UNIT 6: ENVIRONMENTAL DEGRADATION

UNIT STRUCTURE

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6.1 LEARNING OBJECTIVES

After going through this unit, you will be able to -

- explain the meaning of Environmental Degradation
- identify the different types of Environmental Degradation
- find out way to prevent of Environmental Degradation
- discuss the role of education for Environmental Awareness and Attitude Change

6.2 INTRODUCTION

This unit introduces you to the concept of environmental degradation, its types, causes and prevention of environmental degradation and the role of education in promoting environmental awareness and attitudal change. The basic question as to what are the factors that cause environmental degradation need to be explored first in order to create environmental awareness among the masses. Historically speaking, since the last century or so, there has been an alarming increase in human activities that cause

environmental degradation. Today, every aspect of our environment is endangered. The air we breathe, the water we drink and the land on which we grow our food all have been exposed to pollution causing large scale environmental degradation. To over-come the resultant environmental crisis the world is coming together to use technology and resources to repair the damage already done to our environment and also to propagate the use of substitutes in place of certain harmful chemicals so that we can protect and preserve our environment.

6.3 CONCEPT OF ENVIRONMENTAL DEGRADATION

Environmental degradation is a wider and comprehensive term which refers to the lowering and the deterioration of the quality of the environment caused by both natural processes and human activities at local, regional and global perspectives. Environmental pollution is a component of the degradation that means an over-all lowering of the environmental qualities because of the adverse changes brought about by human activities. Environmental degradation is further complicated by rapid increase in population. The quick growth of urban population in the industrially developed cities has resulted in the pollution of air, water, and sound. It has now created a situation where air is unfit for breathing, water is unfit for drinking, and the soil is unfit for cultivation.

Thus, the present population explosion and industrial growth along with pollution have combined to cause large scale environmental degradation in the form of pollution of the natural resources. This pollution is largely a man made problem particularly in the developing countries of the world. Degradation of environment may result from human activities as well as natural disasters.



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Environmental pollution and environmental degradation are used interchangeably by most people but in reality these are two different concepts and have different meanings. Both environmental pollution and environmental degradation are concerned with the lowering of the quality of the environment. Environmental pollution means lowering of the quality of the environment at local level caused by human activities for exploitation of resources. On the other hand, environmental degradation means deteriorating the environmental quality at the global, regional and local level by natural processes as well as human activities.



CHECK YOUR PROGRESS

Q1. Explain the term 'Environmental degradation' Write within 50 words.

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Q2. Give the differences between environmental pollution and environmental degradation.

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6.3.1 Types of Environmental Degradation

Environmental degradation is divided into two main categories on the basis of the factors responsible for the lowering of the quality of the environment. These are-

(a) Hazards and events

(b) Environmental pollution

Environmental hazards are those extreme events caused by natural process or man's activities which exceed the tolerable magnitude within or beyond certain time limits which make adjustment difficult and result in the loss of property and lives.

Environmental pollution can be defined as any undesirable change in the physical, chemical or biological characteristics of any component of the environment (air, water, soil) which can cause harmful effects on various forms of life or property. The main types of pollution are - air- pollution, water-pollution, soil pollution etc.

6.3.2 Causes of Environmental Degradation

We know that environmental and ecological changes are the result of the changes brought about by science and technology in human life. With the advent of socio-economic, scientific and technological development there has been the serious problem of environmental degradation. In general, the causes of environmental degradation may be divided into two- physical or natural and human actions.

Physical or Natural: Environmental degradation is caused by certain natural phenomena. Some of these are as follows:

- **Soil Erosion:** The loss of soil or disturbance of the soil structure is called soil erosion. Soil erosion causes uprooting of plants resulting in deforestation, loss of pastures, expansion of deserts and increase in the frequency of droughts and floods. It also causes soil creep, earth flow, mudflow, landslides etc.
- **Earthquakes:** Earthquakes are tremors which are produced by the passage of vibratory waves through the rocks. The devastations caused by earthquakes to the life of man and property as well as to the ecosystem is very high. Earthquakes also lead to landslides, change in the course of rivers, loss of plants and animal life, destruction of dams and development of faults and fractures on earth's surface.

