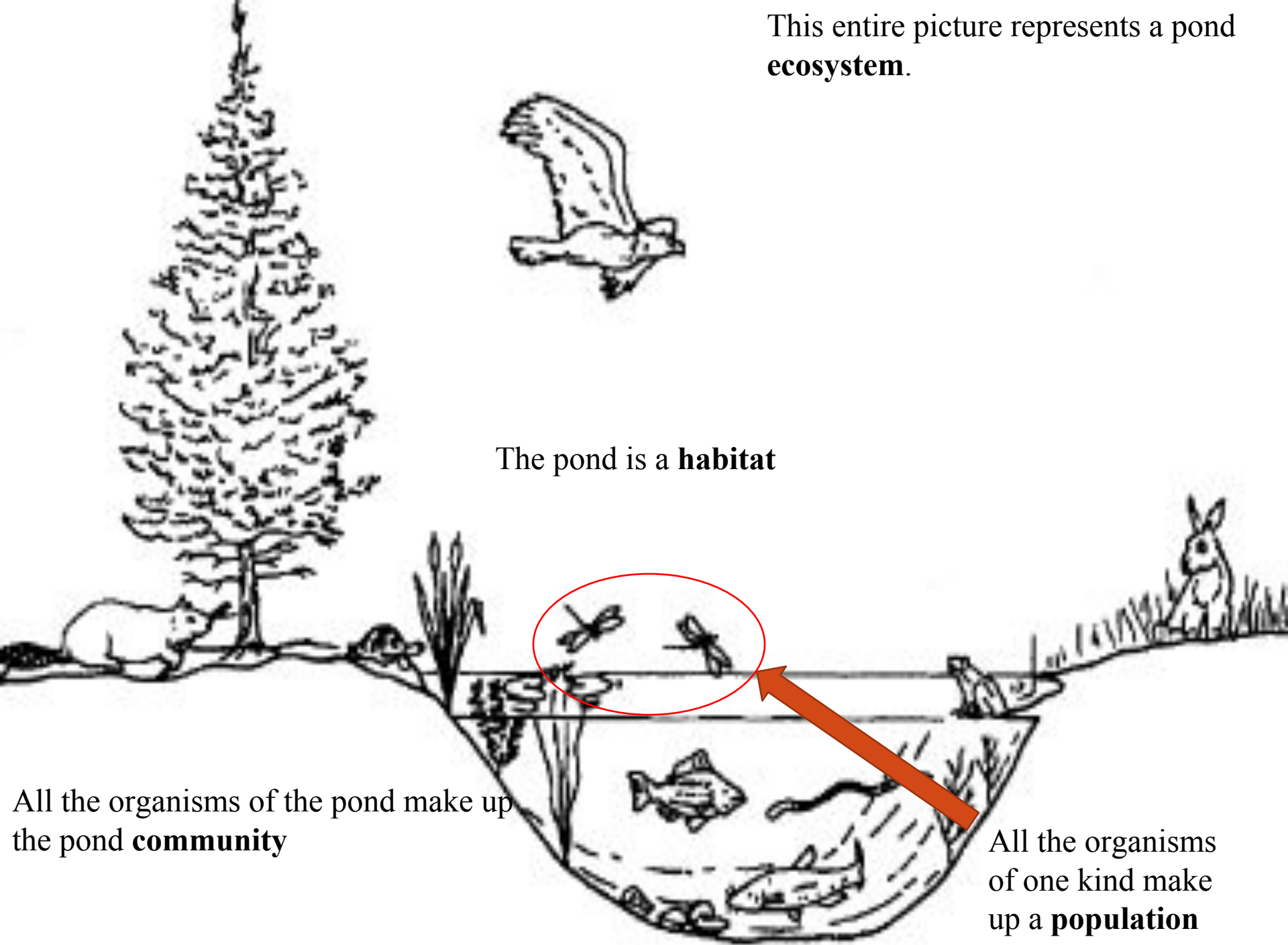
- All the ecosystems of the planet put together, form the biosphere.
- The planet Earth is a vast ecosystem.



