14

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GLOBAL ENVIRONMENTAL ISSUES

There is much to celebrate and appreciate about the world we live in. It includes our environment. However, mostly due to our actions we are altering the very environment, which sustains us. It would be very difficult for us to live in an unfriendly environment. This lesson exposes you to the various global environmental issues or concerns and possible strategies to cope with them.

OBJECTIVES

After completing this lesson, you will be able to:

- *identify and list major global environmental issues;*
- *define and correlate global warming with green house effect;*
- *enumerate the major effects of global warming on living and non-living components of the environment;*
- *briefly explain the causes of biodiversity loss;*
- *comment on major causes of desertification;*
- *explain the cause and effects of ozone-layer depletion;*
- *describe acid rain and its harmful effects on living organisms, buildings and monuments;*
- *identify the causes of oil spills and their impact on marine and terrestrial environment;*
- *state problems related to dumping of hazardous waste.*

14.1 MAJOR GLOBAL ENVIRONMENTAL ISSUES

Increased human activity, urbanization, industrialization have led to rapid deterioration of the environment. This has severely affected the life supporting system.

The developmental discrepancies in different regions of the world pose a serious threat to our common global environment. Consequently, we are confronted with complex environmental issues deserving attention. The important global environmental issues are:

- green house effect and global warming
- biodiversity loss
- desertification
- depletion of ozone layer
- acid rain
- oil spills
- dumping of hazardous wastes

14.2 GREEN HOUSE EFFECT AND GLOBAL WARMING

14.2.1 What is the green house effect?

The temperature surrounding the earth has been rising during the recent past. This is due to the 'green house effect'.

A green house is a glass chamber in which plants are grown to provide them warmth by trapping sun light. Sunlight (a form of energy) passes through the glass and it gets absorbed inside releasing heat radiations unlike sunlight, heat radiation can not escape through glass the heat generated there from, cannot escape out of the glass chamber. Thus, even on a cold winter day, the inside of a green house can become quite warm to support plant growth. The phenomenon of heat build up inside a glass chamber from the absorption of solar radiation is called **green house effect**.

But, you may well ask, where is the glass around the earth that prevents escaping of heat from the earth's surface. Look at the fig. 14.1 and trace the following sequence to understand the green house effect.

14.2.2 Global warming and green-house effect

The green-house effect is a natural phenomenon and has been occurring for millions of years on the earth. Life on the earth has been possible because of this natural green house effect which is due to water vapour and small particles of water present in the atmosphere. Together, these produce more than 95 percent of total green-house warming. Average global temperatures is maintained at about 15^0C due to natural green house effect. Without this phenomenon, average global temperatures might have been around -17^0 C and at such low temperature life would not be able to exist.

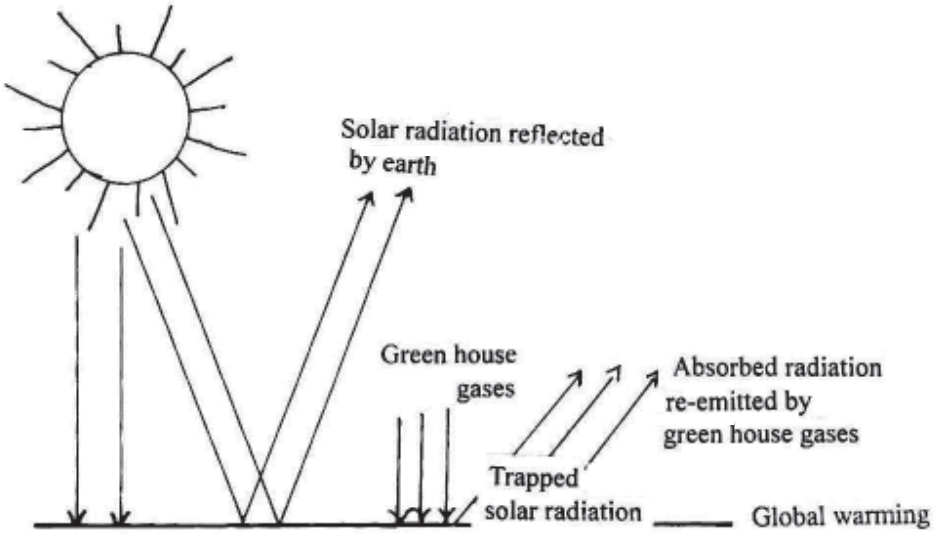


Fig. 14.1: *Solar radiations strike the earth. Some of these radiations are reflected back by the atmosphere into the space, but some pass through the atmosphere towards earth. About half of these are absorbed by the atmosphere and heat the air. The rest reaches the earth's surface. The earth's surface now heats up and gives off longer wavelength, lower energy (infra red or heat) radiations. These infra-red radiations pass back up into the atmosphere. Instead of being radiated 100 percent back into the space, much of it is absorbed by the atmosphere and are reradiated back to the earth's surface. The temperature near the earth's surface as well as that of the atmosphere then rises.*

Before industrialization, simple human activity did not cause any significant increase in the atmospheric temperature. What is particularly worrisome is the increase in the emission of green house gases due to urbanization and industrialization. These green house gases have increased significantly in the atmosphere in recent years. Some important green house gases and their major sources are listed in table 14.1.

