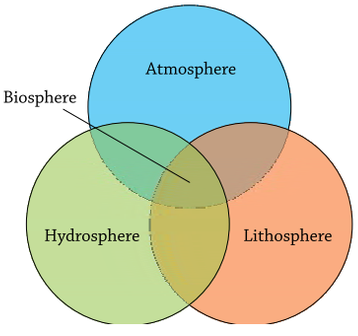
CHAPTER

1 ENVIRONMENT

GEOGRAPHY

Place, people, things and nature that surround any living organism is called its environment. It is a combination of natural and human-made phenomena. The **natural environment** is the biotic and abiotic conditions and processes existing on the Earth and affecting life. The biological/**biotic** or living components of the environment include plants, animals and other micro-organisms. Animals also include human beings. The physical or **abiotic** components of the environment are non-living things, i.e., water, air, soil, rocks as well as conditions like temperature, humidity and sunlight. The biological environment depends on the physical environment, while the physical environment sustains the biological environment. Natural Environment is our basic life support system. It provides the air we breathe, the water we drink, the food we eat and the land where we live. All the elements of our environment and new events have a great impact on our daily life.



Increasing human needs has forced to modify and at times even destroy the natural environment. Human beings make cars, mills, factories and manufacture containers for the goods produced. The car fumes pollute the air, water is collected in a pot, food is served in vessels and land is used to build factories. Human dwellings have changed from a hut to skyscrapers. Villages have developed into towns, cities and mega cities. This all is **human made environment**.

Human environment reveals the activities, creations and interactions among human beings. Human environment has also undergone changes in space and time. The family values and community values have changed a lot. New religions have also come up. Political institutions have changed from an autocratic set up to a democratic set up. Means of transport and communications have made a global human environment but many of the human values have changed to create a life full of chaos and terror. Moreover, the total human impact on our environment is now a major contributory factor to the survival of life on this planet.

When we *study the environment of the Earth in its totality,* we find that the Earth's all the three realms—lithosphere, atmosphere and hydrosphere—are found either in combination or separately but not independently at any spot where the living beings are found. Biosphere is a narrow zone of the Earth where land, water and air interact with each other to support life. Plant and animal kingdom together make biosphere, or the living world. To all living creatures Earth is the home. In biological context, this can be termed as **environment in totality**.

Lithosphere

Lithosphere is the solid crust or the hard top layer of the Earth. It is made up of rocks and minerals. The Earth is made up of several concentric layers with one inside another. The uppermost layer over the earth's surface is called the **crust**. It is the thinnest of all the layers. It is about 35 km on the continental masses and only 5 km on the ocean floors. The crust is covered by a thin layer of soil. It is an irregular surface with various landforms—mountains, plateaus, plains, valleys, etc. Landforms are found over the continents and also on the ocean floors. The rocks of the crust come from the interior of the Earth and are distributed and deposited in layers.

The main mineral constituent of the continental mass are *silica* and *alumina*. It is thus called **sial** (*sisilica* and *al-alumina*). The oceanic crust (the basins that support the oceans) mainly consists of *silica* and *magnesium*. It is thus called **sima** (si-silica and ma-magnesium).

Since rocks are aggregates of minerals they also help to support life. Lithosphere is the domain that provides us forests, grasslands for grazing, land for agriculture and human settlements. It is also the main source of mineral wealth which is the raw material for a wide variety of industrial products for human use.

Hydrosphere

The domain of water is referred to as hydrosphere. On earth water exists chiefly in oceans. They supply water vapour to the atmosphere through evaporation. In the atmosphere water vapour condenses to fall back on Earth in the form of precipitation (rain). This precipitation makes life possible on land. Water is found in oceans, rivers, lakes, ponds, glaciers and in the atmosphere in the form of vapour. Without water life cannot be found on Earth. Water is essential for all living organisms.

Atmosphere

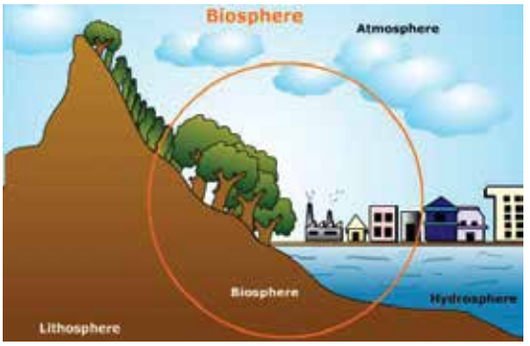
The thin layer of air that surrounds the Earth is called the atmosphere. The gravitational force of the Earth holds the atmosphere around it. Air is a mixture of many gases (chiefly nitrogen about 78.1% by volume, oxygen 20.9%, carbon dioxide 0.03% and other gases 0.97%), dust and water vapour. Atmosphere exists in several layers. Each layer performs a different function. For example, the ozone layer protects life from the harmful ultraviolet rays and scorching heat of the Sun.