Types of Ecosystem



This entire picture represents a pond ecosystem.



The pond is a **habitat**

All the organisms of the pond make up the pond **community**

All the organisms of one kind make up a **population**

Ecosystem Structure/Components

(A) Biotic (Living) Components

- **Autotrophs:** Producers
- **Heterotrophs:** Consumers

Macro-consumers

- Herbivores – Plant eaters
- Carnivores – Animal eaters
- Omnivores – Eating anything

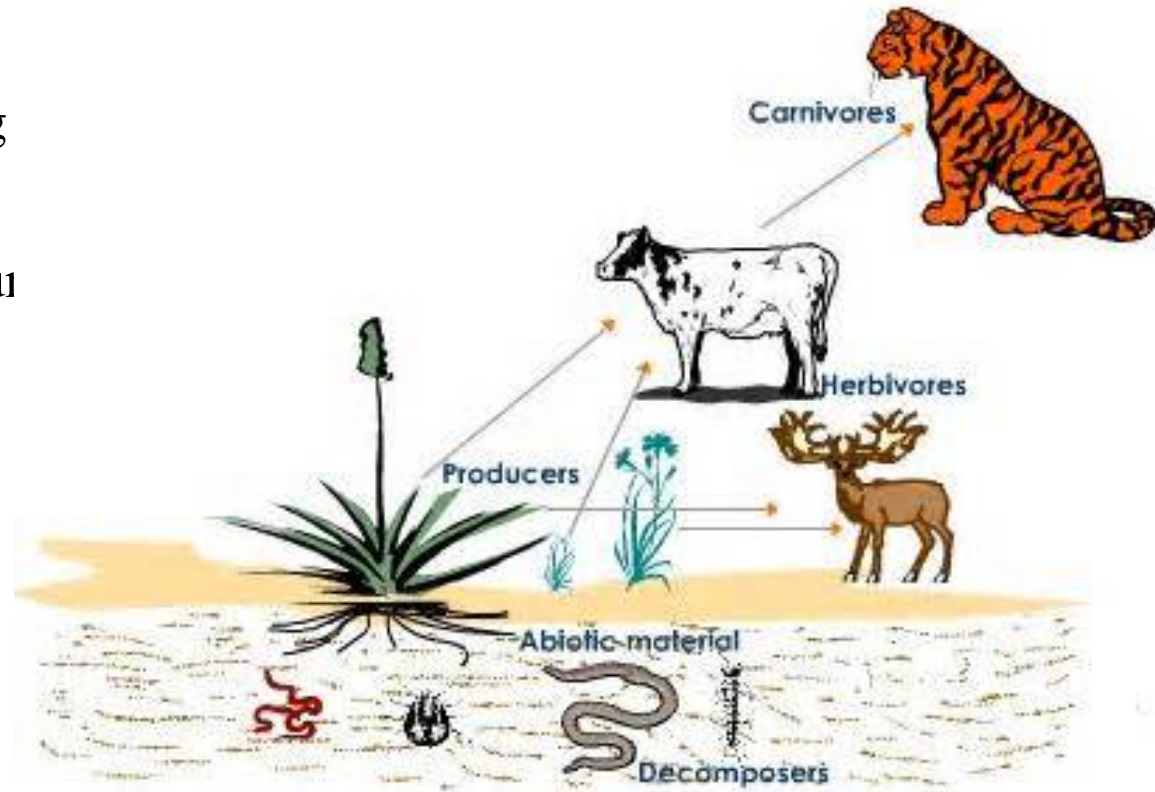
Micro-consumers

