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Air is one of the most important constituents of the environment. It is calculated that a man breathes about 22000 times a day inhaling about 16 Kg of air by weight. Therefore, clean and pure air is necessary for survival and good health. But due to the Air Pollution our health and survival have been endangered. A complete definition of air pollution, according to India Air Prevention and Control of Pollution Act, 1981 is – “air pollution means any solid, liquid and gaseous substance (including noise) present in the atmosphere in such concentrations that may tend to be injurious to human beings or other living creatures or plants or property of environment.” Major pollutants of air are carbon compounds (CO<sub>2</sub>, CO) Carbon monoxide, Sulphur Compounds, Nitrogen Dioxide, Acid Rains, Oxygen difluoride (OF<sub>2</sub>), Mercury, lead, Green House Gases (GHG) and others (Agarwal, K. C., 1996, p. 264).

Industrialisation everywhere has polluted the air. Toxic fumes are emitted into the air from factories and transportation system. A large number of people become ill or die because of the toxic gases in the air they breathe. In 1984 an accidental release of toxic gas from an American owned chemical plant in Bhopal, killed more than two thousand people and injured more than two lakh.

#### 4.3.1.1 Airborne Lead

The story of airborne lead well establishes the connection between industrialisation and air pollution. Scientists estimate the amount of lead in the world's air by taking core samples of the ice in the Greenland icecap. From 800 BC to the beginning of Industrial Revolution around 1750, the amount of lead in the air was low. There was a major increase after 1750 and a massive increase after Second World War when the use of leaded gasoline rose sharply (Seitz, John, L., 1990, p. 120).

#### 4.3.1.2 Depletion of Ozone Layer

The ozone layer in the atmosphere protects the earth from harmful ultraviolet rays from the sun. That layer is now being reduced by Chloro fluorocarbons (CFC), used as a propellant in aerosol spray cans, as a fluid in refrigerators and air conditioners and for other industrial purposes, as exhaust gases from supersonic transport planes. Ozone may also be destroyed by gases which are released when nitrogen fertilizer is extensively used and when nuclear bombs are exploded. German scientists were the first to notice ozone holes in the Antarctica atmosphere. The British scientists in the mid 1980's discovered that the hole over the south pole was growing each year and in 1985 it was about the size equivalent to the area of the U.S.A. (Ibid., p. 123).

#### 4.3.1.3 The Green House Effect

The release of carbon dioxide (CO<sub>2</sub>) into the atmosphere from the burning of fossil fuels coal, oil and natural gas causes the warming of the earth's climate. Scientists agree that CO<sub>2</sub> has increased significantly since the Industrial Revolution, by about 15-25 per cent between 1800 and 1980 (Council on Environment Quality, 1981, p. 1). This increase will cause a warming of the earth's surface “the green house effect” since CO<sub>2</sub> in the atmosphere allows sunlight to reach the earth, but traps some of the earth's heat, preventing it from radiating back into space.

It is estimated that a doubling of the CO<sub>2</sub> level (anticipated in the middle of the next century) could lead to an average global warming of about five degrees Fahrenheit (Ibid.,

p.56). Though 5 degrees does not appear alarming, it would bring a significant climatic change. There would be major changes in the amount of rainfall and its location, with some areas getting more rainfall than at present and some less. Scientists are unable to predict reliably which areas would be hurt and which would gain, but there is speculation that the Central and Western U.S.A. would be seriously harmed by the climatic changes. India, the Middle East and some parts of Africa would have better climate for agriculture than they have now (Ibid., pp. 15-18).

Another possible effect is that the level of the seas might rise by as much as 15-25 feet especially if the West Antarctic ice sheet melts. Such a rising of water level could lead to the evacuation of many coastal cities around the world.

### **4.3.2 The Water Pollution**

Water, like air, is an indispensable and precious natural resource on this planet. But due to industrialisation, urbanisation and other development-related activities, resources of water (river, pond, lake, streams, and seas) have become highly polluted.

Development has tended to turn clean water into dirty water, as it has turned fresh air into dirty air. Water pollution of river take place from sewage produced by cities and wastes released by factories. During floods and heavy rains, huge amount of polluted water rushes into rivers and lakes and huge amount of water drain laden with pesticides, herbicides and excess fertilizers (UNI, The Hindustan Times, Patna edn. 26<sup>th</sup> August, 1995).

#### **4.3.2.1 Lack of Fresh Water**

Water is a renewable but finite resource. We are now using about half of the fresh water available on the planet. Many nations now have water shortages that threaten the health and economics of these nations.