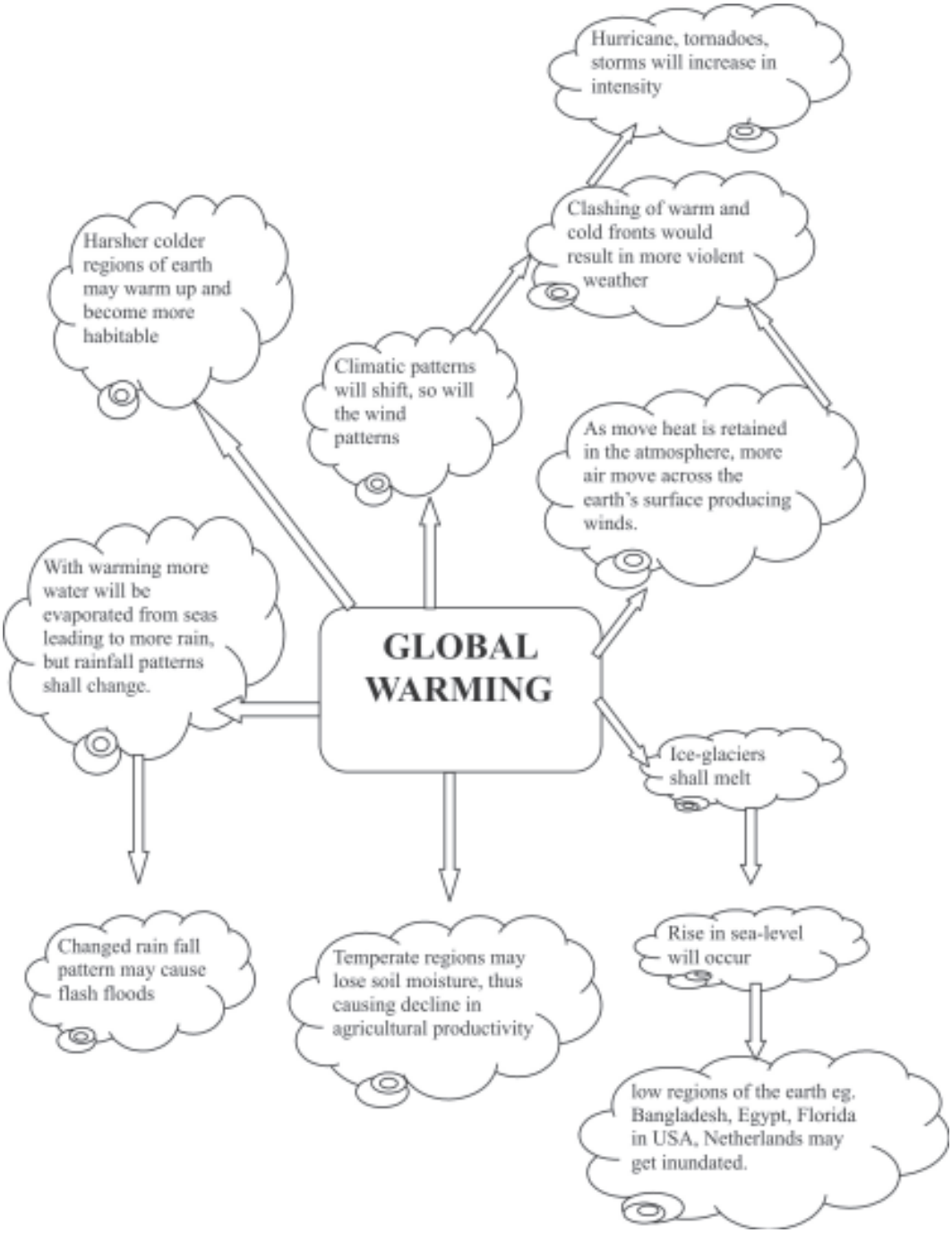
Table 14.1: *Greenhouse Gases: Their sources and Causes*

Gas	**Sources and Causes**
Carbon dioxide (CO_2)	Burning of fossil fuels, deforestation
Chlorofluorocarbons(CFCs)	Refrigeration, solvents, insulation foams, aero propellants, industrial and commercial uses
Methane (CH_4)	Growing paddy, excreta of cattle and other livestock, termites, burning of fossil fuel, wood, land fills.
Nitrogen oxides (N_2O)	Burning of fossil fuels, fertilizers; burning of wood and crop residue.

Global warming affects both living and non-living components of our planet.

Effect on climate

Observe the following diagram and both the effects of global warming:



14.2.3 Effect on living beings

- Increased CO_2 concentration in the atmosphere may increase photosynthetic productivity of plants. This in turn produces more organic matter. It may seem a positive effect. But, then-

- Weeds may proliferate rapidly, and that too at the expense of useful plants.
- Insects and other pests that feed on plants may also increase in number.
- Survival of other organisms gets affected.

14.2.4 Strategies to cope with greenhouse effect

We must take immediate steps to minimize global warming by reducing emission of green house gases especially carbon dioxides. Following steps would be useful in reducing emission/release of green house gases into the atmosphere:

- Increased fuel efficiency of power plants and vehicles;
- Development/implementation of solar energy/non-fossil fuel alternatives;
- Halting deforestation;
- Supporting and undertaking tree-planting (afforestation);
- Reduce air-pollution.(see table14.1)

INTEXT QUESTIONS 14.1

1. Why do you think environmental issues are of global significance?

   _____

2. Enumerate at least 3 environmental issues that confront us today.

   _____

3. Define global warming.

   _____

4. Why is green-house effect called so?

   _____

5. Which kind of radiations are not reflected back out of atmosphere causing green-house effect?

   _____

6. Name four green-house gases.

   _____

14.3 BIODIVERSITY

Plants and animals of a region constitute biodiversity. Biodiversity is a natural wealth essential for human survival.

14.3.1 Classification

Biodiversity could be classified as -

(a) **Species biodiversity**: It includes total number of different taxonomical or biological species. There are more than 200000 species in India of which several are confined to India (endemic).

