

# INTRODUCTION TO ECOLOGY

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## Introduction:

The term ecology is widely used on various contexts in the magazines, dailies, radio and television - mass media communications, government and public meetings.

It is commonly used whenever discussions decision making, plans and legal allocations are made to conserve the natural resources, control the pollution problems and to protect the life from risks. In general, ecology is recognized as one of the natural sciences.

It is considered to be a science concerned with the nature and the interrelations of living world.

The term ecology has been derived from the Greek word "oikos " meaning 'habitation' or 'house' or 'living place'.

Ecology is the scientific study of organisms 'at home' which is called as the 'environment'. The term 'environment' refers to those parts of the world or the total set of circumstances which surround an organism or a group of organisms.

These two terms are inseparable. The science of Ecology involves,

1. the study of the relation of organisms or a group of organisms to their environment,

2. the study of the totality of man and his environment and

3. the application of other disciplines like

Palaeoecology, Oceanography, Hydrology,

Limnology, Climatology, Zoogeography,

Geomorphology, Physics and Chemistry.

Biology is the science of life. Ecology deals with organisms, populations, communities, ecosystems and the biosphere.

The place of living is the organism's environment. Hence, ecology is, sometimes, called as environmental biology.

The interrelation of organisms and the environment may be between

- a. an organism & its place of living, b. an organism & its neighbor,
- c. an organism & its own community, d. an organism & other communities,

e. a group of organisms & an organism and f. a community to a community.

( or ) due to

a. the effect of environment over an organism,

b. the effect of environment over a group of organisms, c. the change of environment over life and

d. the change of environment over a change of environment.

Ecology was first described as a separate discipline in 1886 by the German Zoologist Ernst Haeckel.

It is a multidisciplinary science aimed to deal with many environmental problems.

The study of Ecology deals with

1. the spatial distribution of an abundance of organisms,
2. the temporal changes in the occurrence, abundance and activities of organisms,

3. the interrelations between organisms, communities and populations,

4. the structural adaptation and functional adjustments of organisms to the change in environment,

5. the behavior of organisms under natural environment,

6. the productivity of organisms and energy to mankind and

7. the development of interactive models for predictive purposes.

## **Subdivisions**

In general, ecology is classified into

- a. animal ecology and
- b. plant ecology.

Animal ecology :

This branch deals with the animal population, changes in population, their behaviour, and their relationships with the environment.

Plant ecology:

This branch deals with the relationships of plants to other plants and their environment.

However, animals mostly depend on plants for both food and shelter. Hence animal ecology deals with both animal and plant communities.

The science of ecology is divided into

- a) synecology and
- b) autecology, based on the organism and habitats.

## A . SYNECOLOGY

This branch deals with the study of groups of organisms or the community. This is a habitat based study. A habitat is a place where an organism or species population or a community thrives.

There are two major habitats as

1. terrestrial habitats and
2. aquatic habitats.

Aquatic habitats & Terrestrial habitats.

Marine, Fresh water, Estuarine, etc.

The branches related are:

Marine ecology,

Estuarine ecology,

Limnology, etc

Forests, Grasslands, Deserts, etc.

The branches related are:

Forest ecology,

Grassland

ecology, etc.

Synecology is divisible into population ecology and community ecology. A population emerges when individuals of the same species aggregate themselves to function as a single unit. Much interactions occur when such populations inhabit an area.

A community in turn represents a group of populations. It denotes the co-habitation of different species in a geographical region.

Synecology refers to ecological studies revealing the interrelationships between the species constituting a community.

The study includes

1. population characteristics,
2. position of an individual in a population and its relationship (intraspecific),
3. regulation of population,

4. impact of population on the environment,
5. community characteristics and their interrelationships(interspecific),
6. successional changes and
7. the impact of communities over an environment.

## B. AUTECOLOGY

This branch deals with the study of species or the relationship of an organism to one or more environmental conditions. This is also called as species ecology.

It deals with the nutrition, growth, reproduction, development and life history of individual species in an environment.

The following are the approaches in autecology ;

1. Describing the type of habitat where in the organisms of a species live in.

2. Physical factors of the environment (air, temperature, light, water; oxygen, chemicals) and their interaction with that particular environment and the organism.

3. The influence of various biotic factors (predation, parasitism, competition, exploitation etc) which have a bearing on the life and environment.

4. The interaction of organisms with other organisms of different species.

5. Life and seasonal changes of the environment.

6. Pattern of reproduction and dispersal of organisms.

# BRANCHES OF ECOLOGY

## 1. Population Ecology :

Study of a population, its growth, competition, means of dispersal etc.

## 2. Community Ecology :

Study of distribution of animals in various environments.

## 3. Ecosystem Ecology :

Relation and interaction of plant and animal communities with their total environment.

It deals with the formation of soil, chemical cycles, food and feeding relationship, exchange of energy and productivity.

#### 4. Evolution Ecology :

Concerned with the manner in which all ecological structure and functions have evolved.

#### 5. Geographical Ecology :

Deals with the distribution of organisms over the world and the factors and forces brought out this distribution.

6. Palaeoecology :

Deals with the organisms and their environment existed in the distant geological past.

7. Applied Ecology :

Deals with wild life management, forest conservation, biological control, animal husbandry and pollution control.

8. Oceanography :

Study of marine habitat and organisms.

9. Limnology : Study of life in freshwater bodies.

## 10. Terrestrial Ecology :

This is a major field including

### a. Forest Ecology

Forest ecology is the scientific study of the interrelated patterns, processes, flora, fauna and ecosystems in forests.

The management of forests is known as forestry, silviculture, and forest management.

## b. Cropland Ecology

Cropland ecosystem not only provides people with grains, vegetables, fibers, etc., but also plays an important role in air regulation, soil and water conservation, environmental decontamination, etc.

## c. Grassland Ecology:

Grasslands are areas where the vegetation is dominated by grasses (Poaceae), however sedge (Cyperaceae) and rush (Juncaceae) families can also be found.

Major grassland biomes of the Earth: steppe, prairie, pampa, campos, (grass)veld, tussock.

Tropical grasslands: llanos, savanna. Grassy semideserts.

Physiognomy, dominant grass genera, characteristic vegetation dynamics. Climate as a major determinant of grassland distribution The role of climate in the development of grasslands: temperature and precipitation.

Edaphic determinants: effect of soil and bedrock Soil-grassland interactions, soil physical, chemical and biological characteristics in grasslands. Soil water relations as an important local modifier of regional climate.

Grass – fungi interactions. Grassland ecology is the study of all aspects of the ecology of grasslands, which are regions dominated by grass species but containing other non-woody plants and, in the case of savannahs, some trees as well.

Grasslands occur naturally in many biomes and are also maintained in other areas by livestock grazing.