

ENVIRONMENTAL DEGRADATION

28.1 INTRODUCTION

The term Environment has been conceived by different people differently. To some it has meant home, to others it is a village, town, city, country, or the world at large. In spite of their varied conceptualisations, it is understood that environment is the sum total of the factors that affect life. These factors may be analysed with reference to a home, a neighbourhood, a country, etc.

Various definitions have been suggested by the International Conference on Environmental Education, Tbilisi, Stockholm conference on Human Settlement the World Conservation Strategy, etc. Environment has generally been considered to be a "whole set of natural and social systems in which man and other organisms live and from which they draw their *sustenance*". This view embraces the natural and man-made sources by which human needs are satisfied.

The natural environment consists of the four interlocking systems, viz. The Atmosphere, the Hydrosphere, the Lithosphere and the social environment includes human groups, the material infrastructure built by them, the production relationships and the institutional systems that has been divided. The social environment, when analysed, would indicate how human societies have organised themselves, would indicate how human societies have organised themselves and how they function in order to satisfy their needs and also their greed to possess and conquer natural resources.

Environment would, when viewed historically in this context, consists of physical, biological, social, cultural, political and economic factors, both, in their natural interactions, and independently.

28.2 OBJECTIVES

After studying this lesson, the learner will be able to

- explain the concept of environmental degradation;
- identify various forces causing environmental degradation.
- recognize the growing awareness about environmental degradation.
- assess the concept of sustainable development.

- recognise the national and international commitment to the protection of environment.

28.3 ENVIRONMENTAL DEGRADATION

The degradation of the life support system is the result of many interlinked factors. Environmental degradation is basically of two kinds : a) degradation of the productive capacity of the life support systems on which man depends, that is mainly land and water resources. b) Pollution that will inhibit or reduce the usefulness of water, food and other produce from the ecosystem. Land scape desertification, erosion and loss of biological diversity are examples of the first type of environmental problems. Concentration and accumulation of pollutants (various waste products, pesticides, heavy metals, etc.) in water bodies, soil and elsewhere in the living environment are examples of the latter kind of environmental problems. Often the change in one part of the eco-system will be the beginning of a process which in the long run leads to a destruction of the whole eco-system. Deforestation, for example, will lead to loss of biological diversity. it will also significantly influence erosion, alluviation and the water balance and thus the productive capacity of large areas also outside the deforested areas.

Life support system	→ The surrounding, which provides the basic needs for human survival.
Productive capacity	→ The ability to produce according to strength.
Eco-system	→ Ecological unit consisting of a group of plants and living creatures interacting with each other and with their surrounding.
Deforestation	→ Removal of permanent vegetation.

28.4 FORCES CAUSING ENVIRONMENTAL DEGRADATION

All that surrounds man and other living species and governs, and affects life in general comes within the broad definition of the term Environment, which includes-

- The atmosphere (particles and gaseous matter surrounding the earth)
- The lithosphere (soil, mineral matter, earth's mantle, core)
- The hydrosphere (water in various forms and manifestation on the surface and inside the earth)
- The biosphere (plants and animals on the earth)

What are chemical pollutants?

Chemical pollutants are materials which are present for long in open environment at such levels that are toxic, irritant or injurious to health in particular and life in general. Such materials include gases, vapours, and such matters as fumes, dust, smoke, fog, smog, haze, smaze, etc., which are chemical in nature.

Sustenance	→ The nourishing quality.
Atmosphere	→ The mixture of gases that surround the earth.
Hydrosphere	→ The water body of the earth 71%
Lithosphere	→ Solid crust of the earth.
Biosphere	→ Plants and animals on the earth.

Composition of Atmosphere

The atmosphere is broadly divided into two zones, the lower one called homosphere, extending up to 10 km, from the earth's surface and the upper one called heterosphere.

extending beyond the homosphere for thousands of kilometers. A layer of ozone separates these two zones and prevents the penetration of the piercing cosmic radiations into the homosphere. Whereas the components of the homosphere are molecular or atomic gases like oxygen, nitrogen, carbondioxide, water vapour and rare gases, the components of the heterosphere are high energy atoms and ions produced by the impact of ionizing cosmic radiation on chemical species.

Smog	→ mixture of fog and smoke
Haze	→ thin mist
Cosmic radiations	→ rays that reach the earth from outer space.

INTEXT QUESTION 28.1

Identify the True and False statements :

- 1 The natural environment consists of ten layers.
- 2 Hydrosphere is the water contents of the earth.
- 3 Eco-system is the ecological unit consisting of a group of plant and living creatures interacting with each other and with their surrounding.
- 4 Homosphere is the outermost layer.
- 5 Atmosphere is divided, broadly into four zones.