In recent years the world has seen catastrophic damage and loss of life from an excess of water – monsoons, tsunamis and floods. Ironically, at the same time, “millions of people live without access to adequate or clean water, with little hope their situation will improve as the global water-shortage crisis escalates.” (IRIN, 2007)

“By 2050, as much as 40% of the world’s population may have to live in countries with insufficient freshwater stocks to meet the combined needs of agriculture, industry, and domestic use.” (GBN, 2007, p. 9). “Many major rivers now run dry during part of the year. Water withdrawal from lakes and rivers has doubled in the last 40 years. UN agencies estimate that without major changes, by 2050 more than 2 billion people will live in water scarce areas. Agriculture accounts for 70% of all human usage of fresh water” (Falk, Richard, 1975, p.108).

As populations grow and cities increase in size, industrial, agricultural and individual water demands are rising. According to the World Bank, world-wide demand for water is doubling every 21 years. However, population growth alone does not account for increased water demand. Since 1900, there has been a six-fold increase in water use for only a four-fold increase in population. This reflects greater water use associated with rising standards of living.

#### **4.3.2.2 Depletion of Wetlands**

Millions of species of plants, animals and other organisms enrich our environment.

Awareness of the importance of this biological diversity has grown in recent years along with concern that more effective action is needed to preserve it. There is urgency because destruction of ecosystems and species extinction entails irreversible losses. Ecological degradation of wetlands together with pollution has resulted in the loss of flora and fauna. The high amount of fertilizers and other inputs required in agriculture for increasing the productivity has led to the degradation of the environment. Coral reefs and mangroves are threatened by increasing discharge from industrial establishments along the coastal belt. The mangroves of Sunderbans delta have been reduced to half (Kumar, A. Biju, Science Reporter, December 1999, pp. 10-15).

Organic pollution of water is the most serious problem in most of the developing countries. There has been a marked increase in the surface water pollution caused by the use of Chemical fertilizers, pesticides, acid rain and excessive use of ground water and other natural resources (ARRO, Environmental Degradation and Its Implication on Rural Development, Report of International Workshop, Cairo, 1996).

#### **4.3.2.3 Ocean Pollution**

It has been estimated that the world's merchant ships dump 6,39,000 plastic containers into the seas everyday. On a large scale the world's oceans and seas are being affected by plastic nets and bags that kill sea birds and turtles. The oil leakages from the tankers also harm sea birds and fishes. There is also dumping of nuclear wastes in the sea.

#### **4.3.3 The Land Pollution**

Whenever development takes place, its effect on the land has had been profound. More natural resources from the land are required for the production of goods and services and their extraction disturbs the land greatly. But even more widespread are the changes to the land which come with the disposal of the goods after they are no longer of use and of the wastes which are created in the manufactures of the goods. Many of these wastes are artificial substances which never existed before in the nature. Besides bringing ugliness to the land, the wastes affect the health of the people who come into contact with them.

##### **4.3.3.1 Plastic Panacea**

The plastics industry is jumping on the "green" bandwagon with a new line of "environmentally safe" products. In reality, these products are no friend of the environment.

Plastics are synthetic substances produced by chemical reactions. Almost all plastics are made from petroleum, save a few experimental resins derived from corn and other organic substances. "Plastics" earned their name because they can be molded, cast, extruded or processed into a variety of forms, including solid objects, films and filaments. These properties arise from their molecular structure. Plastics are polymers, very long chain molecules that consist of subunits (monomers) linked together by chemical bonds. The monomers of petrochemical plastics are inorganic materials (such as styrene) and are therefore not biodegradable.

According to the Federal Environment Authority of Germany, the production of 50 thousand polythene bags releases 17 kg of sulphur dioxide. A study of F.A.C. revealed that the production of one tonne of synthetic fibre based on refined natural gases releases at least 13 kg of nitrogen oxide and 12 kg of sulphur dioxide. The production of one tonne of synthetic material leaves behind 5.5 tonnes of solid waste which further adds to pollution of air and water. The processing of plastic also causes emission of Monoxide,

Nitrogen and Hydro carbons in the air and toxic substances into the waste water (may be called “Plastic Pollution”) (Seitz, John, L., p. 122).

In 1989, the U.S. used over twelve billion pounds of plastic for packaging designed to be thrown away as soon as the package is opened. At present this figure is expected to nearly double. Fortunately, more and more people are becoming aware of the damage plastic does to the environment. They are speaking out against it, protesting irresponsible industries and getting laws passed banning polystyrene and other plastics but much remains to be done in terms of not using this material.

The plastic industry is fighting back, using advertisements to promote what they call “environmentally sound” plastic packaging and products. By comparing the breakdown of “degradable” plastics to the familiar, natural decay of living things, manufacturers imply that their products are not harmful and may even benefit the environment. In order to support their claims, plastic producers have used two techniques. The first technique involves linguistic manipulation. According to industry, a plastic product can be called “biodegradable” if a small amount of starch, a legitimately biodegradable material, is added to the plastic.

However, the plastic itself, which generally comprises over 90 percent of the material, is not biodegradable. Although so-called “biodegradable” plastic products typically contain chemicals that help them fragment, the additives do not render the plastic biodegradable.

