

# Environmental Science and Natural Resources

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## **ABSTRACT:**

Natural resources and environmental science are crucial in determining the health and sustainability of our world. Understanding the connections between people and the environment as well as the effects of human activity on natural resources are the main goals of this branch of research. Environmental science provides important insights for solving urgent environmental concerns including climate change, biodiversity loss, pollution, and resource depletion by investigating the deep relationships between natural systems, society, and the economy. The relevance of environmental science and natural resources is briefly discussed in this chapter, emphasizing their importance in fostering a sustainable future.

## **KEYWORDS:**

Development, Environment, Natural, Population, Science, Soil, Water.

## **I. INTRODUCTION**

The French term *Environ* (which means surrounding) is the source of the English word environment. Abiotic factors like light, air, water, soil, etc. and biotic ones like people, plants, animals, and microorganisms make up our environment. Environment is a complicated system with several factors, this encompasses both the living things and the human [1]–[3]. The term environment refers to the bodies of water, air, and land as well as the relationships that exist between them, with humans, and with other living things like plants, animals, and microorganisms. According to her, the environment is made up of a single, interconnected system of physical, chemical, biological, social, and cultural components that are related both singly and collectively in a variety of ways. The atmosphere, hydrosphere, lithosphere, and biosphere are the four interconnected systems that make up the natural environment. These four systems are always changing, and human activity both influences and is impacted by these changes.

### **Components of Environment**

There are four main components of the environment:

- i.** Hydrosphere.
- ii.** Lithosphere.
- iii.** Atmosphere.
- iv.** Biosphere.

All bodies of water, including lakes, ponds, rivers, streams, and oceans, are included in the hydrosphere. The hydrosphere has a cyclical character, often known as the hydrological cycle or water cycle. The term lithosphere refers to the rock mantle that makes up the crust of the earth. The earth is a cold, solid, spherical planet in the solar system that orbits the sun at a fixed distance while spinning on its axis. Soil, earth rocks, mountains, etc. are mostly found in the lithosphere. The three levels of the lithosphere are the crusts, mantle, and core (outer and inner). Atmosphere The term atmosphere refers to the layer of air that surrounds the world [4]–[6]. The atmosphere is a thin layer of gases, including oxygen, carbon dioxide, and others, that shields the solid earth and people from the sun's destructive rays. The atmosphere is divided into five concentric layers that may be distinguished based on temperature, and each layer has unique properties. The troposphere, stratosphere, mesosphere, thermosphere, and exosphere are some of them.

The biosphere, sometimes referred to as the life layer, is the collective term for all surface-dwelling creatures and their interactions with the atmosphere and water. From the smallest microscopic creature to the biggest whales in the sea, it is made up of plants, animals, and microbes. Biology examines the long-term growth, feeding, movement, reproduction, and evolution of millions of species of animals, plants, and other creatures in various habitats. Its topic area is beneficial to various life-related studies and professions, including agriculture, forestry, and medicine. Numerous variables, like rainfall, temperature, geographic location, etc., affect the biosphere's

diversity. The man-made environment, in addition to the physical environmental aspects, consists of social groupings, material infrastructures that people have created, production linkages, and institutional systems. The social environment demonstrates how human civilizations have been structured and how they operate to meet their requirements.

### **Multidisciplinary Nature of Environmental Studies**

Ecology, physics, chemistry, biology, soil science, geology, atmospheric science, and geography are just a few examples of the physical and biological disciplines that are combined in the academic area of environmental science to study the environment and the relationship between humans and their environment. Environmental issues' resolution. A comprehensive, quantitative, and multidisciplinary approach to the study of environmental systems is provided by environmental science. Environmental engineering and environmental studies are related fields of study. More social sciences are used in environmental studies to better comprehend human interactions, viewpoints, and environmental policy. Engineering for enhancing environmental quality is the emphasis of environmental engineering. Understanding earth processes, assessing alternative energy sources, reducing pollution, managing natural resources, and studying the consequences of climate change are just a few of the topics that environmental scientist's study. Physical, chemical, and biological processes nearly invariably interact with one another to create environmental challenges.