- **Volcanoes:** A volcanic explosion is an environmental hazard of the severest type, causing heavy loss to plant and animal life. It can also cause major hazards to people who live near them. Large plumes of ash and gas ejected high into the atmosphere can influence climate, sometimes on a global scale.
- **Floods, droughts and famines:** Floods and droughts are natural hazards related with rainfall. Calamities like floods and droughts pose a serious problem to the whole environmental setup of a region. Floods cause accelerated erosional, transportational and depositional activities of the river with the consequent effects on soil. Drought is also a natural hazard which has its impact on the regional ecosystem. Generally, the areas getting rainfall which is too less to support agricultural production are usually called drought prone areas. When droughts become severe they cause famines, which have devastating effects on men, animals and also on the environment.
- **Desertification:** Desertification is a process through which fertile or non-desertic land is converted into dry, infertile or desertic land. Desertification leads to conversion of irrigated croplands to desert like condition in which agricultural productivity significantly falls. It is characterised by severe ecological degradation with the loss of vegetation cover, loss of bio-diversity, depletion of ground water, salinity and severe soil erosion.
- **Tropical Cyclones, Thunder Storms and Tornadoes:** Tropical Cyclones are the most powerful and destructive types of cyclonic storms. It destroys life and property as well as forests and animals. It is also responsible for changes in atmospheric and environmental conditions. A thunderstorm is an intense local storm caused by strong conventional activity. Thunder and lightning normally accompany the storm and rainfall and sometimes lead to cloud burst also. A tornado is a small intense

cyclone in which the air spirals at a tremendous speed. A tornado moves with a wind speed of upto 400 Km per hour in a funnel like shape. The end of the funnel cloud may alternatively sweep the ground, causing complete destruction of anything in its path.

Environmental Degradation due to human actions: Man has created an imbalance in the environment by exploiting it haphazardly to fulfill his needs. Thus, some of the important human factors which lead to environmental degradation are as follows:

- **Overpopulation:** The root cause for the change in the environment is the explosion of human population. Phenomenal increase in human population and the consequent increase in the use of fossil fuel and deforestation have resulted in the increase in green house gases such as carbon dioxide. Growing population has also adverse effects on human health and quality of life.
- **Industrialization:** Industrialization has led to rapid deforestation, unorganised mining, pollution etc. It has created disturbance in the eco-sensitive areas like ozone layer, tropical forests, and led to the extinction of several species of wildlife birds and plants. Industrialization produces a variety of pollutants such as gases, smoke, oil, plastic metallic waste, and acids etc which degrade the environment.
- **Urbanization:** Industrialization leads to the mushrooming of cities all over the world. Industries are mainly centralised in the urban areas and the attraction of job opportunities encourage migration of the rural population to the cities. It results in the growth of slums in the urban areas and highly productive agricultural land is encroached by urban houses, roads and industries. On the environment side, urban centers concentrate on much of the world's pollution and green house gas emissions. Thus, unplanned urbanization leads to degradation

of human health and the quality of the environment, contributing to social, ecological and economic instability in many countries of the world.

- **Deforestation:** Deforestation has brought about environmental disaster. The disaster includes increased carbon dioxide content in the atmosphere which has affected the increase of green house, soil erosion, change in the climate, increasing green house effect, flood, drought etc. It also leads to loss of the habitats of wild life and loss of valuable species including medicinal plants.
- **Mining activities:** Large scale mining operation is responsible for environmental degradation. Mining leads to large scale destruction of natural vegetation and wildlife which creates ecological problems. It may also cause respiratory diseases among the workers as well as among the residents of the nearby areas.
- **Use of Pesticides:** The excessive use of chemical fertilizers and pesticides has resulted in the degradation of the environment which poses a threat to human health. High doses of these highly toxic insecticides not only affect other forms of life, but ultimately find their way in man through ecological cycles.

6.3.3 Prevention of Environmental Degradation

Prevention of environmental degradation should be the foremost priority. Certain natural phenomena like earth quakes, soil erosion, droughts, floods, landslides can cause environmental degradation. Effective measures need to be taken up urgently to prevent and control air pollution, water pollution, soil pollution, noise pollution etc.

Air Pollution: It is very essential to control air pollution. Efforts should be made to minimise air pollution as much as possible. Some of the techniques by which air pollution can be minimised are-

- Vehicular pollution is a common feature in the towns and cities. Proper and regular tuning of the vehicles should be done. Car pool concept should be introduced and is to be followed in practice by the car owners.
- Using low sulphur coal in industries.
- Use of organic manure instead of commercial fertilizer.
- Using non-conventional sources of energy.
- Planting of more trees, consumption of electricity should be reduced.