(i) Role of Ozone Layer in Environmental Degradation

Reports reveal that compounds like poly-fluorocarbons have high binding energy and so cannot be degraded by low energy oxygen in the atmosphere. They need high energy oxidants like ozone for atmospheric degradation. These chloro-fluorocarbons are used in refrigerators, air-conditioners and other cooling devices as condenser fluids which slowly leak into the atmosphere. Excessive inputs of these would require large amounts of ozone to degrade them. This leads to depletion of ozone in the ozone layer, causing holes. The punctured ozone layer allows free access to cosmic radiations into the homosphere resulting in rise in the atmospheric temperature, melting of *icebergs*, submersion of large chunks of land, increase in population density, further concentration of population due to shrinkage in space, greater hazards caused by the activities of larger number of people and the cycle continues to the *detriment* of man and the biosphere.

(ii) Role of Carbondioxide in Environmental Degradation

Carbomonoxide and carbondioxide are the major pollutants produced from all combustion processes—industrial or vehicular. Increasing levels of carbonmonoxide cause death while those of carbondioxide raise the atmospheric temperature progressively by continuously absorbing Infra-red radiations of the sun. This effect is similar to the heating effect on a house whose outer walls are painted green. This is so because green colour absorbs red colour and so when infra-red radiation which has heating affect is absorbed by green colour, the green coloured material gets excessively heated. The phenomenon is therefore know as Green House Effect. It is estimated that at present levels of carbondioxide released into the atmosphere, the earth's temperature would rise by as high as 3°C by the year 2030. This rise is far in excess of the rise in the last 1000 years.

(iii) Acid Rain and Environmental Degradation

Acidic gases like oxides of carbon , sulphur and nitrogen produced form burning and

smelling operations on a small or large scale in houses, engines and factories would re-enter the lithosphere through rain. Being highly acidic, this water gets the name acid rain. Unless degraded, it would come back to the earth. The hazards of the acid rain on soil, water and life are tremendous.

(iv) Water Pollution

Nearly all areas of the world have water pollution problems; about one billion people (20 percent of the world's population) do not have soft drinking water, and the demand for potable water is increasing every day in highly populated countries like China and India.

Underground water is polluted by sewage and chemicals whether it is in the United States of America, the most technologically most advanced country, or in less advanced India. Some 25 percent of our water needs are met from wells and tanks. People living in cities do look upon water as an easily available material. They buy water when there is scarcity; government and private agencies have elaborate system of selling water in times of need. But urbanites tend to forget that this water comes from large lakes, tanks and rivers in rural areas. Drainage from agricultural lands, where chemical fertilisers, herbicides and pesticides are used, can pollute large sheets of water. In rural areas chemical pollution of water may not be acute unless those areas are in the vicinity of factories from where effluents flow into the river or seep through the soil to underground sources.

(v) Thermal Pollution

Another source of water pollution is heated water discharged from power plants into the rivers and the seas. Termed thermal pollution, this type of pollution can raise the temperature of water by a few degrees and thereby destroy fish and other aquatic life and upset the ecological balance of the area. The danger to aquatic life is heightened by oil spills caused by oil tankers involved in accidents.

(vi) Nuclear Wastes

Nuclear wastes dumped into the sea can similarly affect aquatic life and bring about ecological imbalances. Radio-active dust in the air sent up from nuclear explosions, tests and power plants reaches water supply sources through rainfall. It also reaches these sources via run offs from land surfaces during heavy rains.

Radio-active fall contaminates soil, plant and water life, thus affecting the entire eco-system of the planet.

(vii) Air Pollution

Air pollution is mostly caused by automobiles which release carbonmonoxide. Rapid industrialisation has also caused air pollution as tones of smoke is released from factories into air. Noise created by automobiles, factories and others also contribute to air pollution.

icebergs	→ Huge solid forms of ice which float in the sea
determent	→ deterioration
infra-red	→ invisible rays, below the red in the of spectrum
effluents	→ discharge of liquid waste matter, for example, from a factory to a river

INTEXT QUESTIONS 28.2

1. Name some polluting agents.
.....
.....
 2. How does the ozone layer get penetrated?
.....
.....
 3. What are effluents?
.....
.....
 4. Name some agents of air pollution.
.....
.....
-

28.5 GROWING AWARENESS ABOUT ENVIRONMENTAL PROTECTION

In the past two decades, environmental problems have attracted the attention of decision makers, scientists and even laymen in all countries. They are becoming increasingly conscious of issues such as : famines, droughts, floods, scarcity of fuel, firewood and fodder, pollution of air and water, problems of hazardous chemicals and radiation, depletion of natural resources, extinction of wildlife and dangers to flora and fauna, etc. People are now aware of the need to protect. The natural environmental resources of water, soil, plant life that constitute the natural capital on which man depends.

