

THE CONCEPT OF ECOLOGY AND ENVIRONMENT

Man has been taking keen interest in his surrounding and for that matter his environment in a practical sense since his evolution. His matter of survival was dependent on his understanding of the natural forces, the flora and fauna surrounding him. Civilization and settled agriculture further strengthened his relationship with environment as he started modifying and controlling the forces of nature. However it is important to understand the concepts of environment ecology or eco systems which are loosely used interchangeably or as substitutes of each other. Where as they differ in their scope and mechanism.

11.1.1 Meaning and definition of Ecology:

The science of ecology has had a gradual development through history. The reference to this concept is found in the writings of Aristotle and other philosophers of Greek period.

The term ecology was first proposed by a German Biologist Ernest Hackel in 1866. The word is derived from two Greek words 'Oikos' that means house, a place to live and logos i.e. the study of. Therefore ecology is a study of organisms at home. Ecology is mainly concerned with the biological connections and processes of organisms, land, water etc. It can be referred as the scientific study of the interactions that determine the distribution and abundance of organism.

According to Webster's dictionary "ecology is the totality or patterns of relations between organisms and their environment".

For E. Hackel "It is the science of relation between organisms and their environment".

Taylor defined ecology as "the science of all the relations of all the organisms in relation to all the environments"

According to the United States Council on Environmental Quality, "ecology is the science of the intricate web of relationships between living organisms and their non-living surroundings.

Hence it is imperative to understand and differentiate the concept of ecology with reference to environment or the components of ecosystem.

11.1.2 Scope and principle of ecology:

Scope of ecology:

Ecology is a multidisciplinary science. Because of its focus on higher levels of the organization of life on earth and on the interrelations between organisms and their environment, ecology draws heavily on many other branches of science, especially geology, geography, meteorology, climatology genetics, chemistry, physics, biology, maths and now even computer science.

Ecologists aim to explain the distribution, life processes and adaptations amongst the organisms. Further it tries to analyse the movement of energy flow and successive growth and development of organisms. It tries to comprehend the nature of biodiversity and its complexity.

Alongwith understanding the interrelation and interdependence of the organisms, ecologists are also concerned about manner in which manipulation and misuse of non-living organisms by human population is taking place, ruining the balance.

Principles of ecology:

All living organisms and their environment are mutually reactive, affecting each other in various ways. Animal population, flora and fauna (vegetation) are interdependent throughout the environment.

Components in ecology are dynamic and works as a sieve (to perforate) selecting organism for growth and others for decay.

The species maintain uniformity in structure, function, reproduction, growth and development by preservation of its genetic pool.

Modification in the organisms of ecology takes place through growth, dispersal, reproduction, death and decay.

Under similar climatic conditions there may be simultaneous development of more than one community and some of which may even reach their climax or critical stage.

11.1.3 Meaning and definition of Environment:

The term environment is derived from French word “environs” meaning around, encircle or encompass. And hence the term environment in short can be used for surrounding. Environment can also be referred as the totality of all the

externalities that affect human life. In broader perspective environment consists of human, social, political, economic and physical environment.

Webster's ninth new college dictionary defines environment as the "circumstances, objects or conditions by which one is surrounded".

The Encyclopedia Britannica defines environment as the entire range of external influence acting on an organism both physical and biological".

It can also be defined as the "surrounding in which organisation operates including air, water, land and natural resources, flora and fauna, humans and their inter relations".

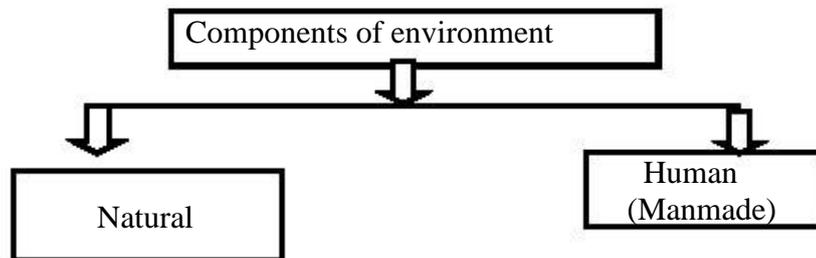
In nutshell environment comprises of all the biotic, abiotic, natural and human components defining the form and survival of each in a given system at a given time or over a period of time.

Components of environment:

Broadly speaking, components of environment can be classified in to two

- a) Natural and
- b) Human (manmade)

Figure 11.1



- Lithosphere (land)
Anthrosphere
- Hydrosphere (water)
- Atmosphere (air)
- Biosphere (flora/fauna/microbes)

Natural environment -:

1. **Lithosphere:** It is the solid rocky crust covering the entire planet. It is inorganic and composed of minerals. It consists of continents, mountains and ocean floor, which makes up 29% of the earth's surface.
2. **Hydrosphere:** It is composed of all the water on and around the earth. It includes all the oceans, lakes, rivers, ponds and streams on the earth. It covers 71% of the earth's surface of which 97% is in the oceans. Only 3% is fresh water which includes the solid ice sheets as well as liquid form in the rivers and ponds.
3. **Atmosphere:** The atmosphere is the layer of gases surrounding the earth's surface. It consists of 78% of Nitrogen, 21% of Oxygen, 0.03% carbon dioxide and other gases. The atmosphere helps to maintain the temperature near the surface by absorbing the dangerous ultraviolet rays coming from solar radiation.
4. **Biosphere:** This component comprise of living or non living organisms, flora and fauna, plants and animal species including one-cell organisms. They all are vital to maintain the energy flow via eco-cycles, food webs and food chains (discussed in the following sections) and thus maintain the balance in nature.

Man-made environment-:

Anthrosphere: The part of environment made, modified, or used by humans for their activity is called Anthrosphere. The entire infrastructure made by humans by using the natural components of the environment can be considered as a part of Anthrosphere. For e.g. buildings made with the use of wood, cement or water. Even an ocean-going ship used to ship goods made in the factory.