(b) **Genetic biodiversity**: It includes land traces; horticultural varieties; cultivers, ecotypes (related types differing due to difference in the ecological condition); all within a biological species.

(c) **Ecosystem biodiversity**: It includes various biological zones, like lake, desert, coast, estuaries, wetlands, mangroves, coral reefs etc.

Both flora and fauna, all over the world are under an assault from a variety of indiscriminate human activities. These activities are often related to rapid growth of human population, deforestation, urbanization and industrialization.

14.3.2 Reasons for biodiversity loss

Rapid decline of biodiversity is a result of various causes.

(1) **Loss of habitat**: Due to the growing human population, wetlands are being made dry through landfills, as the demand for land increases. Natural forests are cleared for industry, agriculture, dams, habitation, recreational sports, etc. As a consequence-every plant and animal species occupying that ecosystem is temporarily or permanently affected. So are the migrating birds or other animals visiting that habitat.

Thus, the population of different species occupying that habitat become unsettled. An altered ecosystem causes changes in the neighbouring ecosystems.

(2) **Pollution**: Pollution also alters the habitat to such an extent that it becomes critical for survival of some of the species. For example, pollution that leads to green house effect results in global warming. All those species that are slow to adjust to the changed environment are eventually lost.

(3) **Overuse**: Whales for oil, fish for food, trees for wood, plants for medicines etc. are being removed by humans at higher rates than they can be replaced. Excessive cutting of trees, overgrazing, collection of fire-wood, hunting of wild animals for skin (for example tigers from reserve forests of India), ivory etc. all result in gradual loss of species.

(4) **Introduction of foreign species**: With growing volume of international travel accidental introduction of species into a new or foreign area has become easier. There are many species which have invaded new areas to which they were introduced unintentionally. Many of the new species introduced into new regions thrive at the expense of native species. For example: *Parthenium*, *Argemone* and *Lantana* are the common weeds of foreign origin in our country (Fig. 14.2).

Fig. 14.2: *Common foreign origin weeds of our country*

(5) **Environmental degradation**: A vast array of factors causing environmental degradation may result in the loss of biodiversity. Some of these factors are: global warming, increased CO_2 concentration in atmosphere, nuclear radiation; UV-exposure; oil spills, etc.

As an example, let us below, compile a combination of factors which results in the loss of marine biodiversity. (Fig. 14.3)

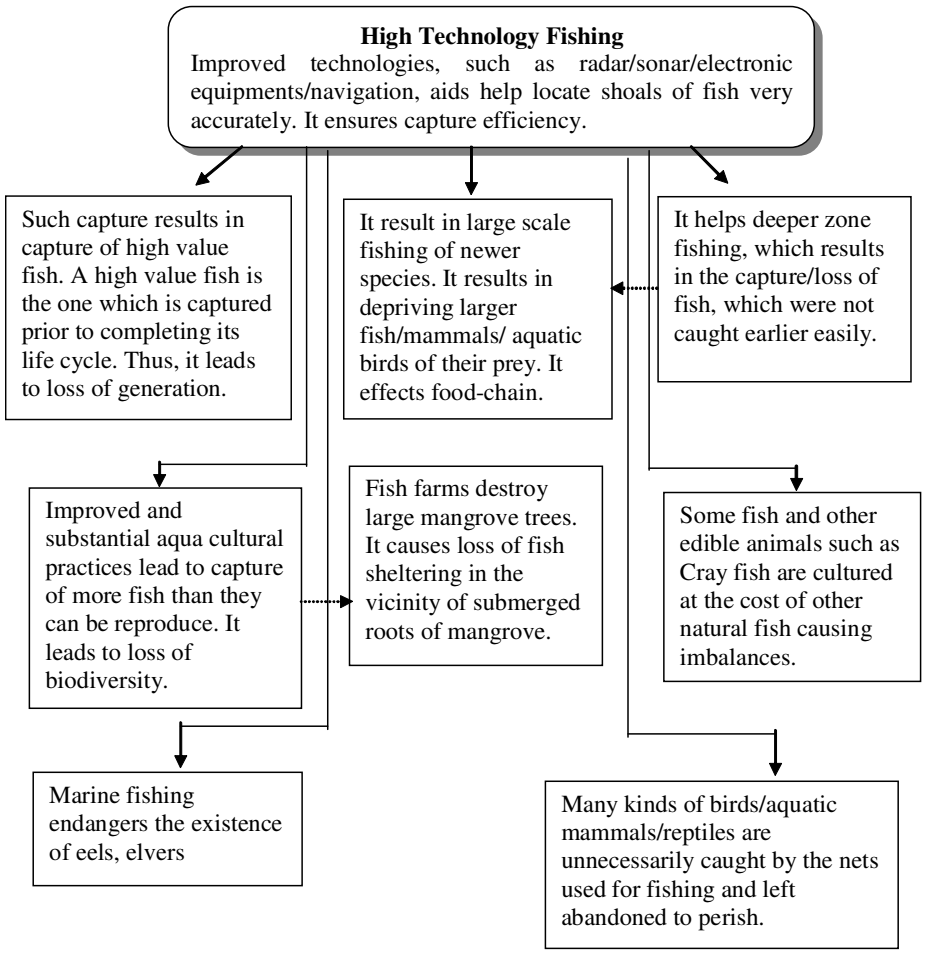


Fig. 14.3: *Loss of marine biodiversity*

Notes

14.4 DESERTIFICATION

As defined earlier (lesson no. 9) desertification is diminution or destruction of the biological potential of the land which ultimately leads to the formation of desert.

