

Multidisciplinary Nature of Environmental Studies

1 Introduction

The word environment is derived from the French word ‘environner’ which means to ‘encircle or surround’.

Thus our environment can be defined as “the Social, Cultural and Physical conditions that surround, affect and influence the survival, growth and development of people, animals and plants”.

It includes all factors (living and nonliving) that affect an individual organism or population at any point in the life cycle.

2 Multidisciplinary nature of environmental studies

The Environment study is a multi-disciplinary program created to promote the study of our natural surroundings.

It comprises various branches of studies like chemistry, physics, medical science, life science, geology, politics, policy studies, law, engineering, agriculture, public health, economics etc. to understand the humanity’s effects on the natural world.

Life sciences including botany, zoology, microbiology, genetics, biochemistry, biotechnology help in understanding the biotic components and their interactions.

The physical and chemical structure of the biotic components and energy transfer and flow are understood with the help of basic concept of physics, chemistry, atmospheric science and oceanography.

Mathematics, statistics and computer science serve as effective

tools in environmental modeling and management.

Economics, sociology and mass communication provide the input for dealing with socio-economic aspect associated with various development activities.

A synthesis with **environmental engineering, civil engineering and chemical engineering** form the basis for various technologies dealing with the control of environmental pollution, waste treatment and development of cleaner technologies for protection of environment.

Environmental laws provide the tools for effective management and protection of the environment.

2.1 Objectives of environmental studies

1. Creating awareness about environmental problems among the students
2. Giving basic knowledge about the environment and its related problems
3. Developing an attitude of concern for the environment
4. Motivating students to participate in environment protection and environment improvement
5. Acquiring skills to help the concerned individuals in identifying and solving environmental problems.

2.2 Scope of environmental studies

1. Natural resources and their conservation and management
2. Ecology and biodiversity

3. Environment pollution and control
4. Social issues in relation to development and environment
5. Human population and environment
6. Research and development
7. Environmental journalism
8. Industry

2.3 Career options

1. Research and development in environment: Skilled environmental scientists have an important role to play in examining various environmental problems in a scientific manner and carry out RD activities for developing cleaner technologies and promoting sustainable development.

2. Green advocacy: With increasing emphasis on implementing various Acts and Laws related to environment, need for environmental lawyers has emerged, who should be able to plead the cases related to water, air, forest, wildlife, pollution and control etc.

3. Green marketing: While ensuring the quality of products with ISO mark, now there is an increasing emphasis on marketing goods that are environment friendly. Such products have ecomark or ISO 14000 certification. Environmental auditors and environmental managers would be in great demand in the coming years.

4. Green media: Environmental awareness can be spread amongst masses through mass media like television, radio, newspaper, magazine, hoardings, advertisements etc., for which environmentally educated persons are required.

5. Environmental consultancy: Many non-government organizations, industries and government bodies are engaging environmental consultants for

systematically studying and tackling environment related problems.

2.4 Importance of environmental studies

1. The importance of environmental studies is that, the current trend of environmental degradation can be reversed if people of educated communities are organized, empowered and involved in sustainable development.

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

3. Environmental studies help maintain ecological balance by providing a basic operating knowledge of Environmental system and process.

4. It gives information regarding the changes that takes place due to anthropogenic factors and helps gain skills of analyzing various Environmental systems and the effect of human activities on them.

5. It also provides knowledge about the development and utilization of energy resources.

3 Environment and its segments

Environment consists of four segments.

1. Atmosphere: Blanket of gases surrounding the earth.

2. Hydrosphere: Various water bodies present on the earth.

3. Lithosphere: Contains various types of soils and rocks on the earth.

4. Biosphere: Composed of all living organisms and their interactions with the environment.

Atmosphere: The following points highlight the vital role played by atmosphere in the survival of life in this planet.

- The atmosphere is the protective blanket of gases which is surrounding the earth. It protects the earth from the hostile environment of outer space.

- It absorbs IR radiations emitted by the sun and reemitted from the earth and thus controls the temperature of the earth

- It allows transmission of significant amounts of radiation only in the regions of 300 – 2500 nm (near UV, Visible, and near IR) and 0.01 – 40 meters (radio waves). i.e it filters tissue damaging UV radiation below 300 nm.

- It acts as a source for CO_2 for plant photosynthesis and O_2 for respiration

- It acts as a source for N_2 for nitrogen fixing bacteria and ammonia producing plants.

- The atmosphere transports water from ocean to land.

Hydrosphere: The hydrosphere is a collective term given to all different forms of water.

It includes all types of water resources such as oceans, seas, rivers, lakes, streams, reservoirs, glaciers and ground waters.
It covers more than 75 % of the earth surface.

Lithosphere: The earth is divided in to layers.

Crust: The crust is the earth's outer skin that is accessible to human. The crust consists of rocks and soil of which the latter is the important part of lithosphere.

