

Multidisciplinary nature of Environmental Studies

The word environment is derived from the French verb 'environner' which means to 'encircle or surround'. Thus our environment can be defined as the physical, chemical and biological world that surround us as well as the complex of social and cultural conditions affecting an individual or community. It includes all factors living and nonliving that affect an individual organism or population at any point in the life cycle; set of circumstances surrounding a particular occurrence and all the things that surrounds us.

Objective of this course is to develop concern for our own environment which will lead us to act at our own level to protect the environment we all live in.

There are three reasons for studying the state of the environment.

1. The need for information that clarifies modern environmental concepts like equitable use of natural resources, more sustainable life styles *etc.*
2. There is a need to change the way in which we view our own environment, using practical approach based on observation and self learning.
3. There is a need to create a concern for our environment that will trigger pro-environmental action, including simple activities we can do in our daily life to protect it.

Environmental science is essentially the application of scientific methods and principles to the study of environmental issues.

Environmental scientists may or may not include organisms on their field of view. They mostly focus on the environmental problem which may be purely physical in nature. For *eg.* Acid deposition can be studied as a problem of emissions and characteristic of the atmosphere without necessarily examining its impact on organisms.

There are two types of environments:

1. Natural environment
2. Man made environment

Natural: The environment in its original form without the interference of human beings is known as natural environment. It operates through self regulating mechanism called homeostasis *i.e.*, any change in the natural ecosystem brought about by natural processes is counter balanced by changes in other components of environment.

Man made or Anthropogenic Environment: The environment changed or modified by the interference of human beings is called man made environment. Man is the most

evolved creature on this earth. He is modifying the environment according to his requirements without bothering for its consequences. Increased technologies and population explosion are deteriorating the environment more and more.

NATURAL RESOURCES

Natural resources can be defined as ‘variety of goods and services provided by nature which are necessary for our day-to-day lives’. Eg: Plants, animals and microbes (living or biotic part), Air, water, soil, minerals, climate and solar energy (non- living or abiotic part). They are essential for the fulfillment of physiological, social, economical and cultural needs at the individual and community levels.

They are of two types namely **Renewable and Non-Renewable Resources**.

Renewable resources: Natural resources which can be used but can be regenerated by natural processes. Ex: water, wood.

Non Renewable Resources: Those which will be exhausted in the future if we continue to extract these without a thought for subsequent generations. Example: minerals, fossil fuels.

Different types of resources *viz.*, forest, water, food, energy and land resources are detailed below.

FOREST RESOURCES

A forest can be defined as a biotic community predominant of trees, shrubs or any other woody vegetation usually in a closed canopy. It is derived from latin word ‘*foris*’ means ‘*outside*’.

India’s Forest Cover is 6,76,000 sq.km (20.55% of geographic area). Scientists estimate that India should ideally have 33% of its land under forests. Today we only have about 12% thus we need not only to protect our existing forests but also to increase our forest cover.

Forest Functions:

- I. Protective and ameliorative functions.
- II. Productive functions
- III. Recreational and educational functions
- IV. Development functions

I. Protective and ameliorative functions

A. Watershed protection

- Reducing the rate of surface run-off of water
- Preventing flash floods and soil erosion

Producing prolonged gradual run-off and thus safeguarding against drought.

B. Erosion control

Holding soil (by preventing rain from directly washing soil away)

C. Land bank

Maintaining soil nutrients and structure.

D. Atmospheric regulation

Absorption of solar heat during evapotranspiration

Maintaining carbon dioxide levels for plant growth

Maintaining the local climatic conditions

II. Productive Functions

- Local use: Consumption of forest produce by local people who collect it for sustenance.
- Food: (consumptive use) gathering plants, fishing, hunting from the forest.
- Fodder for cattle.
- Fuel wood and charcoal for cooking and heating.
- Poles for building homes in rural and wilderness areas.
- Timber for household articles and construction.
- Fiber for weaving baskets, ropes, nets, strings, etc.,
- Sericulture for silk.
- Apiculture for rearing bees for honey (bees as pollinators).
- Medicinal plants for traditional medicines, investigating them as potential source for new modern drugs.
- Market use (productive use): Most of the products used for consumptive purposes and good source of income for supporting their livelihood of forest dwelling people.
- Minor forest products (NTFPs): Fuel wood, fruits, gum, fiber, etc which are collected and sold in local markets as a source of income for forest dwellers.
- Major timber extraction for construction, industrial uses, paper pulp etc. Timber extraction is done in India by the forest department, but illegal logging continues in many of the forests of India and the world.