Between the Stockholm Conference of 1972 on Human Environment and the Rio-di-Janeiro Earth Summit of 1992 on Environment and Development, some of the developments have been summed up by a commentator. "An enormous upsurge in people's concern about the environment, the creation of environmental ministries in almost every country of the world, dozens of binding global and regional environmental treaties, the establishment of worldwide network to monitor and assess environmental degradation, concrete action to save the seas and manage fresh water, and slow down of ozone depletion and climate change"

Awareness is always a prerequisite for effective action. Action has varied from country to country. In many countries new pollution is more than off-setting the remedial measures against earlier pollution. The universal phenomenon of urbanisation is the worst source of environmental pollution. Together with the life-style in affluent countries, which tend to contribute much to the destruction of flora, fauna and essential elements for the wellbeing of man and nature.

28.6 SUSTAINABLE DEVELOPMENT

Sustainable development is an increasing concern of the late 20th century. Appropriate relationship and linkage between the eco-system and the economic system needs to be established. The economic models are to be based on the goal of sustainability rather than growth. Industrialisation has created an environmental holocaust. The chemical effluents

of industries, the flyash of thermal power stations, the disposal of nuclear fall-out, the use of fungicides, insecticides and rodenticides in crop land and warehouses and the use of chemical fertilizers have rendered modern agriculture prone to soil, water and air pollution.

Along with it a global approach of ecological economics has also emerged. Traditional economic analysis focused on productivity and growth. Ecological economists maintain that sustainability should be built into economic models and policies, and integrated into economic management. Better ways of measuring the environment as a "source of natural capital and sink for byproducts generated by man-made capital and other human activities are needed".

To date, there is no consistent system of integrated environmental and economic accounting for countries. The four distinct programme areas identified are-

- (a) Integrating environment and development at the policy, planning and management levels.
- (b) Providing effective legal and regulating framework.
- (c) Making effective use of economic instruments, market and other incentives.
- (d) Establishing systems for integrated environmental and economic accounting.

Holocaust	→ large scale destruction
Fungicides	→ Substance that kills fungus
Insecticides	→ medicine that kills insects
Herbicides	→ medicine that kills unwanted herbs
Rodenticides	→ medicine that kills animals which gnaw things with their strong front teeth, for example rats, squirrels or beaver.
Ecological Economics	→ Refers to a new study in economics which carefully chalks out the programme of sustainable development

28.7 NATIONAL AND INTERNATIONAL COMMITMENT TO THE PROTECTION OF ENVIRONMENT

The growing awareness about environmental protection has resulted in new measures across the world. The late Prime Minister Mrs. Indira Gandhi was the only Head of Government, attending the 1972 Stockholm Conference, which was called the "U.N. Conference on Human Environment". The Rio Conference 20 years later was called the "U.N. Conference on Environment and Development". It was Mrs. Gandhi who first pointed out that poverty was the greatest polluter and unless it was eliminated through national and international efforts it was futile to talk about protecting the planet from environmental disaster. It is, therefore, encouraging that the Agenda 21, the International document that had come out of the Rio conference is basically a charter for sustainable or greening development. UNDP, The World Bank and other institutions of the U.N. system are now advocating the elimination of poverty as the central task in sustainable development. Indeed environmental and developmental policies are seen as complementing each other. The conflict between the requirements of long-term environmental interests and the immediate compulsions of development are only superficial. Any world order to be sustainable cannot be based as three-fourths of its population living in poverty. Admit the affluence of the rest. Environmental rights and developmental rights together constitute the democratic and human rights of all the people of the world.

