POLLUTION

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"A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strengths to our people."

Franklin Roosevelt

Introduction

Pollution is the unfavorable alteration of our environment, largely as a result of human activities. Pollution crises on earth originated due to many factors such as human population, unplanned urbanization and deforestation, profit oriented capitalism and technological advantages. When our pollution is small, and our society largely pastoral, this attitude is did not usually result in obvious pollution, but more people combined with modern technology and a frontier has produced our environmental crisis. Thus in well developed nations on a per capita basis, citizens consume more food, use more pesticides, fertilizers, fuel, minerals, cars, and other manufactured products of all kinds. Most of the products are manufactured in one or other kinds of industries, all of which in their turn add some pollutant in our environment and cause pollution. Pollution should not be confused with contamination which is the presence of harmful organisms or their products causing disease or discomfort.

Pollutant

Any agent or factor that causes or contributes to environmental pollution is known as pollutant. It can also be defined as undesirable substances which are present in the wrong place, at the wrong time and in the wrong

quantity. Pollutants are residues of substances made by us, used by us and even thrown by us as waste products which pollute the environment in one way or other.

Types of Pollution

Pollution is classified on the basis of following factors

A. Broadly classified in to two

1. Natural pollution-which originates from natural processes
2. Artificial pollution- which originates due to activities of man

B. 1. According to the environment-air, water, soil-in which it occurs.

2. According to the pollutant-lead, mercury, CO_2, solid waste, noise, biocide, heat, etc-in which it occurs.

C. Chemical pollutant classified in to two

1. Degradable pollutant- it decomposes very rapidly under normal natural conditions. So, they get easily recycled in the ecosystem. However, when the rate of their production exceeds their decomposition they accumulate in the ecosystem.

2. Non-degradable pollutants usually will not decompose, or decompose very slowly under normal conditions. So they accumulate and get progressively concentrated from lower to higher tropic levels in the ecosystem. Egs. Metallic particles, resistant substance like plastics, polythene and rubber, pesticides like DDT, B.H.C etc

Air pollution

Air pollution or atmospheric pollution is the presence in the air of substances generally originating from the activities of man in sufficient concentration and sufficient duration to interfere with the health, comfort, safety, or full use and enjoyment of property. Air pollution is most severe in cities, industrial centers, and thickly populated areas. Air pollutants include gaseous, liquid, and solid substances. Solid substances occur as small suspended particles are called Aerosols. Air pollutants include both primary and secondary pollutants. Primary pollutants include particles of heavy metals, -Pb, Cu, Cd, Zn, Fe, NO, NO_2, CO, SO_2 ,carbon disulphide, hydrocarbons like ethylene, acetylene, methane, propane, toluene etc, aldehydes like formaldehyde and acetaldehyde, ketones and ammonia. Secondary air pollutants include peroxyacyl nitrate (PAN), ozone, atmospheric acid, nitric acid, hydrochloric acid and carbonic acid.

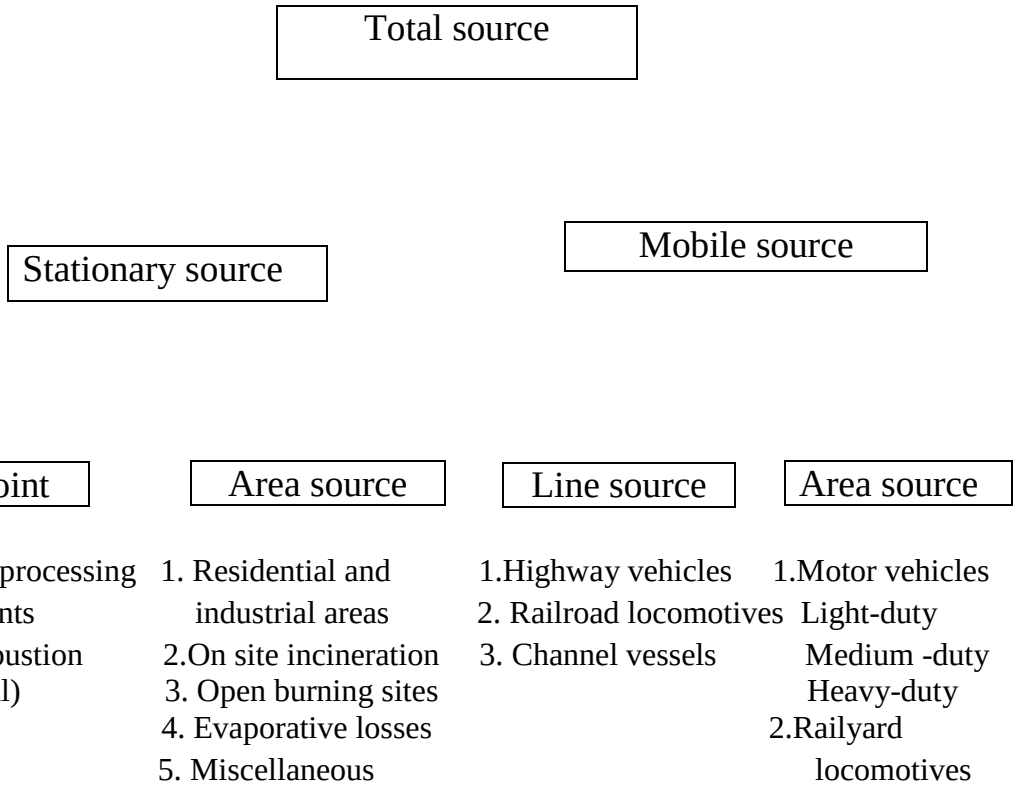
Source of air pollutants

The major source of air pollution is the particulate and gaseous matter released by the burning of fossil fuels such as coal, petroleum etc. Out of this comes a variety of emissions:

1. Fine particles (less than 100µm in diameter) which include carbon particles, metallic dusts, tars, resins, aerosols, solid oxides, nitrates and suphates.
2. Coarser particles (over 200 µm)largely carbon particles and haevt dust that is quickly removed by gravity from air
3. Sulphur compounds

4. Nitrogen compounds
5. Oxygen Compounds
6. Halogens
7. Radioactive substances.

Classification of Air Pollution Sources



The artificial pollutants spread in air by five major burning sources.