The land that has lost its productivity (ability to grow plants) is called a desert. A desert landscape supports a very limited growth of sparse vegetation and stunted growth of plants. Substantial part of earth's 132.4 million sq km of terrestrial area is facing desertification due to overexploitation and mismanage of land resources for human activities. Some of the principal causes, which promote desertification, are:

- over cultivation,
- overgrazing,
- deforestation, and
- salt accumulation due to irrigation.

(a) **Over Cultivation**

Every cycle of cultivation is preceded by ploughing to remove weeds. The ploughed land turns soil upside down thus exposing rich sub-soil to wind and water erosion. Such land may remain barren for most part of the year and in turn lose more soil due to erosion. Such erosion is most pronounced on slopes. Moreover, in regions where rainfall is low, the soil is often dry and is more susceptible to erosion. Ploughed soil loses more water by evaporation.

(b) **Overgrazing**

Deserts receive less rainfall. Deserts have sparce vegetation mostly consisting of grasses and herbs less and best used for grazing. Overgrazing by goats, domestic cattle remove the protective vegetation and expose the soil. Further the movement of grazing animals loosen the soil surface by their hoofs. Unprotected loose soil becomes highly susceptible to erosion by wind and water. Such conditions leads to progressive desertification due to series of events as mentioned in figure 14.4.

(c) **Deforestation**

Forests and vegetation prevent soil erosion and to hold water in soil. Plant roots absorb and recycle nutrients released from the decaying organic matter. Forests are often cleared to agriculture, timber, construction wood, firewood, raw material for paper etc. All this leads to barrenness of the land leading to desertification.

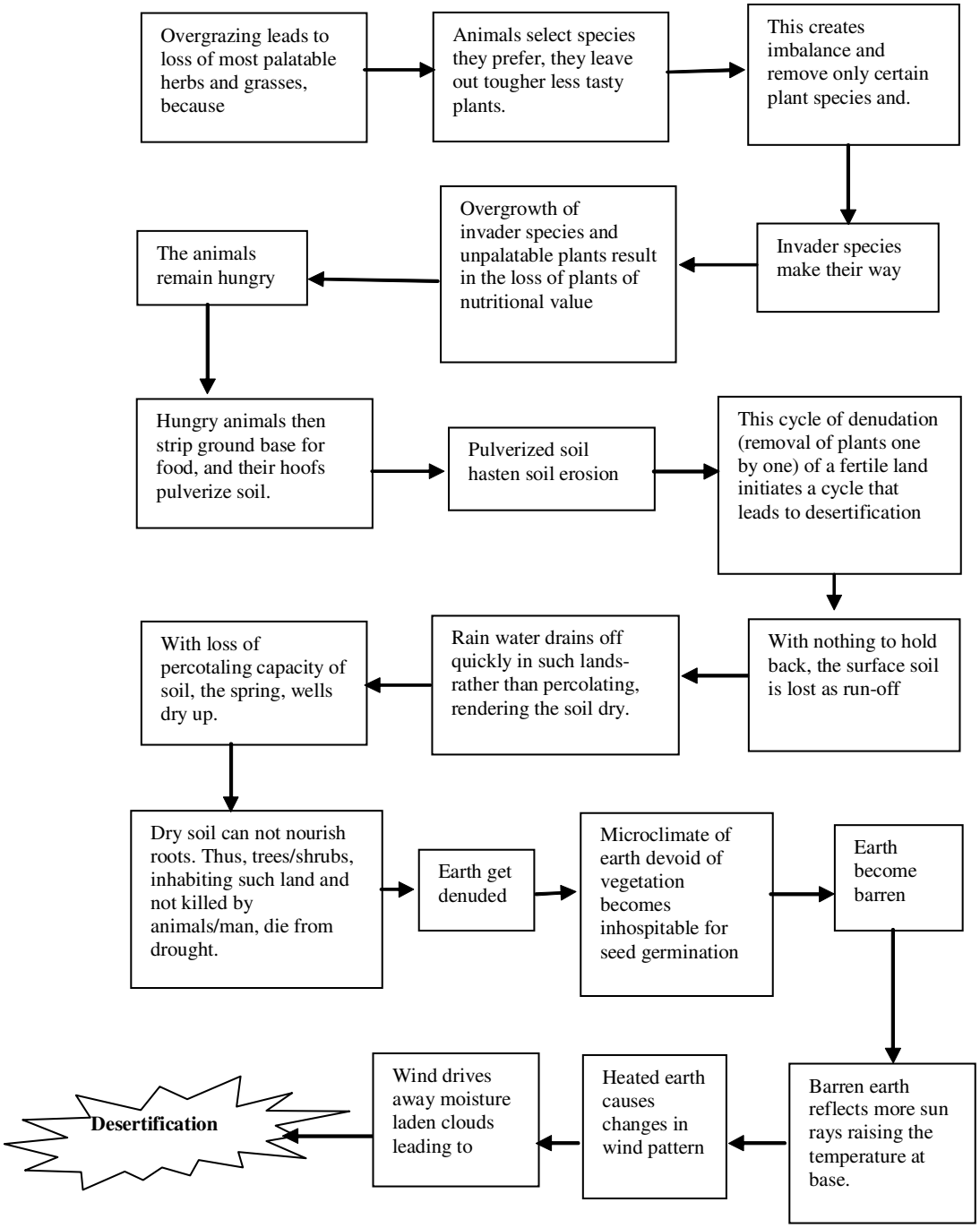


Fig 14.4: *Factors causing desertification*

(d) **Salting due to Irrigation**

With demand for more land for agriculture, crops are grown in areas that have little access to natural water bodies. The water is supplied to these growing areas by artificial means and improved irrigation methods. Such water brings salts dissolved in it. Even the best

quality of irrigation water contain 200-500 ppm of salts. Water used for irrigation is lost from agriculture field through evaporation and transpiration by crop plant. The water gets evaporated but the dissolved salt keeps on accumulating which makes the soils more salty. Saline accumulation of execesive soils prevents retards plant growth. Land devoid of plant cover easily becomes desertified. Accumulation of excessive salt in soil or salinization makes the soil unfit for agriculture.

