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**ECOLOGY AND ECOSYSTEM, STRUCTURE AND FUNCTIONING OF ECOSYSTEM**

Ecology and ecosystem describe the relationship between biotic and abiotic factors in an environmental system. Ecology is the study of ecosystems. Ecosystem describes the relationship of the mass of living organisms, which belong to same or different communities. This is the main difference between ecology and ecosystem. Organisms maintain relationships and interactions between each other as well as the external environment for the purpose of obtaining basic life requirements like food, nutrients, water, and residence.

**Ecology**

Ecology describes the relations of organisms to one another and to their corresponding environment. Three major components studied in ecology are living organisms, the relationship and interactions with other organisms, and the relationships and interactions with the surrounding environment. Symbiotic relationships like rhizobium and legume in plant roots as well as the competition among [herbivorous](https://pediaa.com/difference-between-herbivores-carnivores-and-omnivores/) animals for food are organisms-organism interactions. All animals and plants rely on various aspects of their environment in order to obtain food, nutrients, and water. The response of organisms to climate, soil, topography, atmosphere, and water availability are the other types of relationships of organisms to their living environment. For example, animals in cold environments have small ears but, animals in deserts have long ears since long ears help to cool the body by increasing the heat loss. Ecology maintains a close relationship with the disciplines of physiology, behaviour, genetics, and evolution. The broader details studied during ecology includes:

* Life processes, interactions, and adaptations of a specific species.
* The influence of environmental factors on the organisms in a population.
* The progress changes in the ecosystems.
* The distribution and abundance of organisms in the environment.
* Biodiversity within an ecosystem.

**Ecosystem**

The ecosystem comprises of all living organisms in an area or the community of organisms and non-living abiotic factors dealing with the community. An ecosystem is categorized into biotic and abiotic factors. All living organisms in the environment are identified as the biotic factor. Other non-living physical things which interact with the biotic factor are identified as the abiotic factor. Abiotic factors are climate, sunlight, soil, water, minerals, and other non-living matters. The biotic and abiotic factors are linked by two factors: the flow of energy through the ecosystem and the cycling of nutrients within the ecosystem.

Sunlight is the fundamental energy of the majority of ecosystems. It is used by [autotrophs](https://pediaa.com/difference-between-autotrophs-and-heterotrophs/#ab) in the ecosystem to produce simple carbohydrates from carbon dioxide and water. Autotrophs are considered as primary producers in an ecosystem. Complex organic compounds like proteins, starch, and lipids are produced inside autotrophs. The [heterotrophs](https://pediaa.com/difference-between-autotrophs-and-heterotrophs/#cd) in the ecosystem depend on the organic matter produced by the autotrophs. Heterotrophs are the consumers of the ecosystem. The movement of organic matter from primary producer level to the consumer level makes up a food chain. The final link of the food chain is a decomposer, comprised of microorganisms. The overlapping and interconnecting food chains form the food web.

**Structure of the Ecosystem**

The structure of an ecosystem is characterised by the organisation of both biotic and abiotic components. This includes the distribution of energy in [**our environment**](https://byjus.com/biology/our-environment/). It also includes the climatic conditions prevailing in that particular environment.

The structure of an ecosystem can be split into two main components, namely:

* Biotic Components
* Abiotic Components

The biotic and abiotic components are interrelated in an ecosystem. It is an open system where the energy and components can flow throughout the boundaries.

Biotic Components

Biotic components refer to all life in an ecosystem.  Based on nutrition, biotic components can be categorised into autotrophs, heterotrophs and saprotrophs (or decomposers).

* **Producers**include all autotrophs such as plants. They are called autotrophs as they can produce food through the process of photosynthesis. Consequently, all other organisms higher up on the food chain rely on producers for food.
* **Consumers**or heterotrophs are organisms that depend on other organisms for food. Consumers are further classified into primary consumers, secondary consumers and tertiary consumers.
  + ***Primary consumers*** are always herbivores that they rely on producers for food.
  + ***Secondary consumers*** depend on primary consumers for energy. They can either be a carnivore or an omnivore.
  + ***Tertiary consumers*** are organisms that depend on secondary consumers for food.  Tertiary consumers can also be an omnivore.
  + ***Quaternary consumers***are present in some food chains. These organisms prey on tertiary consumers for energy. Furthermore, they are usually at the top of a food chain as they have no natural predators.
* **Decomposers**include saprophytes such as fungi and bacteria. They directly thrive on the dead and decaying organic matter.  Decomposers are essential for the ecosystem as they help in recycling nutrients to be reused by plants.

Abiotic Components

Abiotic components are the non-living component of an ecosystem.  It includes air, water, soil, minerals, sunlight, temperature, nutrients, wind, altitude, turbidity, etc.

**Functions of Ecosystem**

The functions of the ecosystem are as follows:

* 1. It regulates the essential ecological processes, supports life systems and renders stability.
  2. It is also responsible for the cycling of nutrients between biotic and abiotic components.
  3. It maintains a balance among the various trophic levels in the ecosystem.
  4. It cycles the minerals through the biosphere.
  5. The abiotic components help in the synthesis of organic components that involves the exchange of energy.