WEL-COME

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1.

INTRODUCTION TO ECOLOGY

Concept of Ecology

❖The Scientific study of interaction between living organisms in the natural environment.

❖Ecology is derived from Greek words i.e. Oikos = House and Logos= Study. Therefore, **Ecology** is the study of interactions between organisms and their environment; it includes **biotic** (*living)* factors, as well as **abiotic** (*non-living*) factors.

Ecology

- According to E. P. Odum (1963) ecology as structure and function of nature.
- Earnst Haeckel (1866) defined ecology as a branch of science which deals with the total relationships of an organisms to both their organic and inorganic environment.

Divisions of Ecology

1. Habitat Ecology
2. Population Ecology
3. Ecosystem Ecology
4. Conservation Ecology
5. Production Ecology
6. Radiation Ecology
7. Paleoecology
8. Gene Ecology/ Ecological Genetics
9. SpaceEcology
10. Taxanomic Ecology
11. Human Ecology

Scope and Significance of Ecology

- Ecology is a complex branch of biology which is related to almost all branches of science.
- An ecologist must have a knowledge of uses of pesticides, detergents, sewage disposal, power dams, urban development, atomic radiations etc. to understand the ecological problems.
- To study how deforestation and industrialization is harmful to living organisms and human being due to air and water pollution.

Environment

- The condition in which we live, work etc are defined as environment.
- According to **J. Turk**., " Environmental science provides an approach towards understanding the environment of our planet and the impact of human life upon the environment".
- **D. Chivas** defined " Study of inter relationships between living and non living things called environmental studies".

Multidisciplinary Nature of Environmental studies

Environmental science is very vast and multidisciplinary subject. In environmental studies we basically study the biotic and abiotic factors.

- Multidisciplinary Nature of Environmental studies:

1. Biology and environmental studies
2. Botany and environmental studies
3. Zoology and environmental studies
4. Physics and environmental studies
5. Chemistry and environmental studies
6. Mathematics, Geometry, Statistics and environmental studies
7. Civics and environmental studies

Multidisciplinary Nature of Environmental studies

8. History and environmental studies
9. Economics and environmental studies
10. Politics and environmental studies
11. Geography and environmental studies

Scope of Environmental Studies

Environmental study is a multidimensional, multidisciplinary and interdisciplinary subject, hence it is related with natural and social sciences. Day by day this science is expanding and having much scope as follows;

1. How to maintain natural resources
2. How to control on pollution
3. New sources of food
4. Human welfare
5. Evolution
6. Genetics
7. Survival of human race

Importance of Environmental Studies

1. Conserve Biodiversity
2. Sustainable way
3. Behavior of an organism

Population

- A population is any group of individuals of the same species in a given area or region at a specific time.
- It has characteristics function for whole group and not of the individual members
- All the individuals of population are morphologically and behaviorally similar
- Individuals of a population interbreed freely
- It is a small unit of organization
- There is no relationship of prey – predator
- Intra-specific competition between individuals occur.

Population

A population has many characteristics that area function of the whole group and not of the individual members; these are:

1. Population Density
2. Natality
3. Mortality
4. Age distribution
5. Population growth form
6. Population fluctuations
7. Population dispersal
8. Biotic potential

Community

- A community or biocoenosis includes all types of organisms or individuals of different species mutually living in a given area/ environment
- Different members of a community are morphologically and behaviorally dissimilar
- It is larger unit of organization
- Comparatively large group
- Prey – predator relationship present
- Inter specific competition between organisms occur

Attributes of Community

The important attributes of communities are as follows;

1. Community structure
2. Ecological dominants and indicators
3. Ecological stratification
4. Ecotone and edge effect
5. Ecological niches
6. Ecological equivalents
7. Ecological succession.

Community Structure

The community is mainly composed of three types of organisms and these are,

1. Producers (Autotrophs)
2. Consumers (Heterotrophs)
3. Decomposers (Bacteria and Fungi).

Ecosystem

The self-sustaining structural and functional interaction between living and non-living components known as ecosystem

- Size : an ecosystem may be as large as the ocean or a forest or one of the cycle of the elements, or it may be as small as an aquarium jar containing tropical fish, green plants and snail.

Structural Components of Ecosystem

- Abiotic or Non-living components.
    1. Inorganic substances
    2. Organic compounds
    3. Climatic factors
- Biotic or Living components.
    1. Autotrophs or Producers
    2. Heterotrophs or Consumers
    3. Decomposers or Saprotrophs

Biosphere

- Biosphere is defined as a part of the earth and atmosphere in which many smaller ecosystem exist and operates.

- The biosphere is a global sum of all ecosystem interacting all living being, included their interaction with the three main sub divisions of the biosphere i.e,

1. Lithosphere (Solid matter)
2. Hydrosphere (Liquid matter)
3. Atmosphere (Gaseous envelop of the earth which extends up to the height of 22.5km)

Subdivisions of Ecology

1. Autecology: it is a branch of ecology which studies the individual organism or species.
2. Synecology: Synecology is the study of a group of organisms associated as a unit (essentially a biological community).