UNIT 1

ENVIRONMENTAL SCIENCES: SCOPE AND IMPORTANCE

Introduction

- For the last four decades, several environmental problems—such as pollution, global warming, ozone layer depletion, acid rain, deforestation, and desertification—have remained a major focus of scientists, policy makers, and common public across the world.
- These problems are perceived as the major threats to the life-supporting environment of the earth, thus making our survival on the planet increasingly unsafe.
- In order to tackle these challenges, holistic knowledge about working of our life-supporting environment and thorough understanding of the dynamics of these problems become imperative.

Introduction contd…

- Since no other academic discipline covers the above two knowledge requirements completely, environmental science evolved as an academic discipline to fill in this gap.
- Our life-supporting environment and various environmental problems are highly complex and require interdisciplinary efforts to understand them.
- Environmental science, therefore, integrates approaches of various academic disciplines to fulfil its objectives.

Introduction contd…

- Environmental science is defined as an interdisciplinary academic field that integrates various academic fields (particularly sciences) to study the structure and function of our life-supporting environment and to understand causes, effects, and solutions of different environmental problems.
- In other words, environmental science is the scientific study of all the components or factors that make or influence our life-supporting biophysical environment.
- As per some academicians, environmental science is a methodological study of the environment and includes the study of all biophysical as well as anthropogenic conditions or circumstances under which an organism lives.

Introduction contd…

- An increasing level of concern about environment was reflected in the creation of a number of international environmental agencies and non-governmental organizations (NGOs), including :
- United Nations Environmental Programme (UNEP),
- International Union for Conservation of Nature and Natural Resources (IUCN),
- World Wide Fund for Nature (WWF), and
- Global Environmental Facility (GEF).

Introduction contd…

Similarly, numerous scientific and policy-related forums and conventions were held for settling environmental issues, including Ramsar Convention for conservation of wetland fauna and flora, Montreal Protocol for protecting the ozone layer, Intergovernmental Panel on Climate Change (IPCC) for quantifying the extent of global warming, Kyoto Protocol for reducing emission of greenhouse gases, and Convention on Biological Diversity (CBD) for preserving the rich biodiversity of the planet.

Multidisciplinary Nature of Environmental Science

- Environmental science is the study of all the components or factors that make or influence our life-supporting biophysical environment, including earth processes, ecological systems, biodiversity, natural resource, alternative energy systems, climate change, various types of pollutions, and so on.
- These entities or processes are guided by complex interaction of physical, chemical, and biological processes, as well as significant human intervention.
- Therefore, environmental science integrates information from a number of other disciplines and thus is multidisciplinary in nature.

Multidisciplinary Nature of Environmental Science contd…

- Disciplines such as biology, chemistry, physics, geology, geography, sociology, economics, management, and ethics have largely been integrated to develop different subdivisions of environmental science.
- Its major subdivisions include ecology, geosciences, environmental chemistry, atmospheric science, environmental microbiology, environmental toxicology, environmental impact assessment, and so on.

Multidisciplinary Nature of Environmental Science contd…

- Besides these, there are certain subdivisions—environmental studies, environmental engineering, environmental economics, environmental ethics, environmental management, environmental sociology, environmental biotechnology, and so on—that are generally treated as independent academic disciplines parallel to environmental science.
- Environmental conservation is the main emphasis for most of these disciplines, but the approaches vary.

Multidisciplinary Nature of Environmental Science contd…

- For example, environmental studies incorporate more of the social sciences for understanding human relationships, perceptions, and policies towards the environment.
- Environmental engineering, on the contrary, focuses on design and technology for improving environmental quality.

Scope of the Subject

- Principles and approaches of environmental sciences are applicable in several areas of development.
- These areas are studied as scope of the subject. Environmental science has a vast scope since it covers a wide range of subject matters or issues related to our complex life-supporting system.
- Scope of the subject can be described in terms of major areas of applicability as well as career opportunities related to the subject.

Scope of the Subject Contd...

Three major areas of applicability of the subject are:

(i) management of natural resources,

(ii) conservation of ecosystem and biodiversity, and

(iii) prevention and control of pollution.

Scope of the Subject Contd...

- In addition, environmental science plays a key role in solving complex environmental issues of varying scale, including climate change, ozone layer depletion, energy crisis, desertification, urbanization, population explosion, and so on.
- Scope of the subject in terms of career opportunities is fairly vast.
- For the last two decades, environmental science has been considered to be associated with a number of career opportunities.
- Major career options related to the subject can be described as follows:

Scope of the Subject Contd...

- Industries
- Consultancy
- Research and development (R&D)
- Academics
- Green marketing
- Green media
- Green advocacy
- NGOs
- Government jobs
- International agencies

Importance of the Subject

- Today, the world is facing numerous environmental problems, ranging from local problems such as ground water depletion to global problems such as climate change.
- These problems can be solved only when everyone cares for the environment; for that everyone needs to be informed about the causes, consequences, and remedial measures of different environmental problems.
- In order to achieve this goal, environmental science is promoted and taught at different educational levels.
- The subject bears immense importance as it aims at saving the integrity of the life-supporting environment of earth, which is a unique planet that sustains life.
- Importance of this subject can be described in terms of the various objectives that it fulfils for saving the environment.

Importance of the Subject Contd...

So far, seven such objectives have been identified:

1. It guides us to know how our developmental and day-to-day activities affect environment and how we are affected by changes in the environmental conditions.
2. It guides us to create a pollution-free environment (that is, clean air, water, land, and food) by adopting different methods of preventing and controlling pollution.
3. It guides us to utilize our natural resources such as water, forest, minerals, and fossil fuels in an efficient manner, that is, with maximum utility and minimum wastage, by adopting conservation and recycling strategies.

Importance of the Subject Contd...

4. It guides common public to live an eco-friendly lifestyle by adopting the above three features, that is, knowing environmental implications of one's activities, preventing and controlling pollution, and utilizing the resources efficiently in day-to-day activities.
5. It guides industries to operate in an eco-friendly mode by adopting clean and efficient technologies and installing pollution control systems.
6. It guides us to solve complex global environmental problems such as climate change, ozone-layer depletion, desertification, and energy crisis by using different interdisciplinary tools and approaches.
7. It guides the entire development process to become sustainable by ensuring equal distribution of natural resources between present and future generations, as well as by caring for nature in every walk of life in a holistic manner.

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