

Human Environment

By: Dheeraj

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Sample Preview of The Chapter

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HUMAN ENVIRONMENT

ENVIRONMENT

Introduction to Human Environment



INTRODUCTION

The surrounding in which we live is called our environment. There are different kinds of surroundings on earth. The earth's physical environment provides favourable conditions for the existence and growth of different life forms which constitute the biological environment. The physical and biological environments exist in a symbiotic relationship and form a stable self-perpetuating system. Gradually, the evolution of man has given rise to a new type of environment, the man-made environment. Since man is a social animal, the socio-cultural environment also plays an important role in his life. Thus, this chapter explains three types of environments—natural, man-made and social environment. We may note that the environment is constantly changing and this affects life on earth. Some of these effects can be lasting and irreversible. Therefore, we should be concerned about environment. Two case studies, namely, Bhopal disaster and Chernobyl accident have been presented to show the consequences of environmental mismanagement.

CHAPTER AT A GLANCE

WHAT IS ENVIRONMENT?

The natural environment may be defined as specific surroundings or medium with which a living organism continuously interacts, and to which it is fully adapted. Thus, it includes broad aspects of landscape like soil, water, desert or mountains. In this sense, environment is the sum total of living and non-living components; influences and events surrounding an organism. While living components are called biotic components, non-living are called abiotic components or parts. Since no organism can live alone without interacting with other organisms, therefore, each has other organisms as a necessary part of its environment. It is a fact that all animals dependent upon green plants, directly or indirectly. Similarly, plants also depend on

animals like for pollination of flowers and dispersal of seeds or fruits. For instance, take the case of a pond. The abiotic components in the pond's environments are light, temperature and water in which nutrients, oxygen, other gases and organic matter are dissolved, while the biotic components include microscopic as well as larger plants and animals. Let us consider the case of fish in this pond. Here, the living and non-living constituents in the pond would make the environment of the fish. This may be called the external environment. However, there is another environment within the body of fish, its internal environment.

Natural Environment and its Components

There are many components in environment but they may be divided into two categories, namely, abiotic and biotic. Only a few kilometres above and below the surface of the earth supports life. This life supporting area is called the biosphere which includes four major habitats: marine, estuarine, fresh water and terrestrial. These four habitats have sub-types, which have a typical set of physical and biological features and form different ecosystems which are natural units of biosphere. The main abiotic components of an ecosystem include climatic factors like temperature, wind, water currents, rainfall or physical factors such as light, air pressure, etc. and chemical factors like oxygen, carbon dioxide, acidity and salinity. The totality of all living organisms and their organic by-products are the biotic factors in an eco-system.

Man-made Environment

There are several components of environment which are created by man and is hence called man-made environment. Let us consider an example of man in a city to understand this artificially created part of environment. Man himself has created the city environment himself. Here, water is not taken from streams directly but it is filtered and purified for drinking and other purposes. Food in cities often comes from rural areas. It is found that city

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atmosphere is generally more polluted than that of the rural areas due to factories, vehicles and power plants. Resources are continuously drawn from rural area for the cement and brick buildings. Energy consuming cars, buses, trains, etc. are used for transport. Thus, man has manipulated the environment for his convenience and luxury. We may observe that man-made environment often interferes with the natural environment bringing many changes.

Residential

A city, town or village is a form of human settlement each having a basic organization with its own social, economic and cultural aspects. Housing, water and sanitation, transport, communication, food, energy, education and health are the basic needs of these settlements. River banks used to provide some basic facilities for human settlement in the past. People mostly lived in rural areas while economy was agrarian. The growth of trade and commerce gave rise to cities and with the growth of population people started migrating towards towns and cities. Today, the most important cause for migration is rural poverty. It is true that people migrate to urban areas to better their prospects but the reality of life is harsh as many of them have to spend their entire life on pavements of city roads.

