

COMPONENTS OF ENVIRONMENT

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INTRODUCTION

Before you start reading this topic, just look around and note the various things that surround you like clouds, paper, chair, friends, etc. It is impossible to be alone in this earth, isn't it? After all, no man is an island!

Every organism in this earth is surrounded by a lot of things; say other organisms, plants, water, air, light, land etc. These surroundings of the organism, all the living and non-living things constitute its environment.

There are a lot of definitions for the word environment in the literal and scientific contexts, but the most acceptable definitions can be given as below. The first one is my choice.

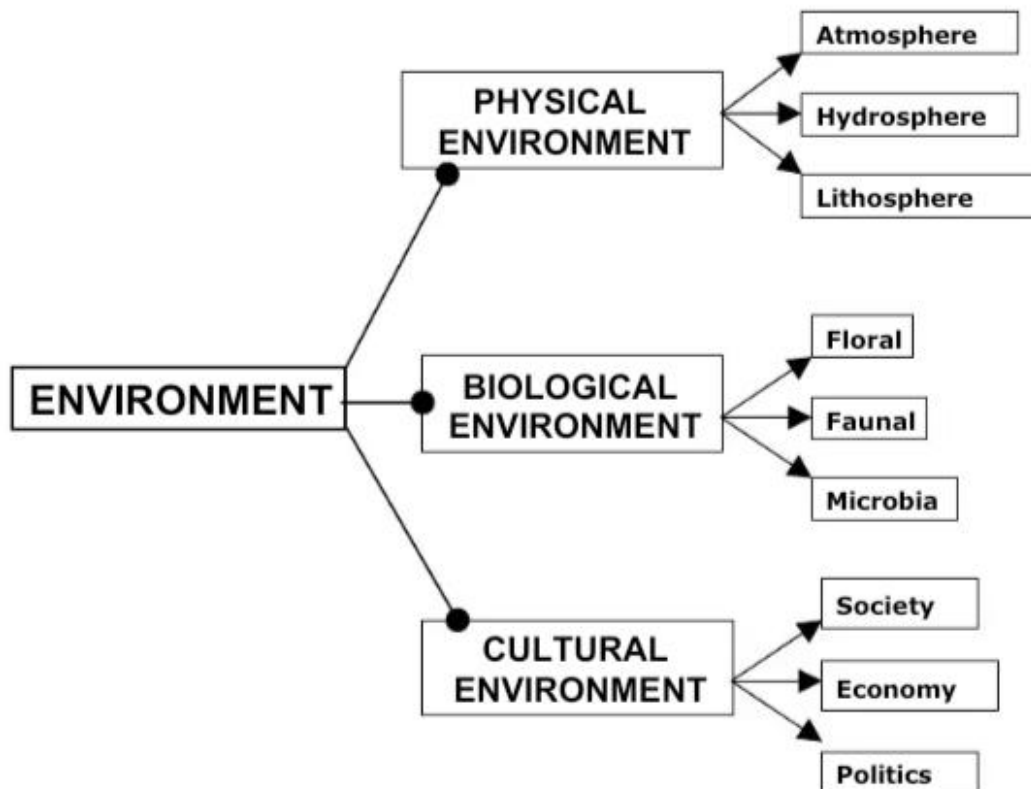
- 1) Environment can be defined as the natural surroundings of that organism which directly or indirectly influences the growth and development of the organism.**
- 2) Environment is defined as the surroundings in which an organization operates including air, water, land and natural resources, flora, fauna, humans and their inter relations" – ISO Definition
- 3) Environment is the sum total of all living and non living factors that compose the surroundings of man

The word environment is derived from the French word "environ". The meaning of the French word is somewhat related to "encompass" "encircle" etc. It is believed to have been introduced into the subject by biologist Jacob Van Erkul in the early 1900s.

With environment being such a generalized term, its classification and an understanding of its composition becomes a necessity.