The second technique is simply bad science. Manufacturers conclude from poorly designed tests that the actual plastic in a “degradable” plastic product is converted to fragments that can be consumed by microorganisms. Having examined data from actual tests of biodegradability, we only find evidence that plastics are not fully metabolised by micro-organisms. Therefore they are not legitimately entitled to the term “biodegradable” and may leave behind harmful fragments of plastic and plastic additives.

While the plastic industry promotes its new “environmentally friendly” products, they deliberately ignore the highly toxic nature of plastic production, whether the product is called “degradable,” “recyclable” or any other “green marketing” catchword.

Among the 47 chemical plants ranked highest in carcinogenic emissions by the Environmental Protection Agency (EPA), 35 are involved in plastic production. Certain plastics such as polyvinyl chloride (PVC), used for indoor and outdoor plumbing, electrical cables and countless other products, are potential sources of highly toxic dioxins when burned in municipal incinerators or in accidental fires. Polystyrene foam products are often made with chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs), both of which are ozone-destroying chemicals.

#### **4.3.3.2 Deforestation and Desertification**

Over the past several centuries the world’s forests have declined one fifth, from 5 to 4 billion hectares of areas. When forests are cleared, their capacity to withhold carbon dioxide from the atmosphere is lost. Due to vanishing of Flora and Fauna and deforestation, over 3000 plant species are endangered in our country. As useful medicines can be prepared from *Rauwolfia serpentina* (Sarpagandha), it has been intensively exploited and has become rare. The tuber of *Dioscorea deltoidea* commonly known as ‘kins’, used to cure rheumatic illness and ophthalmic problems, is facing extinction because of over-collection.

Development projects, construction of big dams, heavy industrialisation, urbanisation and growing population involve deforestation. Research into the mysterious collapse of the Mayan Civilisation in Central America suggests that an exponentially growing population may have put pressures on the environment which led to the collapse (Deevey, E. S., et. al., October 19, 1979, pp. 298-306 ).

Deforestation is a serious problem because it leads to erosion of the land, can cause the soil to harden and can lead to significant changes in the climate. These changes usually mean less rainfall. Sometimes deforestation leads to too much water in the wrong place. Now severe floods are occurring in our country, never witnessed before. It is believed that the destruction of forest cover in the Himalayas, is causing the flooding. The forest cover in the Himalayas which was estimated to be 60 per cent in beginning of this century, now has been reduced to around 12 per cent (Sabri, M. A., 1999, pp. 37-39).

#### **4.3.4 Noise Pollution and Electronic Pollution**

Due to auto horns and noise from loudspeakers, blood pressure and heart beats rise. This noise pollution impairs ear drums also. Radiation from T.V, V.C.R, Mobiles and other electronic gadgets not only affect the atmosphere and mind but also the health of the mankind.

#### **4.3.5 Thermo-Nuclear Pollution**

The greatest pollution today is radioactive fallout from nuclear testing or from storage and disposal of nuclear wastes. When in 1954, a Hydrogen bomb was tested by the United States in the pacific area, it caused widespread radiation sickness among a large number of Japanese fishermen and about 80 per cent of the children on the Island of Rongelap developed Thyroid growth of an intractable nature.<sup>33</sup> And as the tests continue (with the Chinese and the French still conducting them in atmosphere, underground nuclear explosion by India and Pakistan) an increasing number of children (born in the test areas), according to the noted British marine biologist, Arthur Bourne, are likely to die of cancer, and leukemia induced by radiation from them (Isachs, Ignancy, 1977, p. 281).

The testing of atomic weapons and the continued development of nuclear power even for peaceful uses (energy generation) adds on a global scale man made radio activity. Apart from this, the selective destruction of atomic weapons and also, the nuclear waste disposal causes greater problems to such an extent that the polar ice caps may melt and lead to massive flooding by the middle of this century, or even earlier.

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## **4.4 SUMMARY**

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The present social and ecological issues are a direct consequence of man's inability to rise to the level of understanding and responsibility as demanded by his new power role in the world. The problem is within man, not outside him, and so is any solution. Human beings will have to realise that a way of life that rapidly depletes the power of earth can only be called violent. Man's urgent task is to follow a non violent way of life that needs to be widened to combat human dealing with living nature around him and with the limited and finite resources of nature.

There is no other avenue but to explore his goals and values as much as he seeks the world to change. An unending commitment would ensure that man will survive without falling into a state of worthless existence. More and more people all over the world

should look for the ways to redirect ecological system “as if people mattered” (Schumacher, E.F., 1989, p. 139).

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## 4.5 TERMINAL QUESTIONS

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1. Discuss the various social problems India is facing today.
2. Discuss the different ecological issues that are affecting the mankind today.
3. What do you understand by pollution? What are its kinds and damages?

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## SUGGESTED READINGS

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