INTEXT QUESTIONS 14.2

1. List different components of biodiversity.

   _____

2. Why does biodiversity loss occur?

   _____

3. How does high-technology fishing affect marine biodiversity?

   _____

4. How does a species lose its habitat?

   _____

5. What kinds of activities promote desertification?

   _____

6. Which kind of sowing is better in long-term: ploughing or tractor – sowing?

   _____

7. What is a desert?

   _____

14.5 OZONE LAYER DEPLETION

14.5.1 Formation of ozone layer

Ozone (O_3) is a highly reactive molecule containing three oxygen atoms. The upper part of the earth's atmosphere, between 10 and 50 km above the earth surface called stratosphere contains a thin layer of ozone. This ozone layer serves as a natural filter for blocking deadly incoming uv radiation from the sun.

> Ultra violet (UV) radiation, with wavelengths shorter than visible spectrum has high energy. UV radiations can be divided into three forms: UV-A (wavelength between 320-400*nm*), UV-B (wave length lesser than 280 *nm*), and UV-C (wavelength lesser than 280 *nm*). UV-C is most damaging to biological systems.

Since, the early 1970's levels of the stratospheric ozone have thined markedly over certain regions of the earth, particularly over the Antarctic region. The Antarctic region contains one of the worlds' most productive marine ecosystems. The thinning of stratospheric ozone layer is termed "'ozone hole".

14.5.2 Causes of ozone layer depletion

Ozone ($O_{3)}$ layer can be destroyed both by natural and man-made causes-

(i) **Natural causes**: A number of naturally occurring substances destroy stratospheric ozone. Most important of these compounds are:

Hydrogen oxide (HO_x), Methane (CH_4), Hydrogen gas (H_2), Nitrogen oxides (NO_x). Chlorine monoxide (ClO); during volcanic eruptions, significant amount of chlorine may be released in the stratosphere. Tiny particulate matter in the stratosphere, known as stratospheric aerosols, may also lead to ozone destruction.

(ii) **Human activity related causes**: Any event, which release chlorine atoms into the atmospheric, can cause severe ozone destruction, because chlorine atoms in the stratosphere can destroy ozone very efficiently. Most damaging among such agents are human made chlorofluorocarbons (CFCs), which is widely used as refrigerants and to pressurize sprays cans. In stratosphere, chlorine atoms from CFCs react with ozone to form chlorine monoxide and oxygen molecule.

$Cl + O_3 \longrightarrow ClO + O_2$

Chlorine monoxide, may then react with oxygen atoms to release more chlorine atoms:

$2ClO + O_2 \longrightarrow 2Cl + 2O_2$

One chlorine atom can break down 1,00,000 ozone molecules.

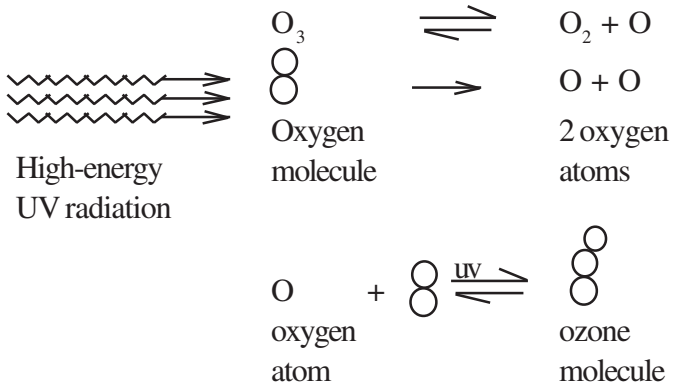


Fig. 14.5: *Formation of ozone* molecule

Table 14.2: Important ozone depleting chemicals and their uses.

Name of the compound	Used in
CFCs	Refrigeration, aerosol, foam, food freezing, warming devices, cosmetics, heat detectors solvents, cosmetics, refrigerants, firefighting
Halon	Fire fighting
HCFC-22	Refrigeration, aerosol, foam, fire fighting
Methyl chloroform	Solvent
Carbon tetrachloride	Solvent

14.5.3 Effect of O_3-layer depletion

Why are we so concerned about ozone hole? It is because without the ozone-shield the deadly uv radiation shall pass through the atmosphere and reach the earth surface. A small amount of uv-radiation is necessary for well-being of human beings and other organisms, such as uv-B promote synthesis of vitamin-D. UV-radiation also act as a germicide to control microorganisms. However, increased uv dose is highly dangerous to living organisms.

Harmful effects on human beings
- Increase susceptibility of skin-cancer
- Increase cataract
- Damage DNA
- Damage cornea
- Cause retinal diseases
- Suppers human immune systems

Harmful effects on plants
- Inhibit photosynthesis
- Inhibit metabolism
- Repress growth
- Destroy cells
- Cause mutation
- Decline forest productivity

Harmful effects on other organisms
- Marine/freshwater organisms are very sensitive to UV-rays
- Fish larvae are very sensitive
- Plankton population severely damaged.
- Affect fish/shrimp/crab larvae

Harmful effects on non-living materials
- Accelerate breakdown of paints
- Accelerate breakdown of plastics
- Affect temperature gradient levels in the atmosphere
- Affect atmospheric circulation pattern, climatic changes.

