Chapter- 18 Pollution of Air and Water

Air Pollution

Greenhouse Effect

Water Pollution

Air Pollution

Air supplies us with *oxygen* which is essential for our bodies to live. Air is 99.9% nitrogen, oxygen, water vapor and inert gases. Human activities can release substances into the air, some of which can cause problems for humans, plants, and animals. The presence in the atmosphere of one or more contaminants is injurious, or tends to be injurious to human health or welfare animal or plant life is called air pollution.

Air pollution

Sources of Air Pollution

The substances which contaminate the air are called **air pollutants**. It may be through natural sources like smoke and dust arising from forest fires or volcanic eruptions.

Other pollutants and their effects are explained below.

- **Carbon dioxide** **(CO_2)** is the principle greenhouse gas emitted as a result of human activities such as the burning of coal, oil, and natural gases.
- **Chlorofluorocarbons** **(CFC)** are gases that are released mainly from air-conditioning systems and refrigeration. When released into the air, CFCs rise to the stratosphere, where they come in contact with few other gases, which lead to a reduction of the ozone layer that protects the earth from the harmful ultraviolet rays of the sun.
- **Lead** is present in petrol, diesel, lead batteries, paints, hair dye products, etc. Lead can cause nervous system damage and digestive problems and, in some cases, cause cancer.
- **Nitrogen oxide** **(Nox)** causes smog and acid rain. It is produced from burning fuels including petrol, diesel, and coal. Nitrogen oxides can make children susceptible to respirator :ers.

Air Pollutants

- **Suspended particulate matter** **(SPM)** consists of solids in the air in the form of smoke, dust, and vapour that can remain suspended for extended periods and is also the main source of haze which reduces visibility. These finer particles, when breathed in can lodge in our lungs and cause lung damage and respiratory problems.

- **Sulphur dioxide** **(SO_2)** is a gas produced from burning coal, mainly in thermal power plants. Some industrial processes, such as production of paper and smelting of metals, produce sulphur dioxide. It is a major contributor to smog and acid rain. Sulfur dioxide can lead to lung diseases.

Acid rain

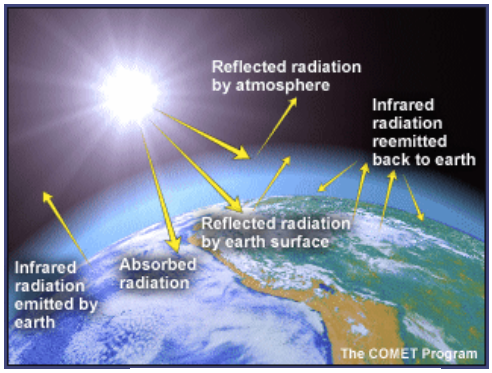
Another effect of air pollution is acid rain. The phenomenon occurs when sulphur dioxide and nitrogen oxides from the burning of fossil fuels such as, petrol, diesel, and coal combine with water vapour in the atmosphere and fall as rain, snow or fog. These gases can also be emitted from natural sources like volcanoes. Acid rain causes extensive damage to water, forest, soil resources and even human health. Many lakes and streams have been contaminated and this has led to the disappearance of some species of fishes. Acid rain corrodes the marble of the Taj Mahal.

Taj Mahal affected due to acid rain

The phenomenon is also called “Marble cancer”. Suspended particulate matter, such as the soot particles emitted by Mathura oil refinery, has contributed towards yellowing of the marble.

Greenhouse Effect

The greenhouse effect refers to circumstances where the short wavelengths of visible light from the sun pass through a transparent medium and are absorbed, but the longer wavelengths of infrared re-radiation from the heated objects are unable to pass through that medium. The trapping of the long wavelength radiation leads to more heating and a higher resultant temperature.



Greenhouse effect

Besides the heating of an automobile by sunlight through the windshield and the namesake example of heating the greenhouse by sunlight passing through sealed, transparent windows, the greenhouse effect has being widely used to describe the trapping of excess heat by the raising concentration of carbon dioxide in the atmosphere. The carbon dioxide strongly absorbs infrared and does not allow as much of it to escape into space. As a result, the average temperature of the earth's atmosphere is gradually increasing. This is called global warming.

Global warming can cause sea levels to rise dramatically. In many places, coastal areas have already been flooded. Global warming could result in wide ranging effects on rainfall patterns, agriculture, forests, plants and animals.

Measures to Control Air Pollution

- Fuels like CNG and unleaded petrol can be used which don't pollute the environment and are much cheaper and efficient fuel.
- There is a need to switch over to alternative fuels instead of the fossil fuels for our energy requirements like the solar energy, hydropower and wind energy.
- Plant trees and nurture the ones already present in the neighbourhood.
- Instead of burning leaves better option is to put them in a compost pit rather than burning.

Water Pollution

Water pollution

Whenever harmful substances such as sewage, toxic chemicals, silt, etc get mixed with water, the water becomes polluted. The substances that pollute water are called **water pollutants.**

Sources of Water Pollution

Dirty water is the world's biggest health risk, and continues to threaten both quality of life and public health

Indust

- Many industries discharge harmful chemicals into rivers and streams, causing the pollution of water. Examples are oil refineries, paper factories and chemical factories. The chemicals released lead to toxicity in plants and animals.
- If the pesticides and weedicides dissolve in water and are washed into water bodies from the fields and polluting them. They also seep into the ground to pollute ground water.
- The excessive quantities of chemicals getting washed from the fields act as nutrients for algae to flourish. Once these algae die, they serve as food for decomposers like bacteria. A lot of oxygen in the water body gets used up. This results in a decrease in the oxygen level which may kill aquatic organisms.
- Hot water from power plants and industries is released into the rivers. It raises the temperature of the water bodies, adversely affecting the animals and plants living in it.

Potable Water

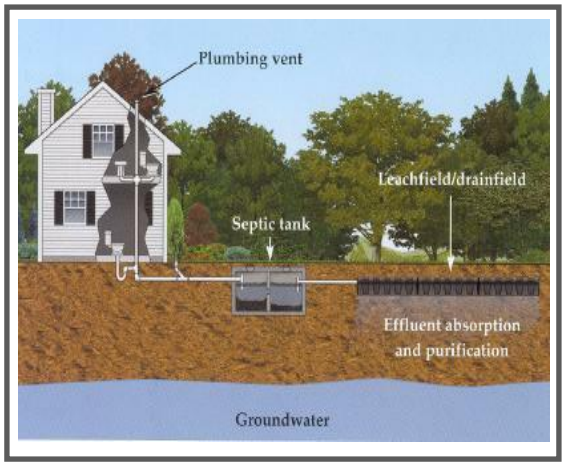
Water which looks clean may still have disease carrying microorganisms and dissolved impurities. Therefore such water is unfit for drinking. Water which is suitable for drinking is called **potable water**.

Water Purification

Water is filtered. This is a physical method of removing impurities.
Boiling kills the germs present in the water and hence is a method for obtaining safe drinking.
Chlorination is a commonly used chemical method for purifying water. It is done by adding chlorine tablets or bleaching powder to the water.

Conservation of Water

- We should save water by not wasting it. **Reduce**, **reuse** and **recycle water.**
- Make sure to dispose of toxic products, such as paints, solvents, and polishes, in the proper area. Don't pour them down your drain. Better yet, avoid toxic products altogether and use environmentally friendly products instead.



Septic tank

- Have a proper system in place that will allow for proper methods of garbage disposal so that it does not find its way into the water bodies. Same is the case with maintaining a proper septic tank and keeping it clean.