- Saprophages – Bacteria & Fungi
- Biophages - Parasites



(B) Abiotic (Non-living) Components

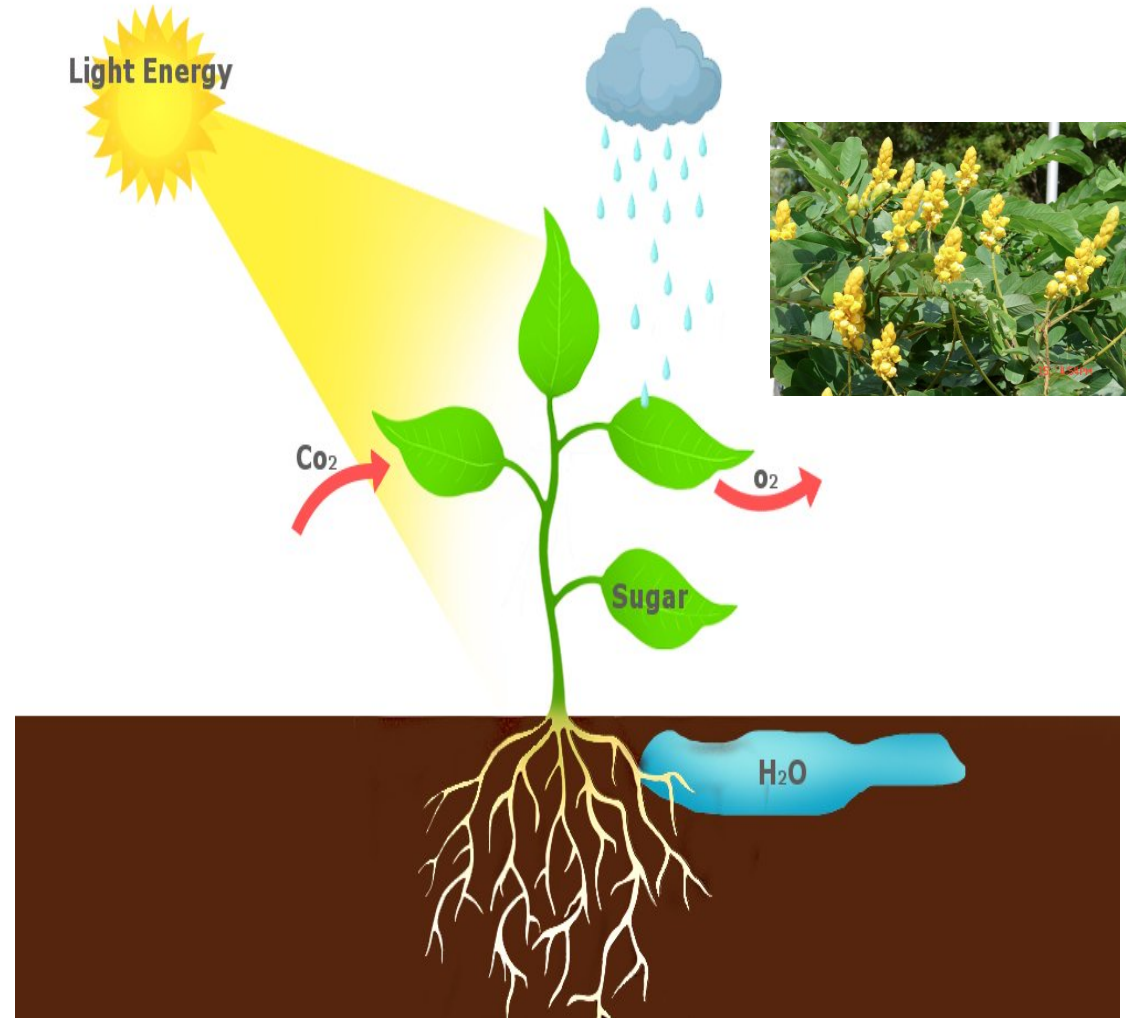
- **Climatic factors**
- **Inorganic substances**
- **Organic compounds**



Grassland Ecosystem Showing Component Parts

Auto-trophs (Self nourishing)

- Green plants, photosynthetic or chemosynthetic bacteria.
- They can convert light energy from sun into potential chemical energy i.e. organic compounds.
- Produce O_2 as by product.
- Also known as 'Producers'.