### **Scope of Environmental Science**

Environmental studies are said to have an interdisciplinary character, making them a topic with broad application. Environmental concerns today extend beyond sanitation and health to include waste management, pollution prevention, biodiversity preservation, and natural resource preservation. This requires specialised vision, which generates new work prospects. There is a tonne of prospects in this sector for scientists, engineers, and biologists. As an environmental journalist, there is a strong probability of employment in this profession. The following fields may benefit from using environmental science. The production of green goods and products is becoming more popular. Therefore, we may conclude that environmental studies have a promising future in the industrial sector.

### **Research and Development**

Due to the growing level of environmental consciousness among the general population, research and development have enormous potential. A range of academic institutions and governmental bodies provide a setting for such study. These academic institutions carry out research to provide the tools for identifying and addressing the causes of environmental contamination. Many actions are being done to reduce greenhouse emissions and embrace renewable energy sources due to the growing danger posed by global warming. They currently spread knowledge on the usage of solar energy for a range of objectives. This gives the history of the environment in the context of research and development [7]–[9].

### **Social Development**

Nongovernmental organisations (NGOs) that promote social development aid in raising public awareness of environmental concerns and the need to safeguard the environment. Additionally, they influence public opinion in this area. They aim to spread knowledge and to influence governmental decisions that have an immediate impact on the environment. The social aspect of this career is reducing population growth by setting up advisory awareness camps.

### **Importance of Environmental Science**

Our indiscriminate discharge of pollutants into the environment has to be protected and conserved, as shown by the environmental research. For the following reasons, environmental science has gained importance.

#### **1. Environment Issues Being of International Importance**

It is widely acknowledged that environmental problems including global warming, ozone depletion, acid rain, marine pollution, and biodiversity are not only local problems but also global problems that need worldwide collaboration and efforts to solve.

#### **2. Problems Cropped in the Wake of Development**

Urbanization, industrial growth, transportation systems, agriculture, housing, and other phenomena were all born out of development. However, in the industrialized World, it has mostly been abandoned. The North has really

been successful in moving the South's dirty Factories in order to totally clean their own environment. The West may have grown without understanding how its actions might affect the environment. Evidently, even if the emerging world takes that course, it is not desirable nor possible.

### **3. Explosively Increase in Pollution**

According to the most recent census, one in seven people on our planet reside in India. With just 2.4% of the world's landmass and 16% of its inhabitants, there is obviously a severe imbalance strain on the environment, particularly the land. Experts in agriculture have identified issues with soil salinity, lack of organic matter and micronutrients, and weakened soil structure.

### **4. Need to Save Humanity from Extinction**

It is our responsibility to prevent the annihilation of mankind. As a result of human actions, which are causing the biosphere to shrink and the environment to be constrained in the name of development.

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

Our ability to live depends on this. In any development plan, the extraction of resources, their processing, and usage must all be coordinated with ecological cycles. Our activities should be organised ecologically for the preservation of the environment and development.

### **Need for Public Awareness**

It is crucial to educate the people about the severe effects of environmental degradation, which, if not stopped and corrective action not done, would lead to the extinction of life. There are many environmental issues that we must address. It is crucial to educate the nation about these issues so that their actions will be environmentally beneficial. These are some examples of these difficulties:

#### **1. Growing Population**

A population of almost a trillion people is increasing by 2.11 percent annually. Each year, the population grows by more over 17 million. It limits the benefits of growth and puts a lot of strain on the country's natural resources. So, the biggest problem we have is how to stop population increase. Although population management does inevitably result in development, this development also causes population growth rates to decline. Women's growth is crucial for this.

#### **2. Poverty**

India is sometimes said to be a prosperous country with destitute people. There is a connection between environmental deterioration and poverty. For their fundamental requirements of food, fuel, housing, and fodder, the great bulk of our population directly depends on the natural resources of the nation. About 40% of our population still lives in poverty. The poor have suffered because of environmental deterioration since they rely on local resources. Therefore, the problems of poverty and environmental deterioration are two sides of the same problem. In essence, poverty is a result of population expansion. Because every kid is a source of income and assistance to the extremely poor, he has little need of worries about the rest of the world.

#### **3. Agricultural Growth**

The strategies to maintain and expand agricultural development without harming the environment must be known to the populace. High yielding cultivars have harmed the physical structure of the soil and increased soil salinity.

#### **4. Need to Ground water**

The judicious use of groundwater is crucial. Our surface water has been contaminated by elements such as municipal garbage, industrial effluents, chemical fertilisers, and pesticides, which have also impacted the quality of the groundwater. As lakes provide a significant problem, it is crucial to restore the water quality of our rivers and other water bodies. Finding effective techniques for the severe difficulties of water consecration, providing safe drinking water, and maintaining clean water bodies are crucial.