Water Pollution: Controlling water pollution is what some easier than controlling air pollution. Water pollution can be prevented and controlled by adopting several remedial measures. They may be mentioned below -

- Proper drainage system should be provided for separate flow of sewage water and rain water.
- Water control act may be adopted by the concerned authority.
- Agro-chemicals like pesticides and fertilizers should be reasonably and judiciously used in agriculture.
- Use of fertilizer in agriculture may be supplemented by nitrogen fixing plants.
- Polluted water may also be purified by using solar power.
- Pollutants present in water may be removed by using the method of water purification.

Soil Pollution: Survival and growth of the living organisms basically depend upon the equality of the land and soil. To check soil pollution and to improve the quality of soil the following steps may be taken -

- Farmers should be trained in the appropriate use of the fertilizer chemicals.
- Bio-gas may be produced from the organic waste products.
- Soil erosion by irresponsible cutting of hilly areas should be stopped by making laws.
- Use of DDT as insecticides should be restricted.

- Industrial water products and garbages of the urban areas should be properly disposed.

Noise Pollution: Noise or sound created in the environment may also be a state of pollution that causes physical and psychological harm. The following steps may be suggested for effective control of noise pollution:

- Noise pollution has been included under the Air Pollution Act to taking its legal step.
- Planting more trees having broad branches along the high ways, Streets and noisy places will act as effective noise barriers.
- Sound absorbing devices may be used to control noise in the residential areas and in the industries.
- Noisy and heavy vehicles should not be allowed near hospitals, schools, etc.
- Proper oiling of machines.

Solid Waste Pollution: Increasing use of the industrial goods and maintaining high Standards of living by the people have at present given rise to the problem of solid waste Substance pollution. This emerging problem of solid waste in the city life may be solved to some extent by adopting the following measures:

- Organic waste may be transformed into bio-gas.
- Re-cycling or re-processing of the materials into useful products.
- Burning the products on the spot.
- Garbages may be used for filling the marshy land and low land areas of the cities.

Radio-Active or Nuclear Pollution: There are certain poisonous nuclear substances that cause harmful effect on the living organisms of the environment. These radio-active substances are produced from human sources like nuclear war, nuclear power plants, x-rays etc. Atomic power experimentation and explosion in the land and have to be stopped by the world organization in the international context. For this purpose, Atomic Energy Act has already been

passed in 1962. It may take certain effective steps to stop nuclear pollution. They may be mentioned below:

- Atomic energy should be used for peace and economic progress rather than for war and destruction.
- Waste products of the laboratory that contain radio-active elements should be properly disposed.
- Site of the nuclear power plans should be carefully selected.
- Awareness should be created on the global level with regard to these nuclear pollution and its possible danger.

Environmental degradation due to physical or natural factors: There are some physical or natural causes of environmental degradation such as earthquakes, floods etc. Earthquake is a natural hazard which causes great loss to life and property. Damage to life and property can be prevented by constructing earthquake resistant buildings in the earth quake prone-zones. Assam type houses are preferable in Assam as the state is located in the seismic Zone.

It is difficult to prevent and control landslides. The first step to prevent landslides is to stop deforestation. It can be minimised by stabilising the slope by draining the surface and sub-surface water and by providing slope support like wired stone blocks.

One can not entirely get rid of floods as it is a natural phenomenon. But, the impact of floods can be minimized by means of technological skill, better warning systems and various control measures adopted by the Governments.

Human action: The rapid rate of population growth, industrial expansion unplanned urbanization, agricultural development, deforestation etc. are continuously accelerating the frequency and magnitude of natural hazards and disasters. The quality of the environment should be maintained through environmental planning, people's participation, environmental status evaluation and environmental legislation and administration. Some atmospheric hazards are caused by human activities such as dams, deforestation

etc. To avoid these atmosphere hazards, alternatives plans and projects may be introduced.

The Educational Management Plan tries to maintain the quality of environment by:

- Safeguarding and preventing environmental impacts.
- Making contingency plans for dealing with accidents or disasters.
- Planning for rehabilitation of projects.
- Monitoring and feedback mechanisms on implementation of necessary safeguards.