Hetero-trophs (Other nourishing)

Macro-consumers

(Phago+trophs – eat+food)

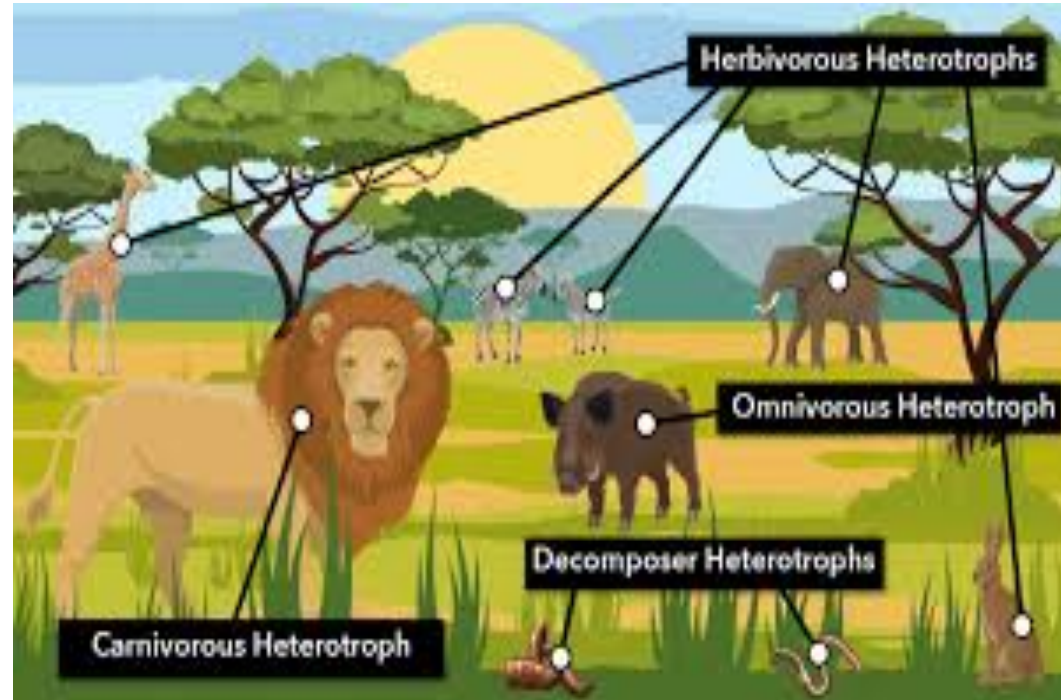
- **Herbivores** – Plant eating
- **Carnivores** – Animal eating
- **Omnivores** – Eating all kind of food

Micro-consumers (Sapro/Osmotrophs)

- **Saprophages** – Feed on dead organic matter e.g. Actinomycetes and fungi (Decomposers)
- **Biophages** – Feed on living organisms e.g. Parasites



- Depend directly or indirectly upon **autotrophs** for their food.
- **Consumers** – consume food built by producers.
 - **Primary consumer** – Grasshopper
 - **Secondary consumer** - Frog
 - **Tertiary consumer** - Snake
 - **Top consumer** - Hawk



Primary Consumers

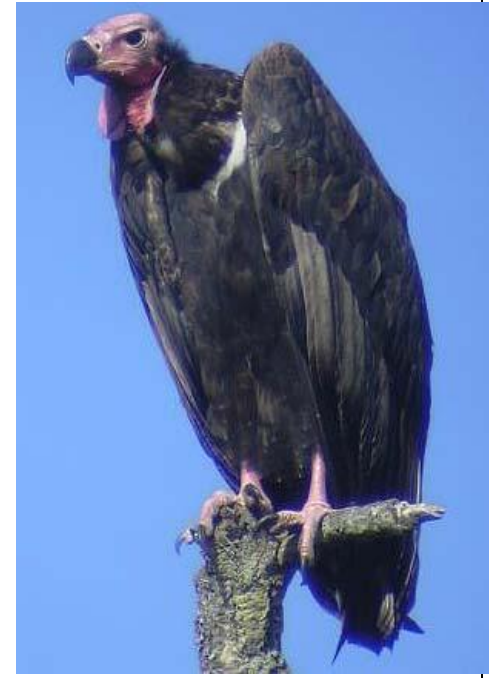


Secondary, Tertiary, Top consumers



Scavengers

- Scavengers are animals that do not kill for a meal, but pick on “leftovers” from other animals
- Hyenas, vultures, crows, racoons, and some bears are scavengers



