Impact Factor : 1.883 Peer-Reviewed Journal ISSN : 2278 – 5639
Global Online Electronic International Interdisciplinary Research Journal (GOEIIRJ)
THEME : ENVIRONMENT AND EDUCATION
{Bi-Monthly} Volume – IV Issue – III October 2015

ATMOSPHERIC AND SOIL POLLUTION

Dr. Kalpana Modi,
Associate Professor,
P.V.D.T. College of Education for Women,
S.N.D.T. Women's University, Mumbai. Pin- 400020. India.

Abstract :

Environmental pollution refers to any change in the natural quality of environment brought about by chemical, physical or biological factors. This happens largely due to man's actions. Pollutants are classified into air pollution, water pollution, soil pollution, etc. depending upon the particular component of the environment being polluted. In this paper, main focus is on pollution of Air or Atmosphere and pollution of soil. The atmosphere has two main layers. From the surface of the earth upwards, the bottom layer is called troposphere. Above the troposphere is stratosphere. Being closer to the earth, maximum pollution occurs in the troposphere. Three main causes of this pollution are smog, greenhouse effect and acid rain. Soil pollution is due to desertification and destruction of rain forests. We need to conserve our soil. In this paper, the causes and effects of pollution, and preventive measures to avoid pollution, are discussed.

Key words - Pollution, Soil, Environment, Acid Rain, Global Warming, Greenhouse Effect, Desertification

Environmental Pollution :

Environmental pollution refers to any physical, chemical or Biological alteration in the quality of air, water and soil to a degree that is harmful to living organisms. Environmental pollution can be classified in many ways based on nature of pollutants, source of pollutants, type of pollutants and components of environment. Pollutants are classified into air pollution, water pollution, soil pollution, etc. depending upon the particular component of the environment being polluted. In this paper main focus is on pollution of Air or Atmosphere and pollution of soil.

Composition of the Atmosphere :

The atmosphere has two main layers. Approximately seven miles from the surface of the earth upwards, the bottom layer is called troposphere. About 70% of the air in the atmosphere is in

this layer. Above the troposphere is stratosphere which reaches approximately 70 miles above the Earth. Next to the stratosphere there exists the Ionosphere. From the point of view of pollution, the troposphere and the stratosphere are important.

Pollution in the Troposphere :

Being closer to the Earth, maximum pollution occurs in the troposphere. Three main causes of this pollution are smog, greenhouse effect and acid rain.

a) Smog

In the cities smog provides the indication of air pollution by hampering the clarity of air. Even though it is more prominent in urban area, the haze of smog can be found everywhere. The smog is combination of smoke and fog. There are two types of smog. Smoke from industrial sources mixed with fog consists of small particles and gases. When it mixes with fog, it creates a low-lying layer of polluted air close to Earth.

b) Greenhouse Effect and Global Warming

Greenhouse is a closed cubical place covered with glass for raising plants. Through the glass the sunlight and ultraviolet radiations pass in. This subsequently creates infrared radiations inside the greenhouse, which in turn cannot pass out through the glass top. Thus the energy trapped inside results in warming of the inside of the greenhouse. This is called as greenhouse effect. In a similar manner, greenhouse effect results into the warming of earth's atmosphere or global warming. This type of global warming is a major environmental hazard. These effects are global. To keep the Earth warm, a certain concentration of the greenhouse gases are necessary, but if the concentration of greenhouse gases in the troposphere exceeds the optimum level; the temperature of the Earth increases. Many scientists predict that by the year 2050, earth will be warmer by 4°C.

Effects of Global Warming :

a) Polar caps on the mountains of ice on the poles of the earth will melt causing rise in sea level.

b) It will cause drastic climatic changes, affecting the agricultural outputs throughout the world.

c) Weather patterns may change.

c) Acid Rain

Acid rain means presence of excessive acids in rain water. The normal rain is slightly acidic in nature. When the rain becomes more acidic than a particular value, it is called acid rain. pH value of normal rain is 5.6. For the acid rain pH is less than 5.0. In West Virginia in US, once the rainfall was as acidic as battery acid. A wide range of undesirable changes occurs due to the acid rain. Acid rain indicates the presence of pollutants in the air. Burning of fuel and petroleum produce sulphur and nitrogen. These gases react with oxygen and are converted into their oxides. They are sulphur dioxide and nitrogen dioxide. These gases are water soluble. While it is raining, these oxides dissolve in rain water and form sulphuric acid and nitric acid. This rain contaminated with acid is called acid rain. Acid rain can fall as far away as 2500 miles from the source of pollution. Wind and the cloud containing polluted air, travel without any regard for boundaries. Therefore the phenomenon of acid rain is equally dangerous for the whole world irrespective of the place where the air gets polluted.

Effects of Acid Rain

a) Increase in acidity of soil destroying forests and crops.
b) In acidic water, fish and other marine animals have difficult time.
c) Acid erodes statues, monuments and buildings. It eats away paints.
d) Acid in the air may contribute to respiratory diseases especially in children.
e) It affects neurological system of humans.

Pollution in Stratosphere

Ozone is a gas which is different form of oxygen, present in the stratosphere. In the 1980s it was found that ozone distribution in the stratosphere is not uniform. Depletion of Ozone was occurring over both the poles of the Earth. It is like the Ozone cover enveloping the earth, has holes over the poles. In short, Ozone holes mean spots of Ozone depletion. The troposphere i.e. in the lower atmosphere, Ozone is air pollutant. Presence of Ozone in troposphere is undesirable. But in the Stratosphere, 10 to 30 miles above the Earth, a thin layer of Ozone and Oxygen forms a protective layer for the Earth. This layer absorbs Sun's harmful ultraviolet radiations. It shields us from the harmful UV rays. During the process of absorbing UV rays, Ozone is constantly being created from Oxygen and is also broken down to Oxygen. This continuous process of creating Ozone leads to increase in the absorption of UV rays.