The International Conventions

The Montreal Convention, and the Conventions on Climate Change, Bio diversity and forests adopted at Rio are landmarks in the world movement for sustainable development and environmental protection. India has accepted these conventions and taking systematic measures to implement them. An environmental action programme funded by U.N.D.P. is under implementation. There are 31 schemes for industrial pollution control approved by the World Bank, involving investment of 105 million dollars. On the anvil are common effluent plants for small industries located in a cluster, the big plants being looked after individually. Seventeen grossly polluting industries have been identified for environment control within a time schedule. For certain categories of industries, prior environmental clearance is compulsory before they can be set up. In regard to transport pollution, apart from conservation measures, pollution free engines are being designed, some of which have already been introduced for two-wheelers, three-wheelers and some of the popular cars. A national Forestry plan assisted by FAO is in progress. Environmental brigades, afforestation brigades, and ecological task force have been organised by Non-government Organisations, NGOs. India's wild life conservation projects have met with remarkable success. India has a protected network of 75 national parks and 421 wild life sanctuaries. The Tiger project has been a great success. India also has an elaborate laws relating to the prevention of pollution of water, soil and air and a system of environmental audit of most industrial projects. While this is voluntary for most countries, India has a mandatory rule in this regard. India is also engaged in a serious and systematic effort to develop alternative and renewable sources of energy like solar, wind and wave energy which are environment friendly. Emphasis is laid on solar energy on which some significant technological progress has been made. India is taking all these measures partially with international assistance.

28.8 Some measures taken by Indian Government to check Environmental pollution

- 1) **Environmental courts** : Special courts are being set up to ensure speedy justice of the poor against factories that pollute the environment.
- 2) **Environment Friendly Products** : The government is setting stringent standards for all products in the market. Those which meet these standards of production and performance will be given the label of excellence, like the ISI mark etc.
- 3) **Deleading of Petrol** : Refineries are being persuaded to make their petrol leadfree. Indian petrol has the highest lead content which creates major pollution through automobiles.
- 4) **Ban on Harmful Pesticides** : Eight chemical pesticides, of which DDT, BHC, Aldrin and Malathion are the main criminals, have been isolated. There are now plans to replace them with safe biopesticides.
- 5) **National waste Management Council** : The main task is to converting 40 million tonnes of flyash, that lie in the mountains near thermal power plants, into bricks, city garbage into energy, sewage into fertiliser.
- 6) **Public Liability Insurance** : This makes it mandatory for all companies in which a toxic leak takes place to take out a public liability insurance to be paid in 48 hours.
- 7) **Pollution by Motor vehicles** : Anti-pollution measures against motor vehicles are being strictly enforced. Vehicles not adhering to the standards prescribed are fined heavily and may even be asked to be off the road.
- 8) **Hotel near Sea Shore** : Action has been taken against a large number of hotels which encroach beaches in flagrant violation of laws.

9) **National River Action Plan** : The proposal is to set up a National River Authority which will plan policy for water use and waste water management at the national level.

10) **Solar Energy commission** : Since the energy sector is the major polluter, the idea is to create decentralised energy at the village level, instead of multiplying the mainstream producer.

11) **No Smoking in Public Places** : A ban is proposed on smoking in public places. The Delhi Government has taken a lead in this direction.

WHAT YOU HAVE LEARNT

- Environment is the surrounding we live in.
- Unplanned human activities cause environmental degradation which disturb the entire ecological cycle.
- Sustainable development is a concept which says that development should be environment oriented, i.e., it should be such that it does not harm natural order.
- Sustainable development stresses the need to redefine the existing economic → approaches.
- Different pollutants such as carbon dioxide, carbon monoxide, pesticides, sewage, smoke, noise cause environmental degradation.
- Human consciousness is now growing to conserve the nature. to conserve or to perish has become the slogan of the hour.
- The United Nations through its agencies is making all efforts to conserve the environment so that future generations do not face the consequences of what the present generation is doing.
- The India Government has also introduced laws and has taken measures which go on to promote environmental awareness and also helps in preserving the nature.

TERMINAL EXERCISE

1. Define environment?
2. What is sustainable development?
3. Explain the two types of environmental degradation?
4. Explain the role of the following in environmental degradation
 - (a) Role of ozone layer
 - (b) Role of carbon dioxide.
5. What is acid rain and Green House effect?
6. Outline the various efforts made by the Indian Government towards creating a better natural environment.

ANSWERS**KEY TO INTEXT QUESTIONS****28.1**

1. False
2. True
3. True
4. False
5. False

28.2

1. Chloro-fluorocarbons, effluents, noise of automobiles, factories, nuclear dumps, etc.
2. By chloro-fluorocarbons (oxidation)
3. Wastes from factories (liquid) which flow into river
4. Music systems, chimneys, automobiles.

HINTS TO TERMINAL EXERCISES

1. Refer to Introduction
2. Refer of Section 28.6
3. Refer to Section 28.3
4. Refer to Section 28.4 (i) and 28.4 (ii)
5. Refer to Section 28.4 (iii) and 28.4 (ii)
6. Refer to Section 28.8