

CHAPTER – 25

BIOSPHERE



After studying this chapter you learn :

- The meaning of biosphere and its Importance.
- About the meaning of environment, environmental pollution, types of pollution and preventive measures.

Do you know, what the Earth has given to us? But what are we giving back to the earth ?

Meaning : Earth is the only planet which has various forms of life on it. Biosphere is the part of the earth where life exists. The biosphere is the fourth component of the earth and it is the totality of all living things on earth.

Ecology: Ecology is the study of the interaction of living organisms with their physical, chemical and biological environment. In a natural environment, there is a perfect balance between the various organisms living together in the biosphere. This is known as ecological balance.

Ecosystem is a community of plants and animals, together with their immediate environment, including the inanimate part of that environment. It is also defined as ‘the total assemblage of components entering into the interactions of a group of organisms’.

Without ecosystem or ecological balance in the biosphere one cannot imagine the existence of plants, animals and micro organisms either single or in community. Every organism adjusts itself with its physical habitat.

Environment: Environment is the surrounding where an organism, a community or an object exists. It creates favourable conditions for the existence and development of all living organisms. The environment is of two types- Natural or geographical and Cultural or man-made.

Environmental pollution: Environmental pollution is the unfavourable alteration of our surrounding, wholly or partly by human action through direct and indirect effects.

Environmental pollution is one of the most terrifying ecological crisis of today. The factors like over population, industrialization, urbanization, over exploitation of resources, over utilization of automobiles, etc. have influenced a change in the living conditions of plants, animals and human beings.

Pollutants are the substances that cause pollution. Pollutants are natural and man-made. The man-made pollutants are considered to be more dangerous and hazardous than natural pollutants. The pollutants may be visible like smoke, gases, dust, garbage, sewage, etc., and invisible like bacteria, toxic chemicals mixed with water, food, soil, etc.

Types of Pollution: Environmental pollution are of different types. On the basis of pollutants and medium of pollution they can be classified into the following types: Air pollution, Water pollution, Soil pollution and Noise pollution.

1. Air pollution

According to World Health Organisation (W.H.O.), air pollution is defined as, 'Substances put into the air by the activity of mankind in concentration, sufficient to cause harmful effects to his health, vegetation and property'. The important sources of air pollutants are, **Natural:** Volcanoes, forest fire, cosmic dust, etc. **Man-made:** Gases from industries, domestic use, automobiles, mining, nuclear power plants, nuclear explosions, etc.

The important pollutants are : Carbon dioxide, carbon monoxide, sulphur dioxide, nitrogen oxides, chlorofluorocarbons (CFC), hydrocarbons etc. The important effects are change in weather and climatic conditions, ozone depletion, greenhouse effect, global warming, effect on human health, problem with respiratory system, effect on life of animals and plants.

Measures to control air pollution are : Control of gaseous pollutants, control of emission from automobiles, planting of more trees, use of non-conventional energy sources, awareness programme, legal control, literacy and education etc.

2. Water pollution

Water pollution is ‘alteration in physical, chemical and biological characteristics of water which may have harmful effects on human and aquatic life’. The important sources of water pollution are **Natural:** Soil erosion, landslides, volcanic eruption, decay and decomposition of plants and animals etc. **Man-made:** Industrial effluents, urban waste, domestic waste, agricultural waste, thermal waste, oil spill, offshore drilling, nuclear waste etc. Water pollution is of different types: Sea or Ocean water pollution, Ground water pollution, River water pollution, Lake pollution etc.

The important effects of water pollution are: It spreads water-borne diseases and epidemics like cholera, typhoid, diarrhea, jaundice, etc, Causes death of aquatic life, affects irrigation water and on agricultural crops, nature and features of water etc.

Measures to control water pollution: Industrial effluents must be treated; drinking water sources must be kept clean; sewage treatment plants, disposal of waste on the water bodies must be controlled, etc.

3. Soil pollution

Soil pollution is ‘decrease in the quality of soils either due to human sources or natural sources or by both’. It results in the increase of soil erosion, lack of humus, decrease in soil micro-organisms, plant nutrients etc. Sources of soil pollution are, industrial and mining waste, Domestic and urban waste, agricultural waste, nuclear waste etc.

Effects of soil pollution are: it decreases the fertility of the soil, converts the region into wasteland, destroys the micro organisms in the soil etc.