The changes in the atmosphere produce changes in the weather and climate. Atmosphere also helps to form precipitation from water vapour rising from the oceans.

Interaction and Interdependence of the Realms of the Earth : Water vapour condenses around dust particles (forming a part of lithosphere) rising from the ground. Only then the precipitation falls on Earth. In this way the hydrosphere and lithosphere interact and depend on each other for their dynamic states. Plants in the presence of sunlight convert atmospheric carbon dioxide and water to form their food to live and grow. Thus, there is a constant interaction between the lithosphere on which plants grow, atmosphere which supplies carbon dioxide and hydrosphere which is the source of water in vapour form in the air. There are many other processes which happen because of the interaction between the realms of the Earth and their inter-dependence.

Biosphere

The biosphere includes parts of the three realms—lithosphere, hydrosphere and atmosphere. In other parts there is no life. **Biosphere** is a narrow zone of the Earth where land, water and air interact with each other to support life. In other words, plant and animal kingdoms together make biosphere or the living world.



The Four Components of the Biophysical Environment.

Ecosystem

All plants, animals and human beings depend on their immediate surroundings. Often they are also interdependent on each other. An **ecosystem for a given area** is the whole biotic (plants, animals, microorganisms) in that given area plus its abiotic environment (sediments, soil, water, air and gases) to interact with. Thus, the relation between the organisms as well as the relation between the organisms and their surroundings in a given area form an ecosystem of that area. There could be an ecosystem of a small pond, lake, river or ocean as well as of a grassland, a forest, a desert or a mountain.

Biodiversity

Biodiversity or biological diversity includes the vast variety of organisms that inhabit the earth—wild plants and animals, microorganisms, domestic animals, cultivated plants and even seeds. In other words, biodiversity is the variety and variability of life on Earth. More than 10 million species of plants and animals exist on Earth. India alone has about 47,000 species of plants and 89,000 species of animals. It is one of the ten 'Mega diversity' centres in the world. Tropical rain forests of the world are known for their mega biodiversity.

A Pond Ecosystem

The Dynamism of the Environment

The physical and biological elements in the environment are dynamic in nature. They interact with one another. Any change in the physical environment brings about a change in the biological environment and vice-versa. Changes take place slowly or suddenly in the nature of landforms. Sudden changes are more noticeable. The Earth's surface and landforms undergo changes continuously. The distribution of continents and oceans has also varied during the long history of hundreds of millions of years. The lofty Himalayas began forming some 60 million years ago from sediments that lay at the bottom of an ancient sea in that region. Changes in environment were responsible for the evolution of human beings about one million years ago.

Fact File

Species is a group of animals or plants whose members are similar and can breed together to produce young animals or plants.

The mountains are still rising and are being worn down continuously by rivers and glaciers. Changes brought by volcanoes, earthquakes and floods are sudden. The circulation of air and water brings about changes in climatic conditions in different seasons. Plants and animals become extinct in the course of time. New species of plants and animals get evolved and adapt to the new environment. Human beings can, to some extent, mould or modify their immediate environment. Humans kill large number of animals for food, clear land by cutting forests, dig for coal and oil, make the globe warmer by burning fuel in vehicles and factories. However, they cannot change the environment completely.

Man is the only animal which interferes with the environment. Early humans adapted themselves to the natural surroundings. But the progressive humans learnt new ways to use and change environment according to their need. Setting up of industries, construction of roads and dams and use of vehicles have changed their life altogether.

Factory chimneys emit a range of noxious fumes in the air. Vehicles emit poisonous gases. Coal fired power stations emit harmful gases. Aircraft burn up fuel and add gases to the atmosphere. All these gases cause acid rain and global warming. Rivers are polluted by industrial waste and farming chemicals, oil spills from tankers kill sea birds and other creatures. Nuclear power stations dump radioactive liquid waste straight into the sea. Nuclear bomb blasts fill the environment with radioactive dust leaving many areas unfit for living for centuries. All these environmental changes pose a serious threat to the very survival of humans themselves on Earth. The human actions have caused the imbalance in our environment. The implications of this imbalance are many, for example, global warming, uncertainty in the beginning and end of seasons and rains. Our environment is in danger. A perfect balance is necessary between the natural and human environment. Humans must learn to live and use their environment in a harmonious way, because we are dependent on the environment for our food, water, air, fibres, medicines, shelter, raw materials, soil and energy.

Key Words

» Environment	:	Place, people, things and nature that surround any living organism.
» Natural Environment	:	The biotic and abiotic conditions and processes existing on Earth.
» Human-made Environment	:	Things made by humans, e.g. cars, mills, factories, high buildings.
» Biotic Components	:	Living/biological components of the environment including plants, animals and other microorganisms.
» Abiotic Components	:	Physical/non-living components of the environment including water, air, soil, rocks, temperature, humidity, sunlight.
» Sial	:	Silica (si) and aluminium (al) that form the continental crust.
» Sima	:	Silica (si) and magnesium (ma) that form the oceanic crust.
» Processes	:	A series of activities of nature or man.
» Ecosystem	:	Whole biotic (plants, animals, microorganisms) plus abiotic environment (sediments, soil, water, air and gases) of a given area to interact with.
» Biodiversity	:	The wide range of species of plants and animals or their habitats.
» Human Environment	:	Part of Environment comprising of only human beings.
» Species	:	A group of animals or plants whose members are similar and can breed together to produce young animals or plants.