Chlorofluorocarbons (CFC_S) are created from aerosol cans, in refrigerators and air

conditioners as cooling agents, and from the manufacture of plastic foams. These CFC gases drift upward from the surface of the earth to the ozone layer. When UV rays strike CFC molecules, chlorine atoms are released. This free chlorine reacts with Ozone to form Chlorine Monoxide. This in turn destroys Ozone molecule and generates a hole in the Ozone layer where there is no Ozone.

The Ozone holes have serious consequences. Because Ozone is destroyed there is no barrier for UV rays to travel to the Earth, as they are not absorbed now by Ozone. Penetration of Ozone causes damage to living beings. The ultraviolet radiation has many damaging effects.

Effects of Depletion of Ozone

a) Causing skin cancer and cataract.

b) Making body more susceptible to infectious diseases.

c) Harming plants and killing plankton, which forms the bottom of the vast oceanic food chain.

Pollution of Soil

Soil contains innumerable microbes and a large number of plants, animals and mineral reserves for purposeful use. Land is valuable for survival of human beings. Soil is fast depleting resource with increasing population. Soil is getting polluted day by day because of various factors. The main factors causing soil pollution are as follows:

a) Destroying Rain Forests

Burn farming is used in the rain forest area. The rain forest soil is typically nutrient poor. When burning is carried out, the ashes provide much needed soil nutrition. In burn farming, after a few years, when the nutrients are gone, a new area is burned and the previous area is left to recover nutrients. In present times, these areas are given for grazing or are farmed too soon. This leads to massive soil erosion. This leads to deforestation of rain forest. When vast tracks of forests are cut down, huge amounts of greenhouse gases are released into the atmosphere, these gases trap heat in the earth's surface causing increase in the temperature of the earth.

b) Coastal Pollution

Coasts are the area where fresh water meets the ocean. Coasts have a wealth of nutrients. Coastal areas are most rich in nutrients and show abundant life species of plants and animals. But the ocean washes up nutrients because of upwelling of currents. Mangroves are the special feature of coastal area. Over a period of time, men have destroyed the mangroves.

The coasts are not safe anymore for the living creatures.

c) Desertification

Because of the destructive activities of man, vast deserts are being created on every continent. The creation of these deserts leads to widespread famine and disease killing millions of people. Overgrazing of land is one major cause of desertification. Grazing animals graze too much on dry grasslands. They eat more vegetation than the land can grow back. They also press and compact the soil so that water doesn't penetrate through it. The plants therefore lack the nourishment. Both the above factors lead to loss of vegetation. The absence of roots in the soil makes it loose and it is blown away by wind and washed off by water. This phenomenon leads to desert condition. Trees and woody plants are chopped down for firewood. The top soil is lost due to erosion, which also leads to desertification.

Over-farming also causes desertification. When the soil is poor in nutrient content, it needs some time in between two plantations to build up and restore the nutrients. When such land is cultivated again and again without allowing it to lie uncultivated, it eventually loses its capacity to grow anything. Wind and water erosion ultimately leads to desertification. Global warming has helped the process of desertification because as the earth gets warm, it leads to less rainfall, which ultimately leads to droughts and creation of deserts.

Effects of soil pollution

a) Soil pollution is responsible for loss of fertility and productivity of soil.

b) Many pesticides are absorbed by plants and they go into human and animal bodies through food chains.

c) Particles of sewage block holes of soil which in turn destroys micro organisms of the soil. Nitrogen fertilizers produce toxic nitrates and nitrites.

d) Animal excreta put in soil are harmful for the health of humans as pathogens enter their bodies through vegetables and crops.

e) Radioactive fallout on vegetation results in abnormalities in animals and humans.

Measures for soil conservation

Soil conservation is very important for maintaining its fertility. Soil conservation also includes measures and techniques related to crop management. The following measures help in conservation of soil.

a) Alternate cropping-It refers to the technique of growing a crop for a few seasons and

then replacing it by another crop.

b) Judicious use of inputs-Balanced use of water, fertilizers and pesticides are essential.

c) Green manuring -A type of cover crop grown to add nutrients and organic matter to soil.

d) Compost-It is a biological process of organic material of refuse to usable stable material.

e) Plantation to check erosion-Crops like grass, ground nuts act as excellent soil covers against erosion by water.

Summary :

Environment which gets contaminated to a degree harmful to the health of the living beings is said to be polluted. Environmental Pollution can be classified in different ways depending upon the nature, source and type of the pollutants or as per the component of the environment. Pollution occurs in two layers of the atmosphere namely the troposphere and the stratosphere. In troposphere occurrence of the phenomena such as smog, greenhouse effect and the acid rain lead to pollution. Greenhouse effect is a term labeled to the process of trapping the UV radiations and generating heat. When it is generated to an extent, which is harmful in many ways, it pollutes the air. The term acid rain is self-explanatory. The acidic rain is the result of reaction of the pollutants such as oxides of sulphur and nitrogen present in the air with water in the air. In stratosphere, thinning of the Ozone layer leads to Ozone hole. We not only pollute the air but we are equally responsible for soil pollution. Soil pollution is due to desertification and destruction of rain forests. We need to conserve our soil. Then only animals and human beings will be able to live healthy life.

References :

1. Prabhakar V.K., Environmental Education. Anmol Prakashan, 2001.
2. Simmons I.G., The Ecology of Natural Resources, ELBS, 1981.
3. Vhristianson E.E., Green House - Global Warming, University Press, 1999.
4. Chawrasia B.P, Environmental Pollution - Perception and Awareness, Chugh Publications, 1992.