14.5.4 Measures to prevent ozone (O_3) layer depletion

Global awareness and action on the part of world community in the form of Helsinki (1989), Montreal (1990's) conventions and protocol have had some important success on this front. A complete ban on the use of CFCs and other ozone destroying chemicals is

recommended. Further, use of HCFCs (Hydrochloric fluorocarbons) as a substitute for CFCs is being recommended on temporary basis because HCFCs are relatively less damaging to ozone layer as compared to CFCs, but they are not completely ozone safe.

INTEXT QUESTIONS 14.3

1. Which kind of electromagnetic waves are screened by ozone in the stratosphere? Give their wavelength.

   _____

2. How many oxygen atoms are these in an ozone molecule?

   _____

3. How do volcanoes contribute to O_3 depletion?

   _____

4. Which kinds of anthropogenic activities are most dangerous to ozone-shield?

   _____

5. Name some harmful effects of UV radiation on human-being.

   _____

14.6 ACID RAIN

Acid rain refers to any precipitation (rain, fog, mist, snow) that is more acidic than normal. Acid rain is caused by atmospheric pollution from acidic gases such as sulphur dioxide and oxides of nitrogen emitted from burning of fossil fuels. Acid rain is formed when the air that contains acidic gases emitted mostly from power plants industries and automobiles, combines with the rain drops. The acid rain affect ecosystems in diverse ways (see fig. 14.5)

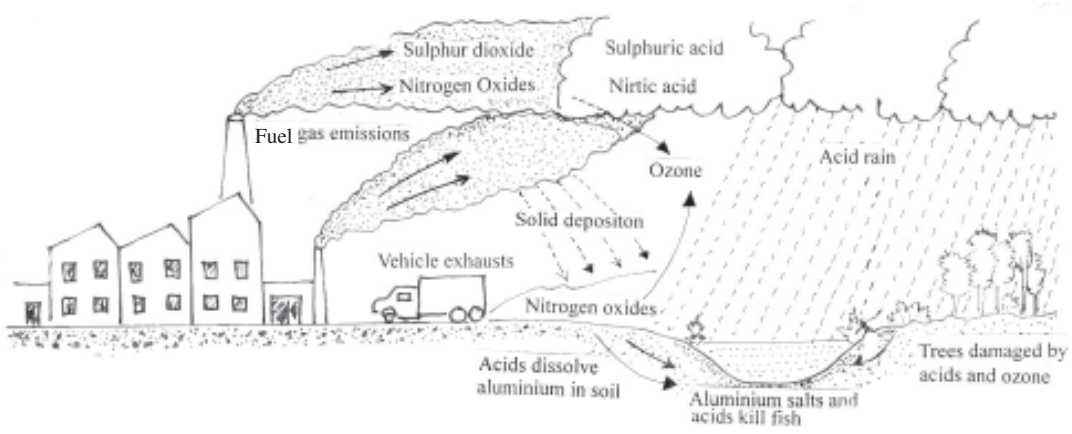


Fig.14.5: *Acid rain*

Therefore, emission of sulphur dioxide oxide and of oxides nitrogen into the atmosphere can lead to the formation of acid rain.

It is also recognized that acidic smog, fog, mist, move out of the atmosphere and settle on dust particleswhich in turn accumulate on vegetation as acid depositions. When rain falls, the acid from these depositions leak and form acid dews.

The table below shall help you to know the sources of gases/materials that contribute to acid rains (table 14.3)

Table14.3: *Acidic gases and their emission sources.*

Acidic gases	**Source**
CO_2 (Carbon dioxide)	Fossil fuel burning, industrial process, respiration.
CH_4 (Methane)	Paddy fields, wetlands, gas drilling, landfills, animals, termites
CO (Carbonmonoxide)	Biomass burning, Industrial sources, Biogenesis, Plant isoprene's.
SO_x (Sulphur oxides)	Fossil fuel burning, industrial sources, volcanoes, oceans.
NO_x (nitrogen oxides)	Fossil fuel burning, lightening, biomass burning, oceans, power plants

14.6.1 Harmful effects of acid rain

Acid precipitation affects both aquatic and terrestrial organisms. It also damages buildings and monuments.

(i) Effects on aquatic life

The pH of the surrounding or medium is very important for metabolic processes of aquatic organisms. The eggs or sperms of fish, frogs and other aquatic organisms are very sensitive to pH change. Acid rain kills their gametes affecting the life cycles and productivity. Death or their inability to increase in numbers affects aquatic food chains in acidic water bodies, causing severe ecosystem imbalances.

Acidic lake waters may kill bacteria/microbes/planktons and the acidic lakes become unproductive and life less. Such acidic and lifeless ponds/lakes adversely affect fisheries and livelihood.

(ii) Effect on terrestrial life

Acid rain damage cuticle of plant leaves resulting etiolation of foliage. This in turn reduces photosynthesis. Reduced photosynthesis accompanied by leaf fall reduces plant and crop productivity.

Acidic medium promotes leaching of heavy metals such as aluminum, lead and mercury. Such metals when percolate into ground water affect soil microflora/ micro fauna. The soil becomes lifeless. Absorption of these toxic metal ions by plants and microorganisms affect their metabolism.

(iii) Effects on forests

Acid rains damage forests and kill vegetation and causes severe damage to the landscape.

(iv) Effect on buildings and monuments

Many old, historic, ancient buildings and works of art/textile etc. are adversely affected by acid rain. Limestone and marble are destroyed by acid rain. Smoke and soot cover such objects. They slowly dissolve/flake away the surfaces because of acid fumes in the air. Many buildings/monuments such as Taj Mahal in Agra have suffered from acid rain.