Parasite -

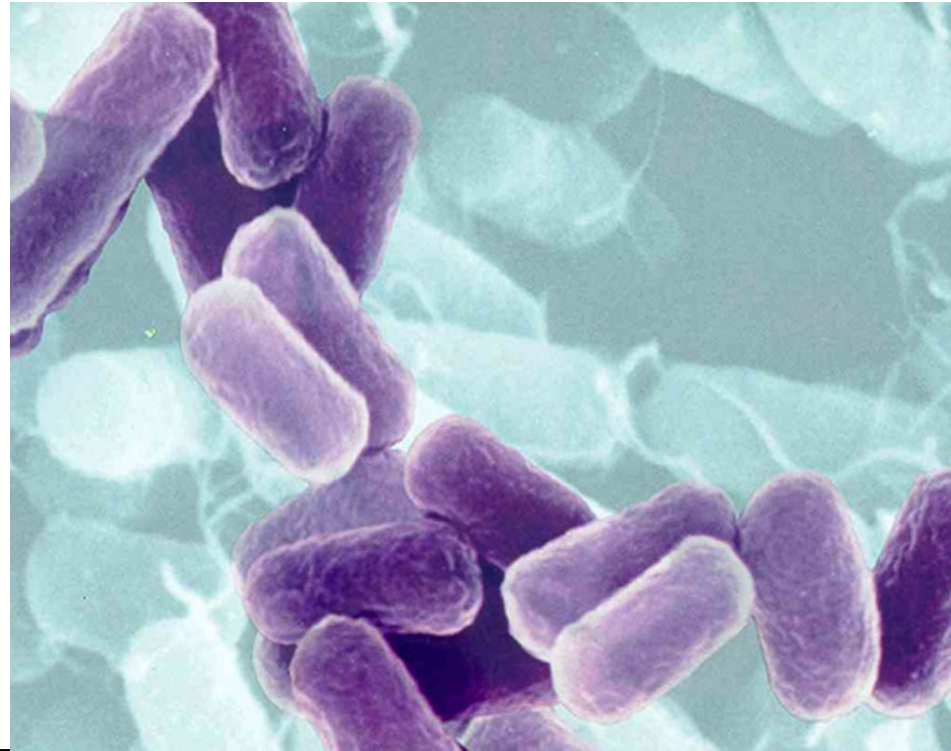
Host

The parasite harms the host and benefits from the relationship. The host is harmed, but not usually killed.



Decomposers

- **Decomposers** or **detritivores** are organisms that degrade or decompose dead remains of animals and plants in simpler molecules.
- Decomposers play an important role in **recycling** of nutrients e.g. **fungi and bacteria**.