Mantle: It is the middle layer of the earth and is made up of different types of rocks (Igneous, sedimentary and metamorphic)

Core: It is the innermost geological layer of the Earth. It is primarily a

solid ball of rocks and minerals.

The lithosphere consists of upper mantle and the crust.

Biosphere: The biosphere or ecosphere is a global ecosystem composed of living organisms (biota) and the abiotic (nonliving) factors from which they derive energy and nutrients.

It extends from 2 kilometres into the atmosphere to 8-10 kilometers under the oceans and a few kilometres in the lithosphere

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4 Vertical structure of atmosphere

Troposphere

- The bottom layer of the atmosphere that stretches about 11 Km
- Contains 75 % of the air
- Temperature decreases with altitude
- Storms and rainfall take place
- Made up of mostly N_2 & O_2

Stratosphere

- The second layer of the atmosphere that extends up to 50km.
- Contains 24 % of the air
- Temperature increases with altitude
- Contains ozone (O_3) layer that protects us from harmful ultraviolet rays

Mesosphere

- The third layer of the atmosphere that extends up to 80 km.
- Temperature decreases with altitude
- The coldest layer
- Here most meteors burn up

Thermosphere (ionosphere and exosphere)

- The fourth layer of the atmosphere that stretches about 1000 km.
- The hottest layer due to the ions (H^+ and He^+) that directly absorb the sun's radiation
- Temperature increases with altitude
- Where radio waves are reflected.

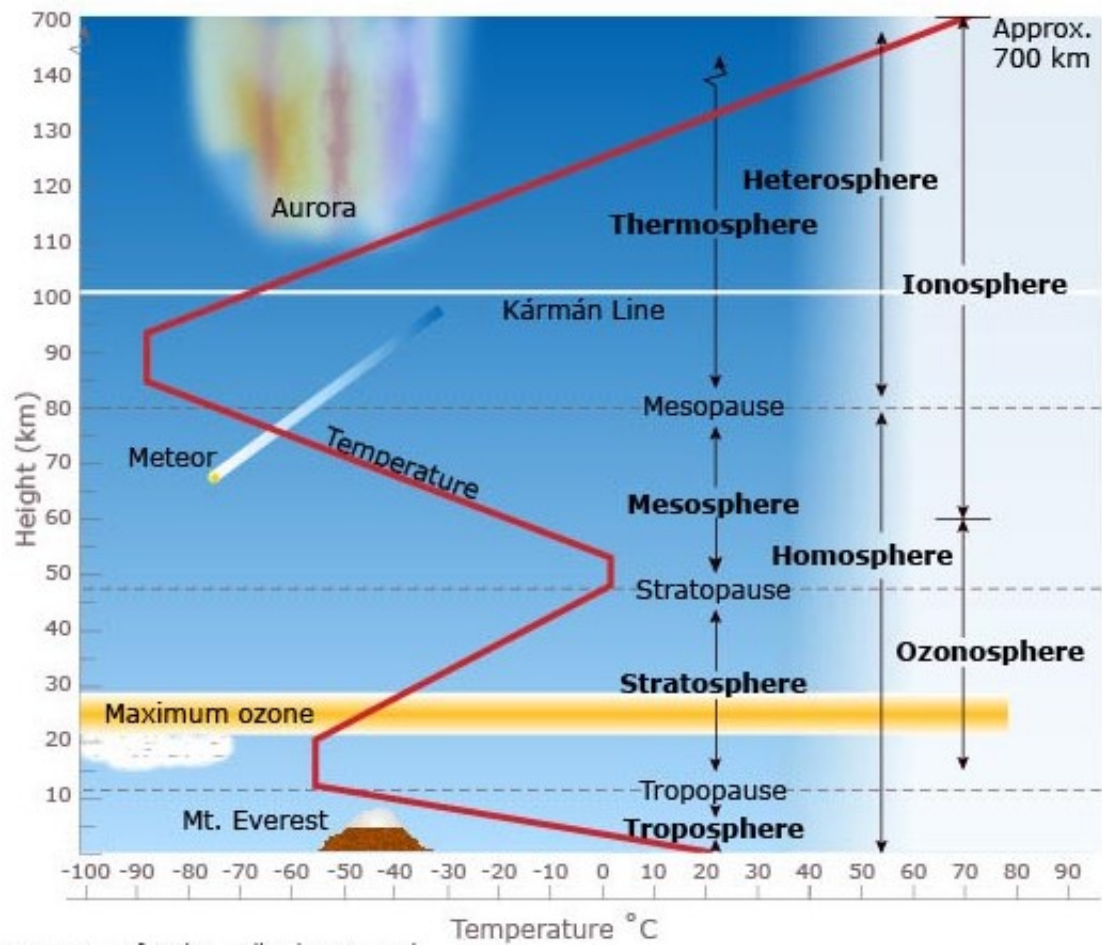


Figure 1:
Vertical structure of atmosphere