

## **PUC 1<sup>st</sup> Year –Semester -2**

### **Unit VI: Ecology and Environment**

#### **Module NO: 28: Ecology and its Importance**

“Ecology is the study of environmental interactions which control the welfare of living things, regulating their distribution, abundance, production and evolution”

The word “Ecology” has been derived from the Greek words “Oikos” meaning “House hold” or “home” or “place to live”. Thus ecology is a field study concerned with relationship between the living organisms and their environment.

Ecology is one of the most popular areas in biology. Even the layman and general public are greatly interested in ecology in view of the problems of environmental pollution, over-population, human survival, pest control and conservation of natural resources.

Modern ecology is mainly concerned with the functional interdependencies between living beings and their environments. The environment of animals and plants come mainly under two categories. i.e.,

1. Living or Biotic environment which consist of other organisms which influence the life of animals and plants under study
2. Non-living or Abiotic environment which is either physical or chemical or both. The physical agents are light, temperature, humidity and pressure. The chemical agents are like water, minerals, chemical compounds, O<sub>2</sub>, CO<sub>2</sub>, N, S and pH etc.

The organism depends upon its environment for its survival, while the environment accommodates the organism providing substratum and medium for their vital activities.

Irrespective of animals or plants under study, now-a-days two main divisions of ecology are recognized, namely autecology and synecology.

**Autecology:**

Autecology is the study of inter-relationships of the organisms of a species to biotic or abiotic environment. It is also known as species ecology. Autecology deals with the nutrition, growth, reproduction, development and life history of the individuals of a species in a given environment.

**Synecology:**

Synecology is the study of inter-relationship of different groups of the living organisms, such as populations, biotic communities and ecosystems and their environment, which are associated together as a unit. It can be differentiated into population ecology, Ecosystem ecology, ecology of community and ecology of habitat.

The practical application of ecology is found in agriculture, biological surveys, pest control, fishery biology, forestry etc. The study of ecology is accomplished in four levels or organization which constitute the Ecological spectrum. The four levels of organisms are:

1. Population
2. Communities or Biocoenoses
3. Ecosystems
4. Biosphere which includes the biologically inhabited soil, air and water.

**Population:**

Population is a group of organisms of the same species, living in a specific area at a specific time. Organisms which belong to the same population undergo interbreeding .

**Community:**

Two or more populations together constitute a community. A community is characterized by interactions taking place between its constituent populations. There are many different ways in which populations belonging to different species interact with each other. The different ways are competition, parasitism, predation, commensalism and mutualism.

**Ecosystem:**

An ecosystem is a functional unit of the biosphere in which members of the community interact among themselves and with the surrounding environment, involving flow of energy forming a well defined trophic structure.

**Biome:**

A biome is a major regional or global community of organisms. Biomes are usually characterized by the climate in the given area

**Biosphere:**

Biosphere is simply the place, area, zone where life exists on earth. The hydrosphere, lithosphere, and atmosphere together constitute the biosphere.

**Importance**

Ecology is the science of all the relations of all living organisms to all the their environment.

Man is as much a part of ecosystem as any other animal. The problems of varied nature, whether socioeconomic, political or similar other policies are all in someway correlated with ecology. For example, production of

grains, live stock, timber, fibre, fish, flowers, control of pest species, conservation of wild life etc are all basically ecological problems. Ecology plays an important role in agriculture. The problems of crop rotation, weed control, management of grass land, forestry etc are nicely solved under ecology. The problems and effects of disposal of wastes, pollution of air, water and land, deterioration of habitat, productivity and contamination of sea, radioactive pollution, effect of the use of insecticides, herbicides and fertilizers can be taken up only with the assistance of trained ecologists. In the above context, every person should have some basic knowledge of various principles of ecology. Human life on this earth still depends upon the trapping of solar energy, upon cycling of materials and water through the ecosystem. The study of ecology is thus a must for every chemist, engineer (Town planning), doctor (public health), lawyer, administrator, teacher, agriculturist and forest developing officer.

Ecology gives valuable guidance for the conservation of our natural resources and in our national affairs. The importance of ecology can well be guessed from the fact that it is indispensable for other fields of great importance as agriculture, wild life conservation, fisheries, animal husbandry, environmental physiology, climatology, geology, oceanography, public health, space research etc.

Now it has become such a significant branch that it is felt that every human being must have knowledge of basic principles of ecology for his successful living on this earth, and the knowledge of organisms, environment and the inter relationships is vital for the conservation of nature.

**Questions:**

1. Define ecology
2. Differentiate between Autecology and synecology
3. Describe the importance of Ecology