#### **5. Development and Forests**

River catchments are provided by forests. Due to the rising need for water, plans were created to use the powerful river for extensive irrigation projects. These would undoubtedly sink forests, evict locals, and harm the ecology

and animals. As a result, debates in politics and science have centred on the Narmada and Bhagirathi dams, among others.

### **Natural Resources**

Resource refers to a supply source. Water, air, soil, minerals, coal, forests, agriculture, and animals are a few examples of natural resources. All of the materials are categorized according to their number, quality, suitability for reuse, men's activity, and accessibility. Natural resources are substances that exist naturally and are valued in their mostly unaltered (natural) state. The quantity of a natural resource that is available and the level of demand determine its value. E.F. Schumacher popularised the phrase in his book *Small is Beautiful* from the 1970s.

#### **a) Renewably available or limitless resources**

If handled carefully, renewable resources can sustain themselves or be replaced. In nature, these resources are continually replenished. As a result, excessive and careless usage is unlikely to result in the loss of renewable resources.

#### **b) Non-renewable resources or resources that are depleted**

These expended resources cannot be recovered; hence they are permanently gone. They consist of fossil fuels and metallic minerals. All industrial metals might run out in less than a century at the present pace of use, while petroleum and natural gas could run out in 15 to 20 years.

### **Natural Resources and Associated Problems**

The human population is expanding every day. Natural resource demand increased as the population continued to grow. Man began using natural resources considerably more extensively as a result of urbanisation, the demand for energy, and industrialization. Resources that are not renewable are scarce. They are difficult to replace. These resources could run out at some point [10]. It establishes a balance between population increase and resource use, which is a topic of great concern. This excessive use causes a number of issues. Due to excessive watering, there are issues with water logging in certain areas. There may not be enough water available in certain locations for agriculture and business. Natural resource conservation is thus necessary. There are many problems associated with natural resources:

#### **Forest Resources and Associated Problems**

- a. Use and over-exploitation.
- b. Deforestation.
- c. Timber extraction.
- d. Mining and its effects on forest.
- e. Dams and their effects on forests and tribal people.

#### **Water Resources and Associated Problems**

- a. Use and overutilization of water.
- b. Floods, droughts etc.
- c. Conflicts over water.
- d. Dams and problems.

#### **Mineral Resource and Associated Problems**

- a. Use and exploitation.
- b. Environmental effects of extracting and using minerals.

#### **Food Resources and Associated Problems**

- a. World food problems.
- b. Changes caused by agriculture and over grazing.
- c. Effects of modern agriculture.
- d. Fertilizer-pesticide problems.
- e. Water logging and salinity.

#### **Energy Resources and Associated Problems**

Growing energy needs.

## Land Resources and Associated Problems

- a. Land degradation.
- b. Man-induced landslides.
- c. Soil erosion and desertification.

## Forest Resources

Given that they are natural resources and components of the biosphere; forests are among the most significant natural resources on planet. mostly made up of trees, shrubs, and other woody plants... Forests occupy around one-third of the planet's total land area. Both environmentally and commercially, forests are significant. Because they absorb CO<sub>2</sub> and emit O<sub>2</sub>, which is needed to support life on earth, woods are to be regarded ecologically as the planet's lungs. The harmful gas CO<sub>2</sub> is absorbed by forest trees, which lowers global warming, supports the hydrological cycle, and prevents soil erosion. Forest ecosystems are excellent and store a lot of water. Economically, woods produce food, firewood (conventional fuel), bamboos, rubber, pharmaceuticals, gums, resins, fodder for grazing animals, and other products.

## II. CONCLUSION

Natural resources and environmental research are crucial to the future of our world. Environmental scientists and specialists are attempting to protect the delicate balance between human well-being and the natural world via scientific study, policy formulation, and cutting-edge technology. Environmental science knowledge helps us to understand the various complexity of our environment and offers ways to reduce the harmful effects of human activity. Recognising the significance of natural resources and their sustainable management is essential from a larger viewpoint. These resources, which include biodiversity, air, water, forests, and minerals, serve as the cornerstone for the growth of human society. For maintaining the long-term availability of natural resources and minimising environmental deterioration, sustainable management practises are crucial. These include conservation, recycling, renewable energy, and responsible resource exploitation.

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