Measures to control soil pollution: Controlled and judicious use of chemical fertilizers, pesticides and insecticides, proper disposal of industrial and urban waste, proper use of land and crop management, awareness programme on proper soil utilization and its maintenance etc.

4. Noise pollution

Noise pollution is ‘any undesirable sound dumped into the atmosphere leading to health hazards’. The important sources of noise

pollution are **Natural**: Thunder, cyclones, heavy rainfall, hailstorms, waterfalls, ocean waves etc. **Man-made**: Industrial noise, automobiles, air crafts, domestic noise, mining etc.

Effects of noise pollution are: noise pollution causes temporary or permanent hearing problem, headaches, restlessness, cardiovascular diseases, Psychological disorder, behavioural changes, lack of concentration, etc.

Measures to control noise pollution: Industries must be located away from the residential areas; construction of sound proof walls in the factories, restricting unnecessary use of sirens, horns and loud speakers; airports must be located away from the residential zones; protective instruments the workers in the industries, noise producing vehicles must be checked etc.

Global warming : The temperature of the earth is increasing slowly over the years. For the last few years global temperature has increased. This phenomenon is termed as Global warming. The warming of atmosphere is caused by greenhouse effect and trapping of heat by the atmosphere. The world getting warmer, climatic zones are shifting, glaciers are melting and sea level is rising due to global warming eg., high rate of melting of ice in Himalayas, Arctic and Antarctic regions.

Greenhouse effect : The energy that the earth receives from the sun has to be balanced by the radiation emitted from the earth's surface. The use of fossil fuels is increasing greenhouse gases in the atmosphere. Carbon dioxide and other greenhouse gases trap the heat radiated from the earth. Thus increasing of greenhouse gases is causing an increase of temperature. This is called 'Greenhouse effect'.

Ozone depletion : Ozone is a thin layer of gas found in stratosphere. Ozone absorbs ultraviolet rays and protects all forms of life on the earth's surface. In recent years the use of air conditioners, refrigerators, sprays and deodorants are destroying the ozone due to the synthetic chemicals released into the atmosphere, primarily 'chlorofluorocarbons' (CFC). The highest ozone depletion in the world is recorded in the atmosphere over Antarctica. The ozone depletion has caused the ozone hole. This has to be controlled for the sake of the people of the present and future generation.

Acid rain : Acid rain contains high amounts of acids particularly

sulphuric acid and carbon monoxide. It is caused when the rain drops pass through the polluted atmosphere. The rainfall with poisonous acids kill marine organisms. Acid rain is damaging forests, agricultural crops, old buildings, monuments etc.

Acid rain is also referred to as 'lake killer'. The 'Black Triangle' stretching over Poland, Czech Republic and South-east Germany is one of the worst acid rain affected regions in the world.

Bio-Diversity : The variety of flora (plants) and fauna (animals) in a region is known as biodiversity. Distribution of different kinds of plant and animal species in a region shows the richness of biodiversity. The maintenance of biodiversity is very important both for the quality of environment and also for human survival.

The conservation of 'Biodiversity' is very important to save and protect rare plants and animal species. Providing good environmental condition for their living is the best means of protection.

The earth is the only living planet in our solar system. The way in which changes, disturbances, hazards are taking place on the earth, can lead to the destruction of the quality of life on our earth in the near future.

To 'Save Earth' and 'Mother Planet' we must educate people, formulate awareness programmes, utilize resources judiciously, control pollution awareness through education, symposiums, seminars, skits, films, summits. These necessary to save our "MOTHER EARTH".



"Save Earth", "Save Mother Planet"

EXERCISES

I Answer the following questions :

1. What is Biosphere?
2. Define ecology.
3. Name the different types of environmental pollution.
4. What are the measures to control water pollution?
5. What is Bio-diversity ?

II Define the following :

6. Biosphere
7. Ecological imbalance
8. Global warming
9. Greenhouse effect
10. Ozone depletion
11. Acid rain

III Terms to remember :

12. Pollution
13. Environmental Day
14. Climate change
15. Chlorofluorocarbons (CFC)
16. Earth Hour and Earth Day
17. 'Save Earth'

IV Activity :

18. Collect information on the impact of global warming. Also enlist the ways of controlling global warming.

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