CLASSIFICATION OF ENVIRONMENT

The classification of the environment can be best described from the following figure



Of these, we are more concerned with the physical environment from our perspective as the cultural environment and biological environment are left to specialists like economists and biologists. Read further for a brief intro of the cultural and biological environments.

The Cultural Environment gives an idea of learned behavioral traits those are clear and shared by members of society. *For example, if a person born in India*

and living in India and a person born in India and living in Australia would have two different cultural environments, which they have to adapt too. The students may have already come across the problems of cross cultural communication, which is indeed related to the cultural environment of an organism. The cultural environment can be divided into three sub-heads namely

The social environment reflects the traditions that he or she was grown, lives in, and the community with whom the individual interacts. The economic environment refers to the set of factors that surrounds the organism involving monetary, natural, and human resources that influence the behavior of that particular organism. The political environment involves the environment involving conflicting interactions, between other organisms, often resulting in the formation of alliances or coalitions and used to resolve the conflict and achieve the goals of the allies or their influential members. **The most important thing about the cultural environment is that it cannot be physically represented, but it is there anyway.** The study of this aspect of environment is taken care by economists, sociologists, politicians and other such people.

The biological environment as the name indicates refers to the various flora (plants), fauna (animals) and microbes (micro organisms) that are found in our surroundings. We are already familiar with this environment through our study of biological sciences.

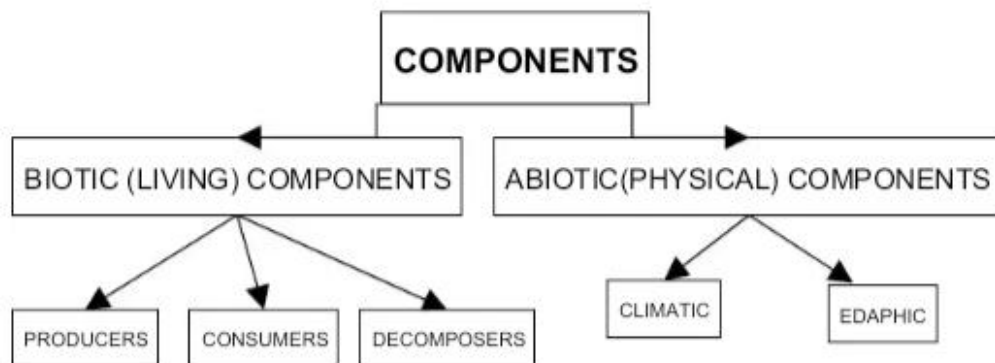
As we discussed in the above classification, environment has three distinct dimensions namely: physical environment, biological environment and cultural environment. All the same, the study of the cultural environment has been allocated to sociologists, economists and managers. The biologists and doctors are in charge of studying our biological environment. This leaves the physical environment, which is taken care of by the environmentalists.

COMPONENTS OF ENVIRONMENT

The conflict of words and thoughts between scientists of European origin and American origin has had its toll on the subject of environment. For the same topic, they may have different names and different philosophies. When we say, components of environment, the same problem appears.

1. Components of Environment as per British literature

Here the components are classified in terms of biotic and abiotic based upon life. The biotic components are further listed as producers, consumers and decomposers and the abiotic components are classified as climatic(water, air) and edaphic(land). It is from this component system that the study of structure of ecosystem was evolved.



2. Components of Environment as per American literature

As per American literature, the components of environment are listed as

1. Hydrosphere(Water)
2. Atmosphere(Air)
3. Lithosphere(Land)
4. Biosphere(Flora/Fauna/Microbes)
5. Anthrosphere (man made things)

I understand your confusion on what to write if they ask you the components of environment. It is pretty simple logic. If they ask biotic and abiotic components, follow the British way. If they ask about the spheres of environment, be American. If they simply ask components of environment, show that you are an Indian by plainly writing down air, land and water.

