

## Chapter 1

### Introduction to Environmental Studies And its Multidisciplinary

#### Nature of

The word 'Environment' is derived from the French word 'Environner' which means to encircle, around or surround. The biologist Jacob Van Uerkal (1864-1944) introduced the term 'environment' in Ecology. Ecology is the study of the interactions between an organism of some kind and its environment. As given by Environment Protection Act 1986, Environment is the sum total of land, water, air, interrelationships among themselves and also with the human beings and other living organisms. It studies the sources, reactions, transport, effect and fate of a biological species in the air, water and soil and the effect of and from human activity upon these. Environmental Science deals with the study of processes in soil, water, air and organisms which lead to pollution or environmental damages and the scientific basis for the establishment of a standard which can be considered acceptably clean, safe and healthy for human beings and natural ecosystems.

The word environment is derived from the French word '**environ**' meaning surroundings. Hence, everything surrounding us is called "ENVIRONMENT".

The **Oxford Advanced Learners Dictionary** defines environment as the natural world in which people, animals and plants live.

According to Boring, 'A person's environment consists of the sum total of the stimulation which he receives from his conception until his death.' Indicating that environment comprises various types of forces such as physical, intellectual, mental, economical, political, cultural, social, moral and emotional.

Douglas and Holland defined that 'The term environment is used to describe, in aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organisms.

**Ecology** is the science that studies the relationships between living things and the environment. It is also considered to be a discipline of biology.

**Environment Science** is the systematic and scientific study of the environment and our role in it.

**Environmental Studies** can be defined as the branch of the study concerned with environmental issues.

**Environmental studies** is an multidisciplinary academic field which systematically studies human interaction with the environment in the interests of solving complex problems. Environmental studies bring together the principles of the physical sciences, commerce/economics and social sciences so as to solve contemporary environmental problems. The environment consists of **four segments** of the earth namely atmosphere, hydrosphere, lithosphere and biosphere:

1. **Atmosphere:** The Atmosphere forms a distinctive protective layer about 100 km thick around the earth. A blanket of gases called the atmosphere surrounds the earth and protects the surface of earth from the Sun's harmful, ultraviolet rays. It sustains life on the earth. It also regulates temperature, preventing the earth from becoming too hot or too cold. It saves it from the hostile environment of outer space. The atmosphere is composed of nitrogen and oxygen besides, argon, carbon dioxide and trace gases.

The atmosphere has a marked effect on the energy balance at the surface of the Earth. It absorbs most of the cosmic rays from outer space and a major portion of the electromagnetic radiation from the sun. It transmits only ultraviolet, visible, near infrared radiation (300 to 2500 nm) and radio waves. (0.14 to 40 m) while filtering out tissue-damaging ultra-violet waves below about 300 nm.

2. **Hydrosphere:** The Hydrosphere comprises all types of water resources oceans, seas, lakes, rivers, streams, reservoirs, polar icecaps, glaciers, and ground water. Oceans represent 97% of the earth's water and about 2% of the water resources is locked in the polar icecaps and glaciers. Only about 1% is available as fresh water as surface water in rivers, lakes, streams, and as ground water for human use.

3. **Lithosphere:** Lithosphere is the outer mantle of the solid earth. It consists of minerals occurring in the earth's crusts and the soil e.g. minerals, organic matter, air and water.

4. **Biosphere:** Biosphere indicates the realm of living organisms and their interactions with environment, viz atmosphere, hydrosphere and lithosphere.

## **Elements of Environment**

Environment is constituted by the interacting systems of physical, biological and cultural elements inter-related in various ways, individually as well as collectively. These elements are:

**(1) Physical Elements**

Physical elements are space, landforms, water bodies, climate, soils, rocks and minerals. They determine the variable character of the human habitat, its opportunities as well as limitations.

**(2) Biological Elements**

Biological elements such as plants, animals, microorganisms and men constitute the biosphere.

**(3) Cultural Elements**

Cultural elements such as economical, social and political elements are essentially man-made features, which make the cultural background.

**MULTIDISCIPLINARY NATURE OF ENVIRONMENT STUDIES**

Environment studies is a multidisciplinary subject where different aspects are dealt with in a holistic approach. The science of Environment studies comprises various branches of studies like chemistry, physics, life science, medical science, agriculture, public health, sanitary engineering, geography, geology, atmospheric science, etc. It is the science of physical phenomena in the environment.

The complex relationship that exist in our natural environment among people, animals, others organisms, water soil, air tree, ocean, and so on. The interconnections are numerous and involve many different disciplines. We need inputs from diverse disciplines such as biology, botany, zoology, soil science, technology oceanography, atmospheric science, economics, sociology, anthropology and ethics. Environmental studies involve educating the people for preserving the quality of environment.



