

Ecosystems

Ecosystems

- An ecosystem is a functional unit of nature where living organisms interact with each other and with the non-living environment.
- It includes plants, animals, microorganisms, soil, water, air, and all the interactions among them.



Key Features of Ecosystems

- They include both living (biotic) and non-living (abiotic) components.
- Energy flows from the sun to producers and then to consumers.
- Nutrients cycle repeatedly within the ecosystem.
- Each organism plays a specific role to maintain balance.
- Ecosystems vary in size: a small pond, a garden, a forest, or even the entire biosphere.

Components of an Ecosystem

A. Biotic components

- Producers (green plants, algae)
- Consumers (herbivores, carnivores, omnivores)
- Decomposers (bacteria, fungi)

B. Abiotic components

- Sunlight
- Temperature

- Water
- Air
- Soil
- Minerals and nutrients

Importance of Ecosystems

- Provide habitat for organisms.
- Regulate climate, water cycles, and nutrient cycles.
- Supply resources like food, fuel, and fiber.
- Support biodiversity.
- Maintain environmental balance.

Concept of an Ecosystem

- The concept of an ecosystem explains how living organisms and physical environment form a self-sustaining, interacting system.

Basic Ideas in Ecosystem Concept

- Every ecosystem is a combination of biotic and abiotic factors working together.
- It functions through energy flow and nutrient cycling.
- Organisms depend on each other (interdependence) for food, shelter, and survival.
- Ecosystems can be natural (forests, oceans) or artificial (aquariums, crop fields).

Fundamental Ecological Concepts Related to Ecosystems

1. Food chains

- A simple sequence showing who eats whom.
- Starts with producers and ends with top predators.

2. Food webs

- A network of interconnected food chains.
- Shows complex feeding relationships.

3. Ecological pyramids

- Pyramid of number
- Pyramid of biomass
- Pyramid of energy
- These represent the decreasing amount of life-supporting factors as we move from producers to top consumers.

4. Energy flow

- Energy enters through sunlight.
- Flows from producers to herbivores to carnivores.
- Energy flow is always one-directional.

5. Nutrient cycling

- Continuous movement of nutrients like carbon, nitrogen, phosphorus in the environment.

Self-Sustaining Nature of Ecosystems

- Ecosystems can maintain stability through natural processes.
- Balance is maintained through interactions between organisms and environment.

Structure and Function of an Ecosystem

- An ecosystem has a definite structure and performs specific functions to sustain life.
- Understanding both is essential in environmental science.

Structure of an Ecosystem

The structure includes:

1. Abiotic components

- Physical factors: sunlight, temperature, rainfall, humidity.
- Chemical factors: nutrients, minerals, gases (oxygen, carbon dioxide).

2. Biotic components

- Producers: create food using sunlight.
- Consumers:
 - Primary consumers: herbivores
 - Secondary consumers: carnivores
 - Tertiary consumers: top predators
- Decomposers: break down dead matter and recycle nutrients.

3. Trophic levels

- Each step in the food chain is a trophic level.
- Levels include producers, primary consumers, secondary consumers, tertiary consumers.

4. Community structure



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