SUMMARY

- Natural environment consists of the living things—plants, animals and other micro-organisms plus nonlivings things—water, air, soil, rocks, sunshine.
- Natural environment is our basic life support system.
- Increasing human needs has forced to modify and at times even destroy the natural environment.
- Human environment reveals the activities, creations and interactions among human beings.
- The three realms of the earth—lithosphere, hydrosphere and atmosphere are found in combination or separately but not independently.
- Lithosphere is the solid crust or the hard top layer of the Earth.
- The domain of water is referred to as hydrosphere.
- The thin layer of air that surrounds the Earth is called the atmosphere.
- Atmosphere also helps to form precipitation from water vapour rising from the ocean.
- Biosphere is a narrow zone of the Earth where land, water and air interact with each other to support life.
- An ecosystem for a given area is the whole biotic plus abiotic environment of that area.
- Biodiversity includes the vast variety of organisms that inhabit the earth.
- The physical and biological elements in the environment are dynamic in nature. They interact with each other.
- The human actions have caused the imbalance in our environment.
- Humans must learn to live and use their environment in a harmonious way.

Exercise Time

A. Tick (✓) the only correct choice amongst the following :

1. Which is not a part of environment ?
   a. Hydrosphere b. Lithosphere c. Biosphere d. Spheroid
2. Which is a part of human-made environment ?
   a. Mountain b. Sea c. Forest d. Road
3. Which is not a component of human environment ?
   a. Land b. Religion c. Community d. Political party
4. Which is not a natural ecosystem ?
   a. Forest b. Desert c. Lake d. Aquarium
5. Which is a threat to environment ?
   a. Increase in carbon dioxide b. Increase in trees
   c. Increase in ponds d. Increase in crops

B. Fill in the blanks :

1. Land, air and water form our _____environment.
2. Thickness of lithosphere is _____ km under the oceans.
3. Plants, animals and _____ are an important part of the biotic environment.
4. The _____ environment sustains the biotic environment.
5. The physical and _____ environments are interdependent and interact with each other.

C. Match the Following :

1. Biotic components	a. factories and high buildings
2. Abiotic components	b. plants, animals, microorganisms
3. Human-made Environment	c. interaction among human beings
4. Human Environment	d. air, water, land

D. Write true (T) or False (F) against the following statements in given brackets :

1. Biosphere is also a component of atmosphere. ( )
2. The non-living environment is also called the biotic environment. ( )
3. Humans cannot change the environment totally. ( )
4. Our environment is static in nature. ( )
5. The great variety of life on Earth is called biodiversity. ( )

E. Define the following terms :

1. Biotic components
2. Abiotic components
3. Crust of the Earth
4. Species
5. Human environment
6. Biodiversity

F. Identify the following :

1. The force that holds all things to the surface of the Earth
2. The rocks of the continents rich in silica and aluminium
3. The layer of air that envelopes the Earth

4. Interaction of lithosphere, hydrosphere and atmosphere
5. Harmful rays of the Sun

G. Answer in one word or one pharse :

1. What are the two major components of biotic environment ?
2. What are the things included in the physical environment ?
3. What does support life ?
4. What kind of environment is land ?
5. What are included in human environment ?
6. What are the two kingdoms in biological environment ?

H. Answer these questions briefly :

1. What are the major components of the environment ?
2. Give four examples of human made environment ?
3. What is an ecosystem ?
4. What is lithosphere ?
5. What is biosphere ?
6. Why do man modify his environment ?
7. Name the constituents of air and their percentages ?
8. Why do we should live in harmony with nature ?

I. Differentiate between :

1. Biotic components and Abiotic components.
2. Natural Environment and Human-made Environment.
3. Human Environment and Human-made Environment.
4. Biological Environment and Human Environment.
5. Atmosphere and Biosphere.

J. Answer these questions in detail :

1. What do you mean by natural environment ? Describe.
2. How do lithosphere, hydrosphere and atmosphere interact to form biosphere ?
3. How have human beings changed the environment ?
4. How should human beings not create imbalance in the environment ?
5. Explain the dynamism of the Environment ?

PROJECT WORK

1. Draw and label the four realms of Earth and their interdependence.
2. Find out the significance of water in our life.
3. In what type of ideal environment would you like to live ? Draw a rough sketch of it.
4. Collect five herbs found in your neighbourhood that are used as medicine, for example, tulsi, neem, pudina (mint).