

# **ECOSYSTEM**

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# Ecosystem

- The term ecosystem was first coined by A.G Tansley.
- The ecosystem word comes from two different words.
- Eco means the environment and the other hand system is the interaction.
- To sum it up for the ecosystem is the interaction of biotic all living things with the nonliving environment.
- Different ecologists define ecosystems differently.
- Living organisms cannot live isolated from their non-living environment because the latter provides materials and energy for the survival of the former i.e. there is interaction between a biotic community and its environment to produce a stable system; a natural self-sufficient unit which is known as an ecosystem.
- An ecosystem can be defined as a biological community of living beings, interacting with their environment and other non-living components.
- Every living thing, including humans, is involved in these complex networks of interdependent relationships.
- The ecosystem is the basic functional unit that explains all the basic functions an organism interacts with its environment and defines many other of its components.
- The ecosystem is the foundation of the 'Biosphere' and maintains the natural balance of the Earth.

# About Ecosystem

- An ecosystem is a complex web of life, intricately woven with threads of biotic and abiotic components.
- Ecosystems are diverse, ranging from a small pond to a large forest or a desert.
- The balance of an ecosystem is delicate and can be easily disrupted by external factors. They are dynamic and constantly changing, responding to natural and human-induced influences.
- Ecosystems provide a variety of services, including water filtration, climate regulation, and habitat for wildlife.
- Understanding ecosystems is crucial for environmental conservation and sustainable living.
- The study of ecosystems can provide valuable insights for scientific research and technological advancements.
- Ecosystems are dynamic and constantly evolving, reflecting the ever-changing nature of life on Earth.
- The health of an ecosystem is directly linked to biodiversity - the variety of life it supports.

# Components of the Ecosystem

- The structure of an ecosystem is defined by the association of both biotic and abiotic components.
- This encompasses the percentage of energy in our environment.
- The structure of an ecosystem can be divided into two main elements:
  - Biotic Components of the Ecosystem
  - Abiotic Components

# Biotic Components of the Ecosystem

- Biotic components are classified as autotrophs, heterotrophs, or saprotrophs (or decomposers).
- Autotrophs, such as plants, are producers.
- They create food through photosynthesis, providing sustenance for all species higher up the food chain.
- Saprophytes such as fungi and bacteria are decomposers.
- They feed directly on dead and decaying organic substances, recycling nutrients that plants can utilise.
- Consumers, also known as heterotrophs, are organisms that rely on other organisms for sustenance.

# The biotic or living components can be classified into the following categories:

- Green plants act as **Producers** for nourishment for the entire environment through the process of photosynthesis.
- Green plants are classified as **Autotrophs** because they take water and nutrients from the soil, carbon dioxide from the atmosphere, and solar energy in the process.
- **Consumers** are known as heterotrophs, and they consume food produced by autotrophs.
- They can be divided into three broad types based on their eating choices:
  - Herbivores (such as cows, deer, and rabbits) eat plants directly.
  - Carnivores are animals that consume other animals (such as lions, cats, and dogs)
  - Omnivores are organisms that eat both plants and animals, such as humans, pigs, and sparrows.
- Saprotrophs are another name for **Decomposers**.
- These are generally bacteria and fungus that feed on deteriorated and dead organic matter of plants and animals by secreting enzymes on the decaying materials outside their bodies.

