

ENVIRONMENTAL SCIENCE

Class-1

Topic : INTRODUCTION

Definitions

Environmental science or studies

Interdisciplinary studies in natural sciences, including geology, climatology, hydrology, ecology and their interaction with social sciences such as economics, political science, sociology, anthropology and geography

Environment

Environment is sum total of water, air, and land, inter-relationships among themselves and also with the human beings, other living organisms and property. The above definition given in Environment Act, 1986 clearly indicates that environment includes all the physical and biological surroundings and their interactions.

Ecology

Study of the interactions between organisms and between organisms and their environment

Ecosystem

Includes all organisms living in an area and the physical environment with which these organisms interact

1. COMPONENTS OF ENVIRONMENT

Environment has been classified into four major components:

Hydrosphere: includes all water bodies such as lakes, ponds, rivers, streams and ocean etc. Hydrosphere functions in a cyclic nature, which is termed as hydrological cycle or water cycle. Lithosphere means the mantle of rocks constituting the earth's crust. The earth is a cold spherical solid planet of the solar system, which spins in its axis and revolves around the sun at a certain constant distance.

Lithosphere: mainly, contains soil, earth rocks, mountain etc. Lithosphere is divided into three layers-crusts, mantle and core (outer and inner). Atmosphere The cover of the air, that envelope the earth is known as the atmosphere.

Atmosphere : is a thin layer which contains gases like oxygen, carbon dioxide etc. and which

protects the solid earth and human beings from the harmful radiations of the sun. There are five concentric layers within the atmosphere, which can be differentiated on the basis of temperature and each layer has its own characteristics. These include the troposphere, the stratosphere, the mesosphere, the thermosphere and the exosphere.

Biosphere : it is otherwise known as the life layer, it refers to all organisms on the earth's surface and their interaction with water and air. It consists of plants, animals and micro-organisms, ranging from the tiniest microscopic organism to the largest whales in the sea. Biology is concerned with how millions of species of animals, plants and other organisms grow, feed, move, reproduce and evolve over long periods of time in different environments. Its subject matter is useful to other sciences and professions that deal with life, such as agriculture, forestry and medicine. The richness of biosphere depends upon a number of factors like rainfall, temperature, geographical reference etc.

Apart from the physical environmental factors, the manmade environment includes human groups, the material infrastructures built by man, the production relationships and institutional systems that he has devised. The social environment shows the way in which human societies have organized themselves and how they function in order to satisfy their needs.

2. THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL SCIENCE IS ILLUSTRATED IN FOLLOWING

- a. Basic and Applied Studies
 - Physical Science, (Physics, chemistry, Earth science, Atmospheric Science)
 - Life Science (Biology, biochemistry, Microbiology etc)
- a. Technology
 - Civil, Chemical, Hydraulics, Nano
- b. Management and Awareness
 - Economics, Sociology, Law, Education, Management, Mass-communication,
- c. Modeling
 - Mathematics, Statistics, Computer science

Related areas of study include environmental studies and environmental engineering. Environmental studies incorporate more of the social sciences for understanding human relationships, perceptions and policies towards the environment.

- Life Science including (Biology, biochemistry, Microbiology etc) help in understanding the biotic components and their interactions genetics and biotechnology are emerging as useful tools for finding solutions to environmental problems
- For understanding the physical and chemical structure of abiotic components of environment along with mass and energy transfer we have to make use of the basic concept of Physical Science, (Physics, chemistry, Earth science, Atmospheric Science)
- Mathematics, statistics and computer science likewise serve as effective tools in

environment modelling.

- Subject like economics management and sociology provide the inputs for dealing with socioeconomic aspects associated with various development activities
- Environment law provide the guidelines and law measures for effective management and protection of the environment
- Environmental engineering focuses on design and technology for improving environmental quality. Environmental scientists work on subjects like the understanding of earth processes, evaluating alternative energy systems, pollution control and mitigation, natural resource management, and the effects of global climate change. Environmental issues almost always include an interaction of physical, chemical, and biological processes.

3. SCOPE OF ENVIRONMENTAL SCIENCE

Because of environmental studies has been seen to be multidisciplinary in nature so it is considered to be a subject with great scope. Environment is not limited to issues of sanitation and health but it is now concerned with pollution control, biodiversity conservation, waste management and conservation of natural resources. This requires expert eyes and hence is creating new job opportunities. The opportunities in this field are immense not only for scientists but also for engineers, biologists. There is a good chance of opportunity to find a job in this field as environmental journalists.

