

Concepts of Environmental Studies

Environmental study is basically the study of total environment of the earth as a living planet having both physical and biotic components. The fundamental study unit of environmental study is the life layer of the earth having atmospheric, lithospheric and hydrospheric components, which is responsible for the support of all types of life. This life supporting layer is very commonly known as biosphere, is characterized by the operation of several physical and biological processes., mutual interaction and interdependence of abiotic and biotic components of the biospheric ecosystem, production and consumption of ecological resources, various positive and negative responses of interactions between different components of the environment resulting into stability or instability of biospheric ecosystem at different levels (local, regional and global), environmental degradation and pollution arising out of increasing pressure of economic and technological man on the environment and man's renewed efforts and struggle to stabilize the disturbed ecosystem, to conserve and manage the ecological resources and the ameliorate environmental degradation and pollution through different pollution-control and abatement programmes. There are certain basic principles which govern the basic aspects of environmental studies viz. natural processes, both physical and biological in the life supporting layer (biosphere) and relationships between man and environment and man and environmental processes , integrated functional unit of the biotic and abiotic components of the environment (ecosystem), functioning of ecosystem, ecological evolution and succession, climatic changes and ecological modification, and environmental degradation and pollution arising out of human activities and ecological resources and their conservation and management.

The following principles and concepts of environmental study may be identified-

1. Environmental system or ecosystem is the fundamental ecological unit for the study of the environmental study:

The planet earth is the only living planet that has atmosphere, environment and living organisms including plants, animals and micro-organisms. Since the environment is both physical and biological concept, it encompasses both the non-living (abiotic) and living (biotic) components of the planet earth.

Environment is the comprehensive term which in general refers to surroundings. The earth is the only known planet having different kinds of life forms where in there are complex sets of interrelationships between the physical and biological components. Various linkages between

physical and biological components at different levels maintain the unity of the biospheric ecosystem.

2. The biospheric ecosystem is governed by discernible processes:

The dynamic evolving earth system in general and the biospheric system in particular are governed by discernible processes, both physical and biological. The physical or biological processes operate through a set of cycles, the broadest being geocycle. In fact, the endogenetic and exogenetic processes create different types of habitats on the earth surface for living organisms on the one hand and sometimes destroy the habitats on the other hand. The driving force of the endogenetic processes comes from within the earth. Endogenetic forces create different types of relief features of various magnitudes on the earth's surface. Exogenetic forces originate from the atmosphere and are engaged in continuous process of denudation of surface irregularities caused by endogenetic processes.

3. There is continuous creation, maintenance, destruction and recreation of surface materials of the earth

Various physical, chemical and biological processes are continuously engaged in the creation, maintenance, destruction and recreation of surface materials of the earth's surface (both organic and inorganic). The process involved in the creation of the earth materials (inorganic) is known as 'geologic cycle' which includes a set of several sub cycles. The earth materials are not only created but also maintained, change in their properties transferred from one place to another and even destroyed by geologic cycle but these materials are even passing through the aforesaid pathways remain initially uncontaminated and are very useful for man, they became contaminated and are seldom available for human use because either they are dispersed to such locations which may not be reached by man for fairly long period of time or they become so deformed and contaminated that they are not reusable. Sometimes, some renewable natural resources are so contaminated that they become non-renewable.

4. Physical and biological processes operate according to the law of uniformitarianism:

Physical and biological processes operate according to the law of uniformitarianism. James Hutton's law of uniformitarianism having two basic principles of 'the present is key to the past' and 'no vestige of a beginning; no prospect of an end' postulated in 175 and related to 'cyclic nature of earth's history' states that 'all the physical law and processes that operate today, operated throughout geologic time, although not necessarily always with the same intensity as now'. In other words, the very nature of the operation of physical processes remains almost the same throughout geologic history of the earth though their frequency and magnitude may vary. So, the biological processes which operate today might have operated

in the past though with varying degree of relationships between biological communities and physical or natural environment and between organisms.

5. Natural environmental system is governed by homeostatic mechanism:

Physical and biological processes of the natural environmental system operate in such a way that any change in any part of the environment at any place in a specific time period is suitably compensated by negative feedback mechanism in a natural condition. Thus the natural environmental system has 'inbuilt self regulating mechanism' known as homeostatic mechanism through which any change in the natural ecosystem is counterbalanced by responses of the system to the change and ultimately ecosystem stability or environmental equilibrium is restored. Sometimes this situation also leads to the evolution of new species.

6. There is reciprocal relationship between abiotic and biotic components of the natural environmental system:

There is reciprocal relationship between biotic and abiotic (physical) components of the environment. The physical processes create suitable habitats for biological communities on the one hand, biological communities (mostly man) modify the environment on the other hand. In fact, life has continued to modify and alter the atmospheric, lithospheric and oceanic components of the biosphere since the very beginning of the life on the planet earth.

7. The energy flow and circulates of nutrients in the biospheric ecosystem help in the sustenance of life on the planet earth:

The natural ecosystems are open systems characterised by continuous input of energy (solar radiation) and matter (nutrients) and output of energy and matter and they tend to be in relatively stable equilibrium unless there is disturbance in one or more controlling factors. The circulation of elements or matter or nutrients (both organic and inorganic) in the biospheric ecosystem is made possible through energy flow. In other words, energy flow is the main driving force of materials (nutrients) circulation in various biotic components of the ecosystem.

8. There are temporal and spatial variations in species:

There are temporal and spatial variations in species. The Darwin's theory of evolution of species states that there is progressive evolution of species through the processes of natural selection and adaptation to environmental condition which lead to gradual modification and diversification of species over a long period of time.

9. Ecosystem diversity and complexity enhances and maintains ecological stability:

The stability of ecosystem refers to balance between production and consumption of each element of the ecosystem. In other words, ecosystem stability means balance between input

and output of energy and normal functioning of different biogeochemical cycles and stable condition of concentration of all elements.

References

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