# Abiotic Components of the Ecosystem

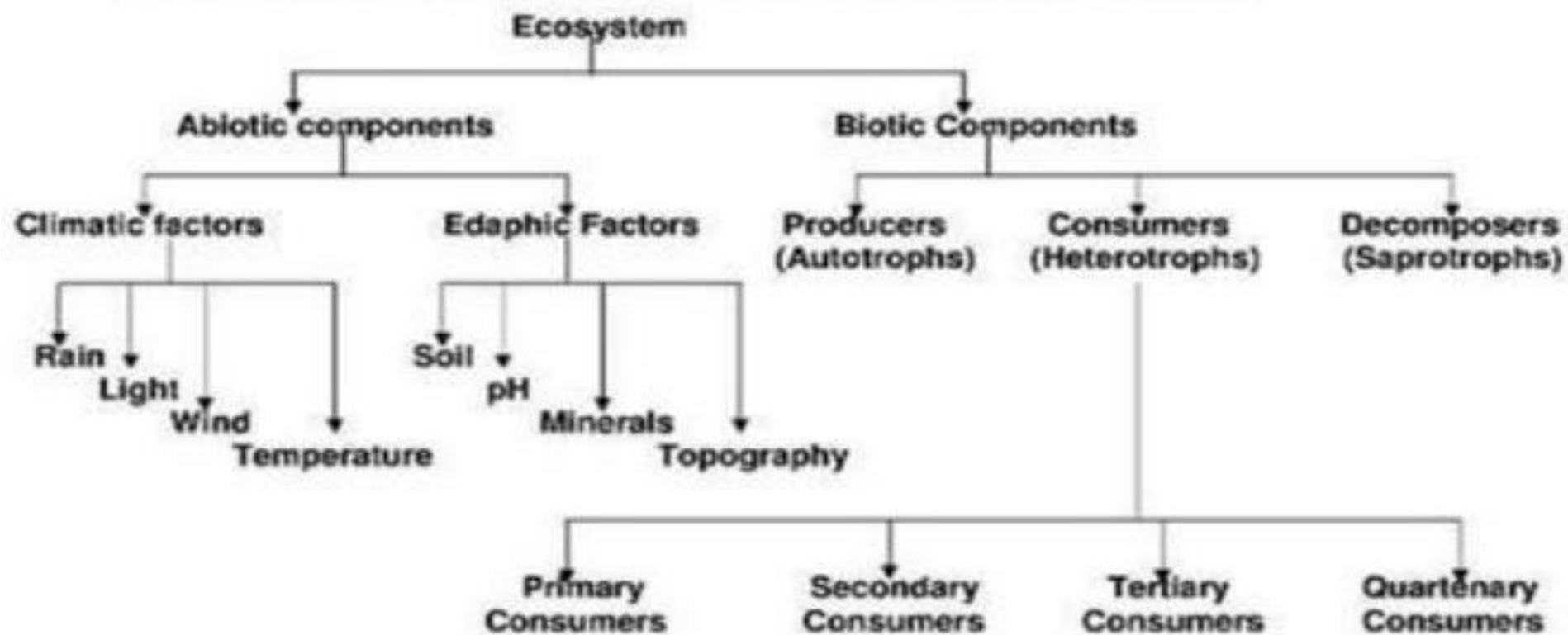
- Abiotic components, also known as detritivores or detritus feeders, consist of:
  - basic inorganic (soil, water, oxygen, calcium carbonates, phosphates, and so on), and
  - organic components
- Physical elements such as moisture, wind currents, and solar radiation are also included.
- The sun's radiant energy is the only significant energy source for any biosphere.

# The abiotic or non-living component can be divided into three categories:

- Sunlight, temperature, rainfall, humidity, and pressure are all physical factors.
- They both maintain and constrain biological growth in an ecosystem.
- Carbon dioxide, nitrogen, oxygen, phosphorus, sulphur, water, rock, soil, and other minerals are examples of inorganic substances.
- Carbohydrates, proteins, lipids, and humic substances are examples of organic compounds. As they are the building blocks of biological systems, they connect the biotic and abiotic components.



# Components of Ecosystem



# Functions of Ecosystem

These functions are not only vital for the survival of the organisms within the ecosystem but also play a crucial role in maintaining the overall balance of nature.

- **Energy Flow:** Ecosystems facilitate the flow of energy through food chains. This energy originates from the sun and is captured by producers (plants) through photosynthesis. It then passes on to consumers (animals) and finally to decomposers (microorganisms).
- **Nutrient Cycling:** Ecosystems are responsible for the cycling of nutrients between biotic and abiotic components. This includes the cycling of essential elements like carbon, nitrogen, and phosphorus, which are used by organisms for growth and reproduction.
- **Ecological Succession:** Ecosystems undergo a process of ecological succession or ecosystem development. This is a gradual process of change and replacement of species in an ecosystem over time.
- **Homeostasis:** Ecosystems have feedback control mechanisms that help maintain a state of balance or homeostasis. This ensures the stability of the ecosystem despite changes in environmental conditions.

# ...Functions of Ecosystem

- **Habitat Provision:** Ecosystems provide habitats for a wide variety of species. Each species is adapted to live in specific conditions provided by their habitat.
- **Biodiversity Maintenance:** Ecosystems support a high level of biodiversity by providing different niches for a wide variety of species.
- **Climate Regulation:** Ecosystems play a significant role in climate regulation. For example, forests absorb carbon dioxide, reducing the impact of climate change.
- **Water Filtration:** Certain ecosystems, like wetlands, help in water filtration, removing pollutants from water before it reaches larger water bodies.

These functions of ecosystems are interconnected, and any disruption in one function can have cascading effects on the others. Therefore, maintaining the health and integrity of ecosystems is crucial for the well-being of the planet.