In the prevention of environmental degradation, education can play a significant role.

- Education must provide information about the occurrence of the extreme events and disasters through the various media well in advance so that everyone can be mentally prepared and can plan for their protection.
- Education should be able to train the administrators and policy makers to handle the situation created by a disaster by providing detailed maps of the problem area.
- Education can help in explaining the techniques and measures of immediate relief for the reduction of disasters.
- With the help of education one can learn about safety rules of building construction to reduce the causalities created by natural hazards.



LET US KNOW

- Environmental degradation is divided into two main categories. These are hazards and Environmental pollution.
- Human beings can make judicious use of natural resources like

petroleum products and form small groups and adopt 'car pool' methods of transportation.

- Re-use of water should be practised if possible. For example, waste water from the kitchen may be used to water the kitchen garden.
- Population growth should be checked to prevent the environmental degradation.
- The quality of the environment should be maintained through environmental planning, people's participation, environmental status, and environmental legislation and administration.



CHECK YOUR PROGRESS

Q3. Mention the different types of environmental degradation.

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Q4. Mention briefly the cause of environmental degradation.

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Q5. Mention any four ways of controlling air pollution.

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Q6. What measures can be taken to prevent soil pollution?

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ACTIVITY 6.1

"Over population and environmental degradation are inter-related" -Explain.

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6.3.4 Role of Education for Environmental Awareness and Attitude Change

Education can be used as the powerful instrument of social change, social control and development in the modern society. The problem of environmental degradation in the form of environmental pollution is largely being caused by man-made sources. As such, it can be controlled and regulated to a great extent through educating people to exhibit responsible behaviour towards the environment. Some of the measures to be taken in this regard are as follows :

- Creation of environmental awareness, developing concern for the problems of environment, developing values and attitudes are some of the initial steps education may take in order to develop responsible behaviour towards the environment.
- Education should provide and arouse awareness about the hazards and disasters among the general public and train the administrators and policy makers to handle the situation created by a disaster by providing detailed maps of the problem area.
- Environmental awareness through education can be provided to all sections of the society through formal and informal agencies. Environmental education must be imparted to the students' right from the early childhood.
- Environmental issues may be incorporated with almost all branches of knowledge.
- Both the interdisciplinary and multi-disciplinary approaches of education may be employed in order to provide environmental education. In the multi-disciplinary approach, important environmental concepts are infused into existing discipline or subjects. These approaches may integrate the knowledge, attitudes, skills and commitment that will result in informed decisions, responsible behaviour and constructive actions.

- Degradation of nature in the form of air, water and land pollution and energy crisis are owing to the problem of human population explosion. So, environmental education should be designed and organised in the context of controlling population through education.
- Environmental education aims at creating mass awareness among the people. For this purpose seminar, group discussion, study circle etc. should be organized on the local, regional, national and even international level.

Education is a potent medium through which human beings can express their fullest potential. It is of critical importance for changing the attitude and behaviour towards sustainability and responsibility. Both formal and informal education is necessary for empowering people so that they bear their responsibility towards environment and to address their concerns about sustainable development. It is also crucial for developing environmental awareness, attitudes and values, skills and behaviour required for sustainable development and for participating in and influencing the decision making process.



LET US KNOW

- Education in all its form is essential for fostering responsible environmental awareness amongst the people. Some measures can be adopted through education for providing awareness and developing the right type of attitudes and values towards the environment-

  - Environmental education is to be introduced in all educational institutions.
  - Interdisciplinary approach is needed.

- Environmental issues may be incorporated with almost all branches of knowledge.
- Population Education should be introduced.
- Mass awareness programme should be taken up.



CHECK YOUR PROGRESS

Q7: Mention in 3 to 4 sentences the role of education in fostering responsible environmental awareness in the people.

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6.4 LET US SUM UP

- Environmental degradation may be defined as continuous wearing out of environment or deterioration of environment due to continuous overexploitation and excessive dependence on its resources.
- Degradation of environment may result from human activities as well as natural disasters.
- Environmental pollution means lowering of the quality of environment as well as the deterioration of the quality of environment at the local level caused by human activities and exploitation of resources.
- Environmental degradation is divided into two main categories such as – Hazards and events, environmental pollution.
- Degradation of the environment may be caused by various factors including - air pollution, water pollution, soil pollution, population explosion, urbanization etc.