

## Chapter-1

# Introduction to Ecology

[Concepts of Ecology, Environment, Population, Community, Ecosystem, Biosphere, Autecology and synecology.]

**Ecology:** (Greek= Oekologie, Oikos= home /place to live & Logos= to study)

Ecology is the study of organisms 'at home' in their native environment. The term Ecology was first introduced by **Reiter** in 1868. But fully defined & used mostly by **Ernst Haeckel** (1869).

Traditional Def<sup>n</sup> – “the study of an organism and its environment”.

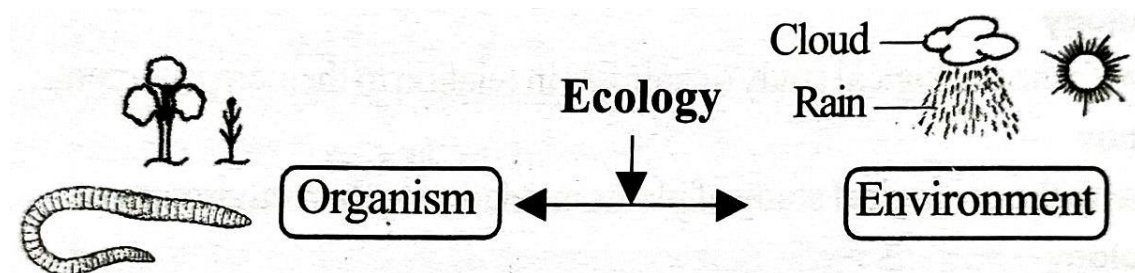
“Study of the inter-relationships of organisms with their physical and biotic environments is called ecology or environmental biology”.

**Ernst Haeckel (1869)**- “the total relations of animals to both its organic and inorganic environment.”

**Taylor (1936)**- “The science of the relations of all organisms in relation to all their environment”.

**Odum (1969)**- “the study of the inter-relationships between organisms and environment”.

Ecology is also called as environmental biology because it deals with study of organisms in relation to their environment. The organisms include plants and animals. The environment includes the surroundings of organisms. E.g. Soil, water, air, sunlight, rock and other organisms.



### Branches of Ecology:

1. Animal Ecology- deals with ecological study of animals in relation to their environment.
2. Plant Ecology
3. Habitat Ecology
4. Marine Ecology
5. Freshwater Ecology
6. Terrestrial Ecology
7. Population Ecology
8. Community Ecology
9. Applied Ecology

## **Subdivisions of Ecology:**

Ecology is divided into two main subdivisions- Autecology & Synecology.

### **1) Autecology:**

It deals with the study of single or individual organisms in relation to environment. It includes life history, behaviour, home-range, population dynamics etc.

e.g. Fish culture, Prawn culture, Pearl culture, Apiculture, Sericulture, Poultry, Dairy etc.

### **2) Synecology:**

It deals with the study of groups of organisms in relation to the environment. It includes study of community and ecosystem.

e.g. Caves, Deserts, Deep sea system, pond ecosystem etc.

## **Environment**

(French: Environner= encircle or surround)

Environment means surroundings.

“Environment is the sum total of water, air and land, inter-relationships among themselves and also with the living organisms”.

The study of environment is called **Ecology** or **Environmental Science**.

“The study of the basic components of our surroundings and their interactions is called Environmental science.”

“Educating people on environment and its problems is called environmental education or environmental studies.”

Every organism is surrounded by many things like air, water, soil, stones, animals, plants etc. All these surroundings constitutes the environment.

The various components present around organism are called **environmental factors**.

The environmental factors include non-living things and living things.

The non-living things of the environment are called abiotic factors. E.g. Air, water, soil, temperature, rocks, sunlight, earthquake, floods, cyclones etc.

The living things of the environment are called biotic factors. E.g. Plants, animals and microbes.

## Population

(Latin: Populus= People)

“A group of organisms of the same species living in a particular area at a given time.”

e.g. Deer population of Corbett National Park.

The human population of India.

A population has the following salient features:

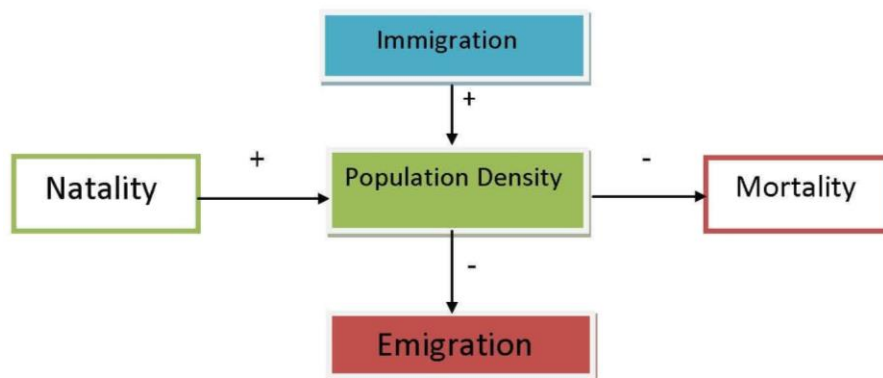
1. All the individuals of a population belong to one species.
2. The individuals are morphologically and anatomically similar.
3. The individuals are genetically related.
4. There is free gene flow between the individuals of a population.
5. The individuals are reproductively isolated from other species.

Populations are of two types:

- 1) Monospecific population: It is a population of individuals of only one species.
- 2) Mixed or Polyspecific population: it is the population of more than one species.

The basic characteristic of a population is its size or density. It is affected by four parameters-

- i. Natality (Births)
- ii. Mortality (Deaths)
- iii. Immigration
- iv. Emigration



## Community

“A community is a group of populations living in a particular area.”

It is formed of many species. It consists of many kinds of plants, animals and micro-organisms of a given area.

“A natural assemblance of plants, animals and micro-organisms living in a particular area.”

e.g., **1) Pond Community:** All the organisms living in a pond forms a pond community. It is formed of different kinds of aquatic plants, fishes, frogs, snakes, insects, crustaceans, micro-organisms etc.

**2) Forest Community:** it is formed of various types of trees, herbs, shrubs, deer, foxes, lions, tigers, birds etc.

There are two types of communities: Major community and Minor community.

### Community Structure:

The community is composed of 3 types of organisms- producers, consumers & decomposers.

**a) Producers:** These are autotrophs, i.e., green plants, algae, green flagellates etc. They synthesize complex organic molecules in presence of sunlight i.e., photosynthesis.

**b) Consumers:** These are heterotrophs, i.e., animals. They can't synthesize their own food. They feed upon other organisms.

The consumers which feed directly on plants or plant products are called herbivores. They are **primary consumers**. E.g., Deers, Cows, Bison etc.

The consumers which feed on other animals are called carnivores. They are **secondary consumers** which feed on primary consumers. E.g., Lions, Tigers etc.

**c) Decomposers:** These are heterotrophs and include mainly bacteria & fungi.

They decompose and breakdown complex organic substances into simple abiotic substances. These are also called as saprotrophs or **microconsumers**.