### **SCOPE OF ENVIRONMENTAL STUDIES**

The scope of environmental studies is very wide and it deals with many areas like i) Conservation of natural resources, ii) ecological aspects, iii) pollution of the surrounding natural resources, iv) controlling the pollution, v) social issues connected to it, and vi) impacts of human population on the environment.

1. Developing an awareness and sensitivity to the total environment and its related problems.
2. Motivating people for active participation in environmental protection and improvement.
3. Developing skills for active identification and development of solutions to environmental problems.
4. Imbibe and inculcate the necessity for conservation of natural resources.
5. Evaluation of environmental programmes in terms of social, economic, ecological and aesthetic factors.

## **IMPORTANCE OF ENVIRONMENTAL STUDIES**

The environment studies make us aware about the importance of protection and conservation of our mother earth and about the destruction due to the release of pollution into the environment. The increase in human and animal population, industries and other issues make the survival cumbersome. A great number of environment issues have grown in size and make the system more complex day by day, threatening the survival of mankind on earth. Environment studies have become significant for the following reasons:

### **Environment Issues are being of Global:**

It has been well recognized that environment issues like global warming and ozone depletion, acid rain, marine pollution and biodiversity are not merely national issues but are global issues and hence require international efforts and cooperation to solve them.

### **Development and Environment:**

Development leads to Urbanization, Industrial Growth, Telecommunication and Transportation Systems, Hi-tech Agriculture and Housing etc. However, it has become phased out in the developed world. The North intentionally moves their dirty factories to South to cleanse their own environment. When the West developed, it did so perhaps in ignorance of the environmental impact of its activities. Development of the rich countries of the world has undesirable effects on the environment of the entire world.

### **Explosive Increase in Pollution**

World census reflects that one in every seven persons in this planet lives in India. Evidently with 16 per cent of the world's population and only 2.4 per cent of its land area, there is a heavy pressure on the natural resources including land. Agricultural experts have recognized soil health problems like deficiency of micronutrients and organic matter, soil salinity and damage of soil structure.

### **Need for an Alternative Solution**

- It is essential, especially for developing countries to find alternative paths to an alternative goal. We need a goal as under:
- A true goal of development with an environmentally sound and sustainable development.
- A goal common to all citizens of our planet earth.
- A goal distant from the developing world in the manner it is from the over-consuming wasteful societies of the “developed” world.

It is utmost important for us to save the humanity from extinction because of our activities constricting the environment and depleting the biosphere, in the name of development.

### **Need for Wise Planning of Development**

Our survival and sustenance depend on resources availability. Hence Resources withdraw, processing and use of the products have all to be synchronized with the ecological cycle. In any plan of development our actions should be planned ecologically for the sustenance of the environment and development.

### **NEED FOR PUBLIC AWARENESS**

The need of the hour is to make the public aware of the consequences of the environmental degradation, if not corrected and reformative measures undertaken, would result in the extinction of life. In today's world because of industrialization and increasing population, the natural resources has been rapidly utilized and our environment is being increasingly degraded by human activities, so we need to protect the environment. It is not only the duty of government but also the people to take active role for protecting the environment, so protecting our environment is economically more viable than cleaning it up once, it is damaged.

The role of mass media such as newspapers, radio, television, etc is also very important to make people aware regarding environment. There are various institutions, which are playing positive role towards environment to make people aware regarding environment like BSI (Botanical Survey of India, 1890), ZSI (Zoological Survey of India, 1916), WII (Wild Life Institute of India, 1982) etc.

It is also necessary to face the various environmental challenges and to act accordingly to make the acts eco-friendly. The major challenges ahead are the following:

**Population:** A population of over thousands of millions is growing at 2.11 per cent every year. Over 17 million people are added each year. India accounts for 16 % of the world population, but with only 2.4 per cent of the land area. This makes considerable pressure on the natural resources and reduces the gains of development. Hence, the greatest challenge before us is to limit the population growth. Although the population control does automatically lead to development, yet the development leads to a decrease in population growth rates. For this development to be happened, knowledge of the women is essential. The future population growth has to be linked to the resource base in order to have sustainable development.

**Poverty Alleviation:** India has often been described a rich land with poor people. The poverty and environmental degradation are inter-dependent. The vast majority of our people are directly

dependent on the natural resources of the country for their basic needs of food, fuel, fodder and shelter. About 65 % of Indians are poor and about 40% of our people are still below the poverty line. Environment degradation has adversely affected the poor who depend upon the natural resources of their immediate surroundings. Thus, the challenge of poverty and the challenge of environment degradation are two facets of the same challenge. The population growth is essentially a function of poverty.

**Agricultural Growth:** The people must be acquainted with the methods to sustain and increase agricultural growth without damaging the environment. Fertilizers and pesticides are causing major threats to the environment in the form of soil and water pollution. It is evident that it is very difficult that these chemicals will be kept out of soil, water and food chain if they are extensively and continuously used in crop production. Highly intensive agriculture has caused soil salinity and damage to the physical structure of soil.