ENVIRONMENT, ECOLOGY AND ECOSYSTEM

At this stage, it is very important to clarify ourselves about these terms environment, ecology and ecosystem lest they may lead to confusion.

Environment, Ecology and Ecosystem are three different terms. But they are inter related.

The natural surroundings of an organism, both living and physical is its environment. Let's say you are an organism. Light, Water, Air, Land etc are your physical surroundings. Humans, Rats, Lizards, Dogs etc are your living surroundings. They are your environment. Scientists believe that natural environment is a better word to use given the common use of the word environment.

Ecology is a branch of study of the interrelationships with the organism and its environment. It is a basic fact that the Earth includes a tremendous variety of living things which depend in some way on other living and nonliving things in its Environment. Definitely, as an organism, camel has a relationship with its environment. Humans have a working relationship with cows, chickens, bees etc. This study of how the existence and activity of organism influences its environment and the vice versa is ecology. Ecology comes from the Greek Words OIKOS (house or place where one lives) and LOGOS (study of) and was formed by Ernst Haeckl in 1869. Thus Ecology means house study or Study of the "House" (the scientist referred the earth as house in all his works) in which we Live. Ecology involves collecting information about organisms and their environment, looking for patterns, and seeking to explain these patterns. It can be confidently established that Environmental Science is more or less Ecology.

The ecology that takes place in a defined area is called ecosystem. Say your relation with water, light, humans, dogs etc in a city, or in a forest, sea etc. Ecosystem is a functional unit of dynamic system of organisms interacting with each other (biotic) and the inanimate environment (abiotic). *We will be looking more into the concept of ecosystems in the future topics.*

1.1 INTRODUCTION

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. Environmental Science is the interdisciplinary field and requires the study of the interactions among the physical, chemical and biological components of the Environment with a focus on environmental pollution and degradation. 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. 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 Environment is about the surrounding external conditions influencing development or growth of people, animal or plants; living or working conditions etc. This involves three questions i.e., what is surrounded, by what surrounded and where surrounded. The answer to the first is living objects in general and man in particular. Human life is concerned to be the main in the study of environment. However,

human life cannot exist or be understood in isolation from the other forms of life like animal life and from plant life. Environment belongs to all living beings and is thus important for all. Hence, environment refers to the sum total of conditions surround in space and time. The scope of the term 'Environment' has been changing and widening by the passage of time. In the primitive age, the environment consisted of only physical aspects of the planet earth ie., land, water and air as biological communities. As of now, it includes social, economic and political conditions also. The answer for the question where surrounded is in nature that physical component of the planet earth, viz land, air, water etc., support and affect life in the biosphere..

1.2 DEFINITIONS OF ENVIRONMENT:

Some important definitions of environment are as under:

1. 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,

intellectual, mental, economical, political, cultural, social, moral and emotional.

2. 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'.

1.3 SCOPE OF ENVIRONMENT:

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.

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.

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.

1.4 ENVIRONMENT STUDIES: IMPORTANCE

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:

1. Environment Issues are being of Global:

It has been well recognised 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.

2. 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.

3. 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.

4. Need for an Alternative Solution

It is essential, specially for developing countries to find alternative paths to an alternative goal. We need a goal as under:

1. A true goal of development with an environmentally sound and sustainable development.
2. A goal common to all citizens of our planet earth.
3. 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.

5. 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 synchronised with the ecological cycle. In any plan of development our actions should be planned ecologically for the sustenance of the environment and development.

6. Misra (1991) recognized four basic principles of ecology, as under:

(i) Holism, (ii) Ecosystem, (iii) Succession and (iv) Conversation.

Holism has been considered as the real base of ecology. In hierarchical levels at which interacting units of ecology are discussed, are as under:

Misra (1991) has recognised four basic requirements of environmental management as under:

1. Impact of human activities on the environment,
2. Value system,
3. Plan and design for sustainable development,
4. Environment education.