The residential and related facilities in rural and urban areas and the environment in which people live may be understood by the following discussion. Most of the rural people live in make-shift huts often infested with insects and pests. Open-air defecation, absence of water supply system and the sewer are other factors contribute to bad condition of life in rural areas. However, the atmosphere in the countryside is not polluted because of the absence of heavy traffic, factories, mills etc. In urban areas, population growth and migration of the poor from small towns and villages is a continuous process. Thus, our cities have become teeming hovels of dirt, disease and crime. Housing, especially in big cities, is the biggest problem. Moreover, the atmosphere is polluted by excessive traffic, factories, mills and smoke from the houses.

Work Place Including Agricultural Fields

Man's history began with all natural environments and man was a passive participant in the natural processes. However, the growth of agriculture and industry changed everything. Thus, buildings, roads, railways, cables for telecommunications, water-supply lines, sewers, and other infrastructures changed the environment. The living condition in developed countries is based on a high level of energy consumption and expensive transportation, while in developing countries most of the people are denied the essential urban amenities and services. It must be pointed out that if there is an undesirable change in physical, chemical or biological properties of air, land or water, it will always have harmful impact.

Let us consider how the crop yields have changed in India from earlier days. Today's agricultural production depends upon high inputs of energy and materials in the form of deep ploughing, fertilizers, irrigation, and use of

pesticides to protect the yield. An increase in yield has been registered but there is also an increase in pollution of soil and water, salinity and depletion of soil. It is important to note that intensive agriculture in the past led to disappearance of large agricultural civilizations leaving only desert, as in Sindh, Middle East, Abyssinia and Central America. Therefore, to sustain our agricultural production, proper and judicious use of available land acreage is necessary and soil fertility has to be increased through balanced use of synthetic fertilizers and organic manures and by avoiding soil erosion and loss of nutrients through maintenance of a vegetation cover.

Social Environment

Apart from abiotic and biotic factors, there is also another kind of environment called the social environment which plays an important role in man's living conditions. This social environment includes cultural norm and values. Political, economic and religious institutions often decide how the environmental resources will be utilized by people and hence put constraints on resource utilization. We can understand the social environment in terms of broad structural arrangements social structure which may be defined as the network of social institutions and groups. The human society needs at least an economic system and a system of communication which includes developing a language and also technology. Apart from these two, arrangements including family and education are also required. Moreover, a system of authority and power as well as a system of ritual are other important needs of the society. All these arrangements constitute social environment.

Family

Among the arrangements described above, family is one of the basic institutions. As a socio-cultural environment, it performs functions including reproduction of humans, socialization of children, transferring of cultural traditions from one generation to another, etc. Further, groups of families live together and form communities which could be classified on the basis of their occupation, religious faith, country, etc. In this sense, society can be called a group of interacting people who live in a specific geographical area sharing a common culture of their own.

Culture

Let us now define culture. It may be defined as the man-made part of the environment determining social environment and social action. It guides us to select a particular set of behaviour that is permitted to him by his biological heritage. Edward Tylor defines culture as that complex whole which includes knowledge, beliefs, arts, morals, law, customs and any other capabilities and habits acquired by man as a member of society. Economy is an important factor which determines how resources are acquired and used. Therefore, economic activity is directly related to one's survival and is in turn affected by the total cultural environment. Moreover, the legal system helps to regulate the social mores of society. Legislative measures

can also ensure a judicious and equitable distribution of land in society.

WHY SHOULD WE BE CONCERNED ABOUT THE ENVIRONMENT?

We must be concerned about our environment because our very existence depends on conservation of the environment. During the unprecedented economic progress of 19th and 20th centuries, the environmental and ecological awareness have been pushed into the background. Now, the whole world, especially the developing countries, faces a near-crisis situation—both economic and environmental. Regarding perception of environmental concerns, there are three types of responses. First argues that environmental concern is a conspiracy of the developed First World against progress in the Third World. The second perception holds strongly that all this non-sense about preserving the tiger and the aesthetic beauty of green belts is diverting the attention from the problems of the poor and that environment has nothing to do with trying to give a better deal to the large and ever-growing population. Finally, the third view holds that this very same large and ever-growing population is responsible for environmental crisis. These views show how little we know of eco-system and eco-balance. Thus, according to the first view, environmental concern is the business of rich countries which cause most of the pollution. Here, it may be noted that the mistake made by developed countries can be avoided if proper developmental strategies are worked out. Moreover, degradation of the environment is going to affect each of us irrespective of the country, region or area as was in the case of the Chernobyl disaster. Let us now take the second argument which would prefer development to improve the lot of the poor at the cost of environmental conservation. However, it is the poor who will get the worst of everything under this model as we had in Bhopal tragedy in which thousands of the poorest of poor people died. The third argument that population pressure leads to environmental degradation is an old one. We must note that the problem is not so much of the poor destroying the environment by their sheer numbers as they are deprived of their share in the distribution of resources. Thus, there are factors other than poverty and population which are responsible for the pollution of earth.