14.6.2 Strategies to cope with acid rain

Any procedure that shall reduce, minimize, or halt emission of sulphur and nitrogen oxides into the atmosphere shall control acid rain. Use of low sulphur fuel or natural gas or washed coal (chemical washing of pulverized coal) in thermal plants can reduce incidences of acid rain.

INTEXT QUESTIONS 14.4

1. Name two acids that are present in acid rain.

   _____

2. How does acid rain affect aquatic life?

   _____

3. Use of which type of fuel will help in preventing acid rain?

   _____

14.7 NUCLEAR DISASTERS

Nuclear energy offers an alternative to many of environmental and social problems. But, it also introduces serious problems of its own. Though environment friendly, it is not yet economically affordable. Nuclear plants pose potential danger of accidents that may release hazardous radioactive materials into the environment. The problems are two fold: (i) nuclear disasters and fall out and (ii) safe disposal of nuclear waste generated by nuclear plants. Some of the major nuclear disasters are given in table: 14.4

Table 14.4: *List of some major nuclear disasters*

Year	Nuclear power plants
December,1952	Chalk River, Toranto, Canada
October,1957	Windscale Plutonium Production Centre, U.K.
April 26, 1986	Chernobyl Nuclear Reactor, Kiew, Chernobyl, USSR
November, 1995	Monju, Japan

Notes

14.7.1 Impact of muclear disasters on the environment

The detrimental effects of nuclear leakage could be quick or slow.

The **quick devastating and immediate effects** of nuclear radiations are well known as witnessed following **Hiroshima and Nagasaki** in Japan during world war II. Therefore, military use of nuclear energy is always fraught with unimaginable consequences.

The **slow nuclear radiations** can also emanate from a variety of sources viz: nuclear reactors, laboratories, hospitals, and direct exposures to radiation for diagnostic purposes (eg X-rays)

Such low dose radiations could have substantial impact on life forms and ecosystems. It is now established that continued small dose exposure to nuclear radiation is very harmful. It can cause: childhood leukemia, miscarriage; underweight babies; infant deaths; increased susceptibility to AIDS and other immune disorders and increased criminilalities.

Underground bomb testing releases radiations in very small doses of radicals that enter water in the soil. This radioactive water is taken by plants through roots. The radioactivity enters food chain when such plants are eaten by animals and humans. Such radioactivity has been detected even in the milk.

INTEXT QUESTIONS 14.5

1. Enumerate the sources of slow nuclear radiations that can pose danger to life forms.

   _____

2. Enlist some harmful affects of nuclear radiation on human being.

   _____

14.8 OIL POLLUTION

Oil pollution refers to layers of oil on water bodies. Oil spills are most glaring of all oceanic pollution. Every marine transport vessel poses a potential danger of oil spill.

14.8.1 Causes of oil spill

The most common cause of oil spill is leakage during marine transport. It includes both small scale (most often) and large scale (accidental) leakages. Oil spill could occur during off shore oil production. There is a continuous oil slicks concentrated along the supply lines used by oil tankers. Motor boats may release oil into the seas. On an average a ton of oil is discharged into the seas for every 1000 tons of oil transported by sea.

14.8.2 Impact of oil spill on marine life

Within hours of oil spill, the fishes, shellfish, plankton die due to suffocation and metabolic disorders. Within a day of oil spill birds and sea mammals die. Death of these organisms severely damages marine ecosystems. Oil spills also either poison or suffocate algal blooms. This in turn makes water body deficient in oxygen. Water deficient in oxygen in turn, is responsible for the deaths of enormous number of fish/marine life.

14.8.3 Impact of oil spills on terrestrial life

Bays, estuaries, shores, reefs, beaches particularly near large coastal cities or at the mouth of rivers are relatively more susceptible to the hazards of oil spills. A number of coastal activities, especially recreational such as bathing, boating, angling, diving, rafting are affected. As a result tourism and hotel business in the coastal areas suffers seriously.

INTEXT QUESTIONS 14.6

1. What is the affect of oil spills on algal blooms?

   _____

2. What is the harmful impact of oil spill on marine life?

   _____

14.9 HAZARDOUS WASTE

Any substance that is present in the environment or released into the environment causing substantial damage to public health and welfare of the environment is called hazardous substance.

Any substance that could have serious irreversible health effects from a single exposure is called very hazardous substance. Any hazardous substance could exhibit any one or more of the following characteristics:

- toxicity
- ignibility
- corrosivity
- reactivity (explosive)

Thus, any waste that contains hazardous or very hazardous substance is called hazardous waste.

Notes

Hazardous wastes can originate from various sources such as: house-hold, local areas, urban, industry, agriculture, construction activity, hospitals and laboratories, power plants and other sources.

Problems related to dumping of hazardous waste

The hazardous waste **per se** or when disposed off release a number of environmentally unfriendly substance(s). some of them are given in table 14.5.