1. Automobiles-cars, scooters, motorcycles etc- are the greatest source of air pollution. They produce nearly two-thirds of carbon monoxide and one-half of hydrocarbons and nitrous oxide. Automobile exhaust also contains leaded gas and particulate lead.
2. Electrical power plants burning fossil fuel, particularly coal and sometimes petrol and diesel, produce two-thirds of sulphur dioxide.
3. Industrial processors such as metallurgical plants and smelters, chemical plants, petroleum refineries, pulp and paper mills, sugar mills, cotton mills, and synthetic rubber manufacturing plants are responsible for about one-fiveth of the air pollution.
4. Heating plants for homes, apartments, schools and industrial buildings are the fourth largest source of air pollution.
5. The transportation industry, exclusive automobiles including rail-roads, ships, aircrafts, trucks, buses, tractors etc, contributes the same type of pollutants as cars.

Minor quantity of pollution is caused by agriculture, which is responsible for pesticides, dust from agriculture practices and field burning.

Physiological Effects of air pollution

1. Carbon monoxide poisoning is one of the most important problems of public health. The gas is absorbed by hemoglobin of the blood to form a stable compound namely carboxyhemoglobin. This is because of the

fact that hemoglobin has got about 200 times more affinity towards carbon monoxide than oxygen. This reduces the oxygen transporting ability of the hemoglobin. Hence the air is polluted with carbon monoxide the human blood is likely to be deprived of oxygen and this could lead to coma and death.

2. Nitrogen dioxide present in air as pollutant causes irritation in eyes, throat, and nose. At high concentration, oxides of nitrogen combine with hemoglobin and impair its function.

3. Volatile lead compounds present in air cause accumulation of lead in the system. The accumulation of lead causes impairing of nervous activities, damage to kidneys and interferes with the formation of R.B.C in the human body

4. Air pollution is very dangerous when temperature inversion occurs in atmosphere. In this case upper layer of warm air will form a blanket over cool air. The warm upper air will prevent the upward movement of pollutants from below. As a result the pollutant s gets trapped and concentrated in the lower atmosphere, near the earth surface. This excessive accumulation of pollutants is always disastrous to man and most organisms.

5. Incomplete combustion of fuels releases unburnt hydrocarbons, aldehydes and poisonous carbon monoxide, sulphur dioxide, nitrogen dioxide etc. These products may combine with particular substances in the atmosphere in the presence of atmospheric water vapour and

sunlight to form smog. This smog forms an umbrella over the industrial towns. Smog formation causes nausea, eye irritation, lung cancer etc.

Acid Rain

Acid rain is one of the effects of air pollution. Every source of energy that we use whether coal, fuel wood or petroleum products, has sulphur and nitrogen. These two elements when burnt in the presence of atmospheric oxygen are converted to their respective oxides, namely sulphur dioxide and nitrogen oxide, which are highly soluble in water. These oxides react with large quantities of water vapour of the atmosphere to form droplets of acids like sulphuric acid, sulphurous acid, nitric acid and nitrous acid. These are washed down the surface of the earth by rain which is known as acid rain, which destroys crops, aquatic lives, buildings etc.

Adverse Effect of Acid rain

Acid rains cause a number of adverse implications. It increases the acidity of the soil, threatens human and aquatic life, destroy forests and crops reducing agricultural productivity. It can also corrode buildings, monuments, statues, bridges, fences and railings. Acid rain creates a serious threat to human health also, since it contaminates not only breathing air but also drinking water and even food. It can affect the human nervous system by making the person can easy prey to neurological diseases. This is due to

the presence of highly toxic compound which contaminates the potable water and enter our body. Acid kills the fish, bacteria, algae and thus the acquatic eco-system is destroyed. Acidification of soil changes its biology and chemistry. When the soil is get acidified, plants can absorb cadmium more easily and high levels of cadmium in plants is dangerous to animals and human beings. Acidic air pollutants have been responsible for many other damaging effects like corrosion of metals, weakening or disintegration of textiles, paper and marble.

Control of Air pollution

1. Air pollution due to exhaust from petrol and diesel can be reduced by better design of the engine to bring about complete combustion of the fuel. The use of lead compounds with petrol should be reduced to the minimum.
2. The height of chimneys of factories should be raised for the atmosphere dilution of smoke.
3. Only fuels with very low sulphur contents must be used in furnaces.
4. Radioactive materials must be converted from gaseous or liquid states to solids for storage. They should be sealed in steel drums and sunk into deep sea for natural decay.
5. Industrial wastes should be properly treated before they are let out by using suitable filters to remove solid wastes, by chlorination to destroy bacteria.

Legal Control of Air Pollution

In India,air pollution control legislation envisages the formation of air pollution Boards at central and state levels with powers to issue and revoke licences to polluting industries, enforce emission standards and frame rules and regulations for the control of air pollution. The legislation is primarily directing the highly polluting industries such as iron and steel, textile and power plants. The Board will have the power to prohibit certain trades and manufacturing processes in notified areas and prescribe emission standards in scheduled premises.

Conclusion

Pollution of the environment is one of the most horrible ecological crisis to which we are subjected today. So we have to realize the factors leads to pollution to our nation and avoid that factors or minimize that ones for better future life.