Let us now discuss environmental problems briefly. Basically, we have three-dimensional environmental problems—environmental pollution, ecological decay or destruction, and resource depletion. Many of these are irreversible. At present, the greatest pollutant is radioactive fallout from nuclear testing, nuclear plants and the long-term storage of nuclear materials, disposal of nuclear wastes and occasional nuclear accidents. Moreover, the increasing concentration of carbon dioxide in atmosphere due to large scale burning of fossil fuels, coal and petroleum, in modern industry and transport leading to a greenhouse effect has become an international concern. Aircraft exhausts and the Chloro-fluoro-Carbons (CFC)

used in aerosol sprays and refrigeration causing ozone layer depletion are other environmental concerns.

In addition to air pollution, land and water are being polluted by the large-scale use of pesticides and chemical fertilizers in both developed countries and developing countries. Large scale deforestation is another serious environmental and ecological problem causing floods, soil erosion, silting of rivers and eventually desertification.

Thus, development without concern for the environment can only be short-term development which in the long run can go on only at the cost of enormous human suffering, increased poverty and oppression. The Conferences of Human Environment organized by the United Nations Environment Programmes show the environmental concern at the world level. India is an active member and also an original signatory to the protocol adopted at the UN Conference, 1972. The India's concern towards environment is also reflected in Articles 48A and 51A of the Constitution.

POTENTIAL HAZARDS OF CARELESSNESS IN DEVELOPMENTAL ACTIVITIES

The real concern about the negative aspect of industrialization and the growing danger of resulting environmental pollution is lacking in India. It has been explained that extensive industrialization, use of chemicals and fertilizers for agriculture and high energy input technologies are a potential risk to the environment. Similarly, overconsumption and wasteful use of resources by the developed nations and the privileged strata in the developing world pose another kind of threat to the environment. But, global problems created by inequitable development go far deeper. Thus, while acid rain and ozone layer depletion are indicators of a slow poisoning of the environment, Bhopal tragedy and Chernobyl accidents are examples of increasing catastrophic hazards as discussed below.

Bhopal Tragedy

The Union Carbide in Bhopal provided jobs and money for people and saving of foreign exchange for the country. However, the MIC plant was troublesome from the very first year and there were several leakages, light and heavy, until the disaster.

The Fateful Night at Bhopal

Officially, it is not known exactly what happened in the Union Carbide factory on the night of 3rd December, 1984. However, press reports have come up with the following sequence of events.

Methyl Isocyanide or MIC stored in three double-walled, partly buried stainless steel tanks which were supposed to be kept at 0°C by cooling but the cooling machines had been out of order for quite some time. Early that night, pressure was increasing in one of the tanks from which the MIC finally escaped. But nothing was done about it. For approximately two hours, the safety valve remained open. Moreover, the safety mechanism for burning off MIC in case of an accident and thus rendering it harmless also did not work. The MIC and other poisonous

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gases surged past into the atmosphere, got condensed with cold air and aided by atmospheric inversion settled down slowly on the ground starting the tragedy of Bhopal.

What Caused the Violent Reaction that Night?

