Environmental Pollution In India: Land, Water And Air Pollution

Abstract:

The word pollution refers to the introduction of contaminants (pollutants) into the environment and having an adverse effect on it. This paper shall focus on how environmental pollution affects us. In this paper we will discuss mainly about three different types of pollution that are land pollution, water pollution and air pollution. This paper will also show us the statistics about the increasing trend of pollution in India over the past years. We will be emphasising on the factors that cause pollution. Finally, we will have an overall view on pollution and how we as an individual can reduce pollution.

Keywords: land pollution, water pollution, air pollution, causes of pollution.

1. Introduction –

Pollution, also called environmental pollution, the addition of any substance (solid, liquid, or gas) or any form of energy (such as heat, sound, or radioactivity) to the environment at a rate faster than it can be dispersed, diluted, decomposed, recycled, or stored in some harmless form. The major kinds of pollution, usually classified by the environment, are air pollution, water pollution, and land pollution. Modern society is also concerned about specific types of pollutants, such as noise pollution, light pollution, and plastic pollution. Pollution of all kinds can have negative effects on the environment and wildlife and often impacts human health.

Environmental pollution is one of the most serious global challenges. Wild-type organisms have a slower degradation rate of hazardous materials. Currently, advanced molecular biology tools along with conventional approaches allow us to rapidly degrade or accumulate hazardous materials from environments. This can help modify microorganisms to gain the ability to sense and degrade hazardous chemicals from contaminated sites, in turn, allowing us to grow vegetation and improve crop productivity. In this chapter, conventional and advanced molecular biology tools for the removal and detoxification of contaminants from soil and water to improve environmental conditions are highlighted.[science direct][Britannica].

Now, we are going to focus on mainly three types of pollution and how they are caused -

- I.Land Pollution
- II.Water Pollution
- III.Air Pollution

I . Land Pollution

The world is getting polluted day by day, human activities have given rise to different kinds of pollution. One such type of pollution is land pollution, basically, land pollution means deterioration of the earth’s surface. The main reason that causes land pollution are different

human activities. Things like garbage, factories, farming and mining are some of the human activities that cause land pollution. We will have a look on how some of these things causes land pollution

Garbage

This is one of the most common causes of land pollution. You will find garbage in every household. Tonnes of garbage is produced by common households annually. When such a massive amount gets generated, the ways to dispose of it falls short.

Therefore, all this garbage gets dumped onto land. This land of disposal is referred to as a landfill. It is basically a wastage of free land which also gives birth to new problems. For instance, these landfills release toxic gases that harm living beings as well as the ozone layer.

Factories

Factories contribute largely to land pollution. They produce toxic waste products and chemicals which prove very damaging to land.

Furthermore, these factories dump off their waste in lands and water bodies. While some countries have stringent laws against this, some do not. This increases land pollution.

Farming

We know farming is very important for every person. They fulfill our food demands. However, irresponsible farming becomes very harmful sometimes.

Clearing of forests for land area in order to farm makes way for land pollution. Moreover, the insecticides and fertilizers sprayed on crops also damage the land.

Mining

It is yet another activity that contributes to land pollution. In order to obtain coal and minerals, we dig holes into the land. This results in land erosion.

Similarly, it also produces harmful gases and toxins which results in contaminated land as well as the air.[toppr]

Land pollution in India

Soil is a very important environmental attribute because it supports all sorts of plant life found on land. Soil becomes polluted due to the misdeeds of man or at times the mischief’s of nature.

The main factors of soil pollution are the high state of soil erosion, excessive use of chemical fertilizers, biocides (pesticides, insecticides and herbicides), polluted liquids and solids from urban and industrial areas, forest fires, water-logging and related capillary processes, leaching, drought, etc.

Some of the microorganisms and unwanted plants enter the soil and result in soil pollution. Some of the air-borne pollutants from the industries are deposited on the land surface and pollute the soil. