

MEANING OF BIOGEOGRAPHY

Biogeography is a branch of geography that studies the past and present distribution of the world's many species. Biogeography is a broad and holistic science that examines spatial patterns of biological diversity.

Biogeography is a subfield of the discipline of geography, the study of the spatial distribution of phenomena over the earth. It is usually considered to be a part of physical geography as it often relates to the examination of the physical environment and how it affects species and shaped their distribution across space. As such it studies the world's biomes and taxonomy - the naming of species. In addition, biogeography has strong ties to biology, ecology, evolution studies, climatology, and soil science.

Biogeography, the study of the geographic distribution of plants, animals, and other forms of life. It is concerned not only with habitation patterns but also with the factors responsible for variations in distribution.

In 1957 P. Dansereau defined "Biogeography which studies the origin, distribution, adaptation and association of plants and animals."

Two branches have recognized in the study of Biogeography. They are-

1. **Phytogeography or geography of plants** and

2. **Zoogeography or the geography of animals.**

Phytogeography is concerned with plants as social units and with the phenomena that affect their life-cycles including the origin, formation, composition and structure of plant communities, their development and change, the relationships among species and between species and their environment, and the classification of plant communities.

Zoogeography is the study of animal life in its various aspects of distribution patterns and interactions with the environment called Zoogeography. The study of the distribution of animals on the earth's surface in relation to their geographical environment is called zoogeography or animal geography.

Scope of Bio Geography

Biogeography, in its broadest sense, attempts to understand the interactions between and among the environment, animals, plants and man, all of which constitute the sub-systems of the global ecosystem. Thus bio-geographical studies include:

1. To examine, by means of experimental analysis, the relationship between complex ecological systems and propagation areas e.g. in a forest, grassland, pond or an estuary.

2. To analyse the spatial and temporal affinities between individual organisms and populations. For example, the spatial variations of an individual species of plant or animal may differ in the same type of ecosystem on account of the differences in the intake of solar energy or the nutrients present. In other cases the differences may be measured temporally and some species may increase or decrease after some time on account of competition, inhibition or mutualism. Still others may evolve into different species by accident, mutation or evolution.

3. To evaluate the ecological potential of the area for a species of plant or animal. The potential may be influenced by abiotic factors like soil, relief, amount of nutrients present in a given area, climatic conditions of temperature, rainfall and moisture or by biotic factors like the methods of dispersal of that species, behaviour towards environment, reproductive rate, adaptations to environment etc.

4. To measure the impact of anthropogenic factors which are responsible for the growth or extinction of certain species in a region as human behaviour is diverse in every region due to environmental variations.

5. To explore the historical reasons of the patterns of biotic dispersal in the past which to a large extent influence the present distributional pattern as well. Examination of the past distributional pattern is done by palaeontological studies of fossil records.

Ecology

Ecology can be defined as the relationship shared by organisms with the environment and with each other. The main three constituents of ecology are the following-

- Interactions and relationships with the surrounding environment
- Interactions and relationships with other organisms
- Living organisms

Every plant and animal present in the ecology relies on the numerous aspects of the environment, in order to get nutrients, water, and food. Another thing that is studied in the field of ecology is how the organisms respond to the atmosphere, topography, soil, and climate and water availability. Additionally, the following things are studied in extensive detail when it comes to ecology-

- Biodiversity within the ecosystem
- Abundance and distribution of organisms present in the environment
- Progress changes and modifications in the ecosystem
- The effects of environmental factors on organisms present in a population
- Adaptations, interactions and life processes of any specific species

Ecosystem

The ecosystem consists of all the living species in a community and dealing with several external and abiotic factors. An ecosystem is divided into two parts-biotic and abiotic. Biotic factors include the living beings of the ecosystem and the abiotic factors include the non-living physical beings. The most common abiotic factors are water, soil, sunlight, minerals, and other things. Two aspects hold the biotic and abiotic factors together-

- The cycling of various nutrients in the ecosystem
- The flow of energy through the ecosystem

Differences between ecology and ecosystem

Ecology and ecosystem differ in the following ways-

1. Ecology revolves around the relationship between the environment and living organisms.

Ecosystem revolves around the study of different places and environments, such as streams, still water, desert, river, grassland, forest etc.

2. Ecology is the study of the environment and different ecosystems.
The ecosystem is generally the subset of the broader ecology.

3. There are no general classifications when it comes to the ecology.
However, the ecosystem can be of different types such as sea ecosystem, forest ecosystem and pond ecosystem.

4. Ecology is an extensive study of living beings or organisms and their interactions and relationship with the environment.
On the other hand, the ecosystem is considered the subset of ecology and it revolves around all the complex interactions between living beings and non-living beings in a community or area.

5. Ecology is a broader perspective of the environment.
An ecosystem consists of every biotic and abiotic factor of the environment.

What is an Ecosystem?

The ecosystem is the structural and functional unit of ecology where the living organisms interact with each other and the surrounding environment. In other words, an ecosystem is a chain of interaction between organisms and their environment. The term "Ecosystem" was first coined by A.G. Tansley, an English botanist, in 1935.

Types of Ecosystem

An ecosystem can be as small as an oasis in a desert, or as big as an ocean, spanning thousands of miles. There are two types of ecosystem:

- Terrestrial Ecosystem
- Aquatic Ecosystem

Terrestrial Ecosystems

Terrestrial ecosystems are exclusively land-based ecosystems. There are different types of terrestrial ecosystems distributed around various geological zones. They are as follows:

1. Forest Ecosystems
2. Grassland Ecosystems
3. Tundra Ecosystems
4. Desert Ecosystem

Forest Ecosystem

A forest ecosystem consists of several plants, animals and microorganisms that live in coordination with the abiotic factors of the environment. Forests help in maintaining the temperature of the earth and are the major carbon sink.

Grassland Ecosystem

In a grassland ecosystem, the vegetation is dominated by grasses and herbs. Temperate grasslands, savanna grasslands are some of the examples of grassland ecosystems.

Tundra Ecosystem

Tundra ecosystems are devoid of trees and are found in cold climates or where rainfall is scarce. These are covered with snow for most of the year. The ecosystem in the Arctic or mountain tops is tundra type.

Desert Ecosystem

Deserts are found throughout the world. These are regions with very little rainfall. The days are hot and the nights are cold.

Aquatic Ecosystem

Aquatic ecosystems are ecosystems present in a body of water. These can be further divided into two types, namely:

1. Freshwater Ecosystem
2. Marine Ecosystem

Freshwater Ecosystem

The freshwater ecosystem is an aquatic ecosystem that includes lakes, ponds, rivers, streams and wetlands. These have no salt content in contrast with the marine ecosystem.

Marine Ecosystem

The marine ecosystem includes seas and oceans. These have a more substantial salt content and greater biodiversity in comparison to the freshwater ecosystem.

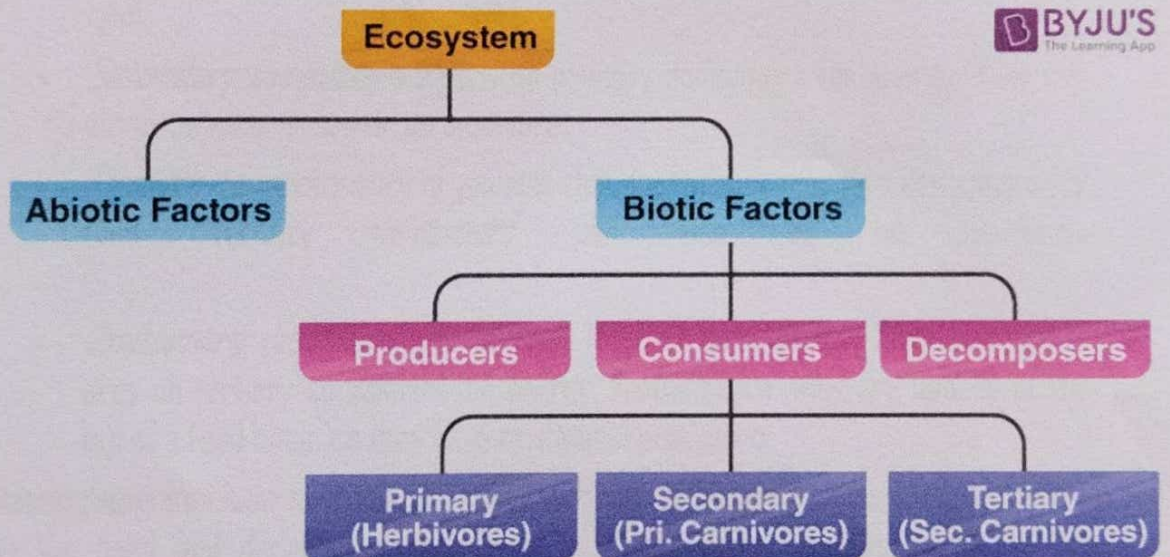
Structure of the Ecosystem

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**. 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.
 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.