III. Recreational And Educational Functions: Eco tourism

IV. Developmental Functions

Employment functions

Revenue

Ecological significance of forests:

1. Balances CO₂ and O₂ levels in atmosphere.
2. Regulates earth temperature and hydrological cycle
3. Encourage seepage and reduces runoff losses, prevents drought
4. Reduces soil erosion (roots binding), prevents siltation and landslides thereby floods
5. Litter helps in maintaining soil fertility
6. Safe habitat for birds, wild animals and organisms against wind, solar radiation and rain

Deforestation:

Deforestation refers to the loss of forest cover; land that is permanently converted from forest to agricultural land, golf courses, cattle pasture, home, lakes or desert. The FAO (Food and Agriculture Organization of the UN) defines tropical deforestation as “ change of forest with depletion of tree crown cover more than 90% ” depletion of forest tree crown cover less than 90% is considered forest degradation

.Causes for Deforestation:

1. Agriculture: Conversion of forests to agricultural land to feed growing numbers of people.
2. Commercial logging: (which supplies the world market with woods such as meranti, teak, mahogany and ebony) destroys trees as well as opening up forest for agriculture. Cutting of trees for fire wood and building material, the heavy lopping of foliage for fodder and heavy grazing of saplings by domestic animals like goats.
3. The cash crop economy: Raising cash crops for increased economy.
4. Mining.
5. Increase in population: The needs also increase and utilize forests resources.
6. Urbanization & industrialization.
7. Mineral exploration.
8. Construction of dam reservoirs.
9. Infrastructure development.
10. Forest fires.
11. Human encroachment & exploitation.
12. Pollution due to acid rain

Environmental effects /Consequences of deforestation

1. Food problems
2. Ecological imbalance
3. Increasing CO₂
4. Floods leading to soil erosion
5. Destruction of resources
6. Heavy siltation of dams
7. Changes in the microclimate
8. Loss of biodiversity
9. Dessication of previously moist forest soil
10. Heavy rainfall and high sunlight quickly damage the topsoil in clearings of the tropical rainforests. In such circumstance, the forest will take much longer to regenerate and the land will not be suitable for agricultural use for quite some time.
11. Where forests are replanted, their replacement can mean a loss of quality
12. Loss of future markets for ecotourism. The value of a forest is often higher when it is left standing than it could be worth when it is harvested.
13. Some indigenous peoples' way of life and survival are threatened by the loss of forests. Fewer trees results an insecure future for forest workers
14. Deforestation can cause the climate to become extreme in nature. The occurrence and strength of floods and droughts affecting the economy.
15. The stress of environmental change may make some species more susceptible to the effect of insects, pollution, disease and fire
16. Most humid regions changes to desert
17. Environmental pollution
18. Global warming

Conservation: Conservation derived from two Latin words, *con* – together,- *servare* – to keep or guard measures, *i.e.* an act of preservation or to keep together .

Concepts in conservation

1. Restraining cutting of trees and submerging the forests
2. Reforestation
3. Afforestation
4. Control forest diseases and forest fire

5. Recycling forest products
6. Replacing forest products
7. Avoids diversion of forest lands for other activities through acts like Forest Conservation Act and Wild life (protection) Act
8. Bringing awareness among people ex: Chipko movement, Appiko , Narmada Bachao Andolan
9. Implementing people's participatory programmes. Ex: Joint Forestry Manangement (JFM)

MANGROVES

The word "Mangrove" is considered to be a combination of the Portuguese word "Mangue" and the English word "grove". Mangroves are salt-tolerant plants of tropical and subtropical intertidal regions of the world. The specific regions where these plants occur are termed as 'mangrove ecosystem'. These are classified as salt-tolerant evergreen forests, found along coastlines, lagoons, rivers or deltas in 124 tropical and subtropical countries and areas, protecting coastal areas against erosion, cyclones and wind. These are highly productive (wood, food, fodder, medicine and honey) but extremely sensitive and fragile. Besides mangroves, the ecosystem also harbours other plant and animal species.