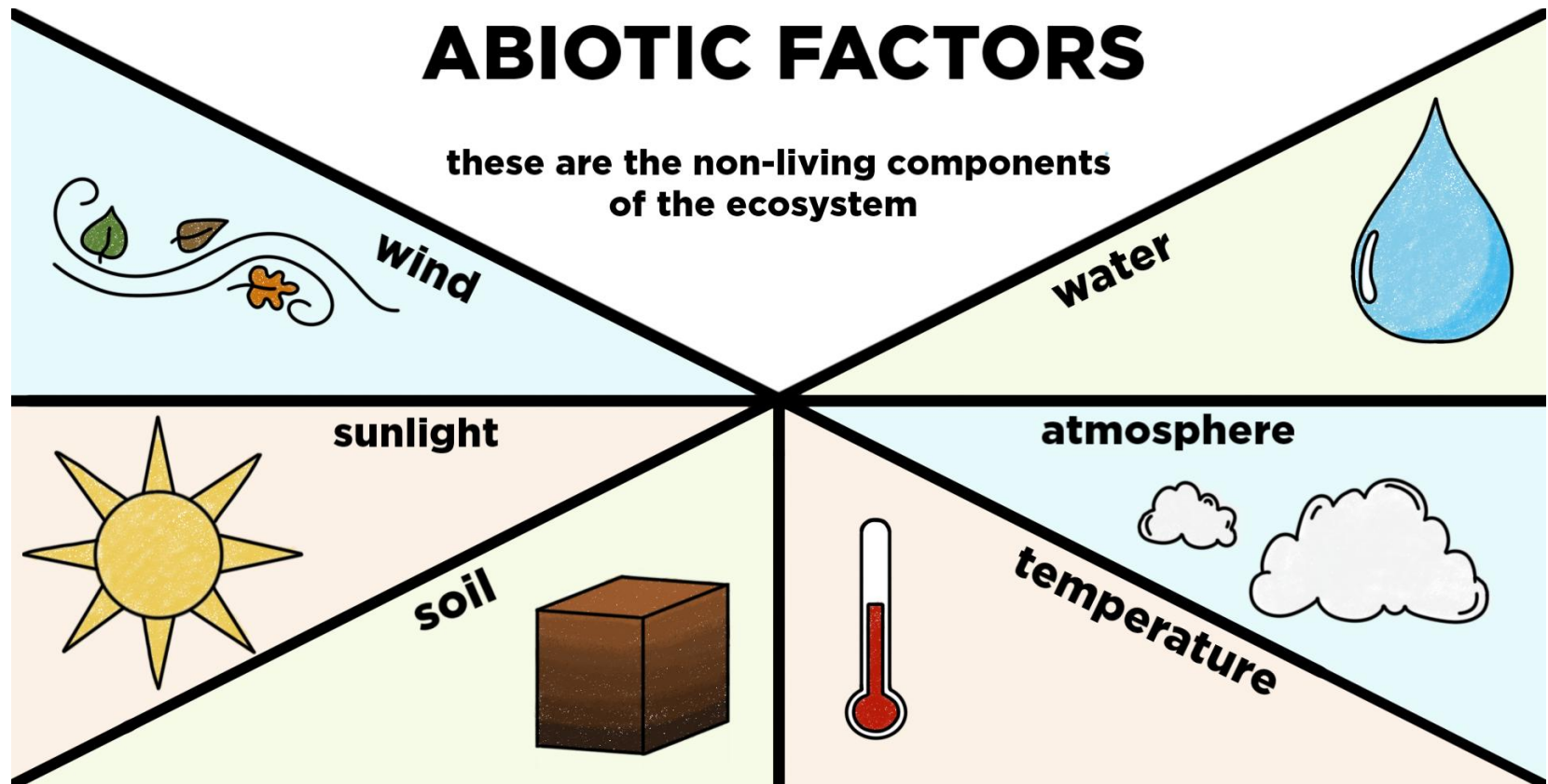
Predators and Prey

- An animal which hunts another animal for its food is called a **predator**.
- The hunted animal is called the **prey**.



Abiotic (Non-living) Components

- **Climatic factors:** Precipitation, Temperature, Light, Wind, Humidity etc.
- **Inorganic substances:** C, N, H, O, P, S, Ca, Mg etc.
- **Organic compounds:** Carbohydrates, Proteins, Lipids, & Humic substances



Plants → **Grass hopper** → **Frog** → **Snake**

1st TL

2nd TL

3rd TL

4th TL

Producer

**Primary
Consumer**

**Secondary
Consumer**

**Tertiary
Consumer**

Herbivore

Carnivores

Autotroph

Heterotrophs



Food Chain



Thank You