MIC gas can react with almost any chemical, including itself, generating substantial quantities of heat and carbon dioxide. The longer the MIC sits in storage tanks, the greater is the chance of side-reactions building up to a runaway reaction. The MIC at the Bhopal plant had been 'sitting' in the storage tank since October, 1983. According to the Carbide's report, it was a unique combination of large amount of water higher than the normal amount of chloroform in the stored MIC which was several per cent instead of a maximum of 0.5 per cent and an iron catalyst resulting from the corroded tank, that led to the violent reaction in MIC, stored at a higher temperature than specified. However, Dr. S. Varadarajan's team, investigating on behalf of the Indian Government, has given a different explanation. They point out that even small quantities of water probably as little as two to three litres, could have reacted with phosgene in the tank. Phosgene is mixed with MIC to keep it stable during storage. The phosgene-water reaction produced heat, carbon dioxide and hydrochloric acid. For the polymerisation of MIC, the heat and hydrochloric acid acted as accelerators. This led to a runaway reaction of MIC.

The Death Toll

It is still not clear as to exactly how many people died in the Bhopal tragedy. By the end of January, 1985, over 2,500 were counted dead and over 1,00,000 injured with irreparable damage to a high percentage of them. However, many believe that even the unofficial figures are not true. According to a UNICEF official, death toll may have been as high as 10,000. It may be noted that those who died were the poorest, living near the factory.

Issues after Bhopal

We have been confronted with a number of questions after the Bhopal disaster relating to the location of other hazardous plants in India, so many people living so close to the plant in Bhopal, about developing a policy for hazardous factories, multinationals operating with lower standards for health and safety in their Third World plants, etc. Here, we may also consider that a number of pesticides and drugs banned or heavily restricted elsewhere are being knowingly imported or manufactured in India. For instance, Polychlorinated Biphenyls (PCBs) are extensively used as pesticides. Moreover, choice of technology is another factor. For example, many companies manufacture carbaryl without MIC. Further, multinational corporations have repeatedly exported banned drugs and pesticides and even entire factories to the third world raising a question about their behaviour. Even after such a long time since the Bhopal tragedy, the government has still not taken any steps to prevent the recurrence of Bhopal-type disasters or developing any emergency response system to industrial disasters.

Chernobyl Accident

Chernobyl accident has aroused doubt about the nuclear industry since the severe problem from the damaged reactor has shaken the confidence of even staunch supporters of nuclear energy.

What Happened at Chernobyl?

The accident was caused during the test of a reactor while the safety systems were disconnected and safety procedures were not followed and the reactor became unstable. As the fuel rods overheated, ruptured and turned cooling water into steam so rapidly and perhaps generating explosive gases, the 1000 ton top of the reactor was blown off. Further, the uranium continued to fission, air was sucked in, and smoke, gases and radioactive particles were released into the atmosphere. Clouds of the dark and dangerous radiation affected a vast European population. Both long as well as short-term ill-effects have been pointed out as a result of the Chernobyl radiation. It is true that only 31 people have been reported to have died as a direct result of the initial explosion during the first few months, the estimate of people likely to be affected varies from a few thousands to more than a million. The radiation is supposed to go down to safe limits in four years.

Issues after Chernobyl Accident

The anti-nuclear group argues that nuclear power is too demanding a technology for fallible human beings. Similarly, it poses a threat to human beings due to nuclear proliferation and burnt up waste. Therefore, it will be increasingly difficult to justify the cause of nuclear power as a future source of energy. Therefore, the real answer to the greater demands for energy needed for development may be found in the 'cleaner' non-conventional sources such as solar and other energy sources.

SELF-ASSESSMENT QUESTIONS

Q. 1. List abiotic and biotic factors of the environment in which you are living.

Ans. In a village, following abiotic and biotic factors of the environment may exist. Abiotic factors include radiation, energy, fire, gravity, average temperature; rainfall and humidity; atmospheric quality; availability and kind of water-soft or hard; altitude and topography-hilly, plain or coastal; fertile, infertile, excessively saline quality of soil. The biotic factors may include different kind of plants and animals; the people of the area; scavengers and microbes including decomposers and so on and so forth.

Q. 2. Write briefly on the statement "We should be concerned about our environment".

Ans. We should be concerned about our environment as our very existence depends on conservation of the environment. The economic progress of 19th and 20th centuries has pushed the environmental and ecological awareness into the background. Today, the entire world, especially the developing countries, faces a near-crisis situation—both economic and environmental. The mistake made by developed countries can be avoided keeping in