Environmental science can be applied in the following spheres:

Ecosystem Structure and Function

The study of ecosystems mainly consists of the study of the processes that link the living organism or in other words biotic component to the non-living organism or a biotic component. So for the study of environment we should aware with biotic and a biotic components.

Natural Resource Conservation

For managing and maintenance of forests which are natural resources and for the maintenance of wildlife forms task under natural resource conservation. It is also a scope of environmental studies

Environmental Pollution Control

With the knowledge of environmental science every body can control the pollution. He/she can handle the waste management and also look for ways to control pollution on the aspect of pollution control.

Environmental management

There are several independent environmental consultants who are working with Central and State pollution control Board. They offer advice to solve the problems of environment the optimum solution for the upcoming problems. They give direction for controlling pollution due to industrial development. There are several current consultants who are working with government pollution control boards, involved in policy making, pollution control and

maintenance of ecological balance.

The scope of environmental studies in industry

Environmental scientist's work towards maintenance of ecological balance, they also work towards conservation of biodiversity and regulation of natural resources as well as on preservation of natural resources. Most of the industries have a separate environmental research and development section. These sections govern the impact that their industry has on the environment. Our environment is being degraded by the rapid industrialization. To combat this 4 menace there is a growing trend towards manufacture of "green" goods and products. So we can say that there is a good scope in the field of industry from environmental studies.

Research and development

Research and development have tremendous scope due to increment in public awareness regarding the environment. Various universities and governmental organizations offer a scope for such research. These universities conduct research studies in order to develop the methods toward monitoring and controlling the source of environmental pollution. Due to an increasing threat from global warming, many steps are being undertaken for the reduction of greenhouse gases and the adoption of renewable energy resources. They generate awareness now regarding the use of solar energy for variety of purposes. This provides scope of environmental history in the field of research and development.

Social Development

NGO (Nongovernmental organizations) help in creating awareness regarding the protection of the environment and making the masses aware of various environmental issues. They also generate a public opinion in this field. They work towards disseminating information and in bringing about changes in political policies that are personally effect the environment. The social dimension of this profession includes controlling population explosion through organizing advisory awareness camps.

4. IMPORTANCE OF ENVIRONMENT STUDIES:

The environment studies enlighten us, about the importance of protection and conservation of our indiscriminate release of pollution into the environment.

Environmental studies have become significant for the following reason:

Environment Issues being of International Importance: environmental issues such as global warming, ozone depletion, biodiversity loss, marine pollution and biodiversity are not merely national issues but are global issues and hence must be tackled with international efforts and cooperation

Problems Cropped in The Wake of Development: rapid development in the selected area leads to Urbanization, Industrial Growth, Transportation Systems, Agriculture and Housing etc which in turn leads to environmental pollution. However, it has become phased out in the developed World. The North, to cleanse their own environment has fact fully, managed to move

‘dirty’ Factories of South. When the West developed, it did so perhaps in ignorance of the Environmental impact of its activities.

Rapid increase in Population: rapid growth of human population resulted into tremendous increase in the demand of resources such as food resources, energy resources ultimately leading to the environmental degradation

Need for An Alternative Solution: recently there is a sense of feeling that current way of economic development is not feasible for long term as resources base is not unlimited giving rise to the concept of sustainable development

Need for Wise Planning of Development

Our survival and sustenance depend. Resources withdraw, processing and use of the product have all to be synchronized with the ecological cycles in any plan of development our actions should be planned ecologically for the sustenance of the environment and development

Need to Save Humanity from Extinction: There is a grave threat on humanity due to continuous degradation of its resource base which has implication on survival and well-being of human society

5. NEED FOR PUBLIC AWARENESS

- Public awareness very essential to help understand pros and cons of environmental problems.
- The United Nations Conference on Environment and Development held in Rio de Janeiro in 1992 and popularly known as Earth summit followed by the world summit on sustainable Development in 2002, have highlighted key issues of global environmental concern
- As the earth's natural resources are dwindling and our environment is being increasingly degraded by human activities, there is a need for action
- Prevention of environment degradation must become a major goal for all
- Decrease of harm on our environment. It is economically more viable than cleaning up the environment once it is damaged.
- Reduction of natural resources wastage. Government should be informed of sources that lead to pollution and degradation of our environment.
- This can only be made possible through mass public awareness
- Growing Population
- Poverty
- Agricultural Growth
- Need to improve Ground water
- Development and Forests
- The proper implementation and especially public participation are important aspects. → Public participation is possible only when the public is aware about the ecological and environmental issues.
- A drive by the government to ban the littering of polythene cannot be successful until the public understands the environmental implications of the same.
- The public has to be educated about the fact that if we are degrading our environment we are actually harming ourselves

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