Table 14.5: *Hazardous wastes, its disposal and effect*

Source	Disposed/used as	Polluting agent	Effect
Industrial waste	Incineration of waste	Toxic fumes e.g. Chlorine polyvinylchlorine	Chlorine could cause acid rain
	Incomplete combustion	Dioxins/organo chlorides	Carcinogenic
	Release into water bodies	Chlorophenol, fluorine compounds, aldehydes, SO_2, CO	Cause environmental pollution
	Plastic	Polythene, poly propylene, polyesters etc on burning release gases	Toxic, ecological pollution
Nuclear waste	Hospitals Laboratories	Slow/sustained in medical/agriculture use	Health hazard, carcinogenic, mutation
Agricultural waste	Forms of Nitrogen wastes	Manure/Dung rich in NO_3/NO_2^{-2}	Accumulate in vegetables, cause methanoglobenemia cyanosis
		Nitrosamines/ NO_3^-/NO_2^-	Carcinogenic contribute to acid rain
		N_2O	Green house effect
		NH_3^+ (from livestock breeding)	Affect aquatic life; stimulate fungal growth; epiphytes; cause weathering of forests
	Phosphates		Eutrophicastion of aquatic environment
	Phyto sanitary product	Insecticides/pesticides/fungicides/herbicides	Enter soil as run off, polluter water table affect aquatic life, carcinogenic, renal failure
	Methane	Ruminating cattle, fermentation of organic matter	Powerful green house effect

INTEXT QUESTIONS 14.7

1. Give four important characteristics that make any substance hazardous.

   _____

2. What is a very hazardous substance?

   _____

3. Is plastic burning hazardous. Why?

_____

4. What are phytosanitory products? How are they harmful?

_____

WHAT YOU HAVE LEARNT

- All of us are inheritors of common global environment.
- All of us are responsible for its growing deterioration. If the deterioration exceeds a limit, it shall be a dangerous place to live in.
- Pollution, ozone-hole, greenhouse effect, desertification, loss of biodiversity, oil spills, nuclear disasters, hazardous waste management, are some of the global environmental problems that need immediate collective attention.
- Increased human activity, urbanisation, industrialisation are led to rapid deterioration of the environment. This has severely affected the life supporting system.
- A green house is a glass chamber in which plants are grown to provide them warmth by trapping solar radiations and heat. Infrared rays pass through glass and the heat generated there from, cannot escape out of the glass chamber.
- Increased fuel efficiency in vehicles; development/implementation of solar energy/non-fossil fule alternatives; halting further deforestation; support and undertake tree planting (afforestation); reduce air-pollution are the strategies for coping with green house effect.
- Flora and fauna of a region constitute biodiversity. It is considered as natural wealth of the nature.
- Biodiversity can be classified into three types i.e. species biodiversity, genetic biodiversity and ecosystem biodiversity.
- Loss of habitat, pollution, and overuse, introduction of foreign species and contribution of other environmental degradation factors are the reasons of biodiversity loss.
- Desertification is diminution or destruction of the biological potential of the land which ultimately leads to desert. Over cultivation, overgrazing, deforestation and salting sue to irrigation are principal causes for desertification.
- Acid precipitation affects both aquatic and terrestrial life. It also damages buildings and monuments.
- We all need to cooperate at individual, domestic, local. National and international level to maintain our environment clean and sustainable.

Notes

TERMINAL EXERCISE

1. Name an introduced weed in India.
2. Name two green-house gases.
3. Name any two compounds that are harmful to ozone layer.
4. Which has been the most disastrous nuclear accident so far.
5. Name one phytosanitory product.
6. Mention various (at least 5) global environmental issues?
7. Why are environmental issues of global concerns?
8. Why should we avoid use of CFCs and such compounds?
9. Explain briefly:
   (a) Compare the effects of tropospheric and stratospheric ozone on life in our planet.
   (b) Suggest strategies to cope with green house effect.
   (c) How does canal-based irrigation contribute to desertification?
   (d) Chlorine atom causes ozone-hole
   (e) Harmful effect of uv radiations on human being.
   (f) Perils of nuclear disasters
   (g) "Environmental problems need global intervention".

ANSWER TO INTEXT QUESTIONS

14.1

1. Because environment has no frontiers, no geographical boundaries.
2. pollution, O_3-hole, green house effect, biodiversity loss, desertification, problems related to dumping of hazardous wastes, nuclear disasters, oil spills (Any three)
3. Global warming is defined as a natural or human induced increase in the average global temperature of the atmosphere near the earth surface.
4. Because it stimulates similar conditions that one encounters in a glass green house.
5. Infrared

6. CFC, methane, nitrogen oxides, CO_2

14.2

1. Species biodiversity, generic biodiversity, ecosystem biodiversity.
2. Because of loss of habitat, overuse, introduction of foreign species.
3. Because, they help locate shoals of fish very accurately and efficiently.
4. When its habitat is destroyed to make way to housing, industry, agriculture, sports etc.
5. Over cultivation, over grazing, deforestation, salting due to irrigation.
6. Tractor-sowing.
7. The land that has lost the productivity capacity is called a desert.

14.3

1. Ultraviolet, 200-400 nm
2. Three
3. By releasing significant amount of chlorine.
4. Any activity that release chlorine atoms into the atmosphere.
5. Causes skin cancer, retinal diseases, damage cornea etc.

14.4

1. H_2SO_4, HNO_3
2. Acid rain lowers the pH of water in which the organism lives. At low pH gametes (egg/ sperms) of the organisms cannot survive. It affects the life cycle. Leading to generation/ population loss.
3. Solar / nuclear energy.

14.5

1. Ignibility, corrosively, reactivity, toxicity.
2. Any substance that could have serious, irreversible health after affects from a single dose of exposure.

14.6

1. It may either poisonous or suffocate, damage marine ecosystem
2. Lack of oxygen in the water body is responsible for the deaths of enormous number of fish or marine life.

Notes

14.7

1. From nuclear reactors, laboratories, hospitals and direct exposure to radiation for diagnostic purposes (X-rays).
2. Quick devastating effect on human and other life forms. Slow effect – childhood leukemia, miscarriages, infant mortality, increased susceptibility to AIOs.
3. It suffocates them, poisons them.
4. If sea water deficient in oxygen, that is very essential for aerobic respiration for the organism living in water.