**Protecting Ground Water from pollution:** Because of intensive agriculture, increase in number of industries, rapid urbanization and population growth, the need for water is growing at a faster rate. This leads to the fast depletion of groundwater table. It is very essential of rationalizing the use of groundwater now. Factors like community wastes, industrial effluents and chemical fertilizers and pesticides have polluted our surface water and affected the quality of groundwater also. The need of the hour is to restore the water quality of our rivers and other water bodies as lakes and to avoid the groundwater pollution. Finding suitable strategies for consecration of water, provision of safe drinking water and keeping water bodies clean which are difficult challenges ahead. Rain water harvesting and water management can help to an extent in this regard.

**Development and Forests:** Forests provide raw materials for construction of houses and for industries like paper and pulp manufacturing, packaging, fire wood and fodder for people etc. Forests serve as catchments for the rivers. With increasing demand of water, huge dams were constructed in independent India leading to submergence of large forest areas; displace local people and damage flora and fauna. As such, the dams on the river Narmada, Bhagirathi and elsewhere have become areas of political conflicts and scientific debate. Forests in India have been shrinking for several centuries owing to pressures of agriculture and other uses. Vast areas of forests in many states are now converted as agricultural lands for growing hilly vegetables and plantation crops and mining. These areas are to be brought back under forest cover. The tribal communities inhabiting forests respects the trees and birds and animal that gives them

sustenance. We must recognize the role of these people in restoring and conserving forests. The modern knowledge and skills of the forest department should be integrated with the traditional knowledge and experience of the local communities. The strategies for the joint management of forests by the government officials and tribal people should be evolved in a well-planned way to implement afforestation.

**Degradation of Land:** At present out of the total 329 mha of land, only 266 mha possess any potential for production. Of this, 143 mha is agricultural land and 85 mha suffers from varying degrees of soil degradation. Of the remaining 123 mha, 40 mha are completely unproductive. The remaining 83 mha is classified as forest land, of which over half is denuded to various degrees. Nearly 406 million head of livestock have to be supported on 13 mha, or less than 4 per cent of the land classified as pasture land, most of which is overgrazed. Thus, out of 226 mha, about 175 mha or 66 per cent is degraded to varying degrees. Water and wind erosion cause further degradation of almost 150 mha. This degradation is to be avoided.

**Reduction of Genetic Diversity:** Immediate measures to conserve genetic diversity need to be taken at the earliest. At present most wild genetic stocks have been disappearing from nature. The protected areas network like sanctuaries, national parks, biosphere reserves are isolating populations. Remedial steps are to be taken to check decreasing genetic diversity.

**Evil Consequences of Urbanization:** Nearly 27 per cent Indians live in urban areas. Urbanization and Industrialization has given birth to a great number of environmental problems that need urgent attention. Over 30 percent of urban Indians live in slums. Out of India's 3,245 towns and cities, only 21 have partial or full sewerage and treatment facilities. Hence, coping with rapid urbanization is a major challenge.

**Air and water Pollution:** Majority of our industrial plants are using outdated treatment technologies and makeshift facilities devoid of any provision of treating their wastes. A great number of cities and industrial areas that have been identified as the worst in terms of air and water pollution. Acts are enforced in the country, but their implementation is not so easy. The reason is their implementation needs great resources, technical expertise, political and social will. Again, the people are to be made aware of these rules. Their support is indispensable to implement these rules.

Since our environment is getting degraded due to human activities, we need to do something about it to sustain the quality. We often feel that government should take proper measuring steps. But all of us are equally responsible to protect our environment. Hence public awareness needs



to be created. Both print media and electronic media can strongly influence public opinion. Politicians should respond positively to a strong publicly supported activity. NGOs can take active role in creating awareness from grass root levels to the top-most policy decision makers. Environment is an integration of both living and non-living organisms. Water, air, soil, minerals, wild life, grass lands, forests, oceans, agriculture are all life supporting systems. Since these natural resources are limited, and human activities are the causative factors for environmental degradation, each one of us need to feel responsible to protect the environment.

The activities help in creating awareness among public are

- Join a group to study nature such as WWF-I or BNHS or any other organization
- Read newspaper articles and periodicals like Down to earth, WWF-I newsletter, BNHS, Hornbill, Sanctuary magazine.
- Discuss environmental issues with friends and relatives.
- Join local movements that support activities like saving trees in your locality, reducing use of plastics, going for nature treks, practicing 3 Rs i.e. reduce, reuse, & recycle.
- Practice and promote good civic sense and hygiene such as enforcing no spitting or tobacco chewing, no throwing garbage on the road and no urinating in public places.
- Take part in events organized on World Environment Day, Wildlife week etc.
- Visit a National park or sanctuary or spend time in whatever natural habitat you have near your home.

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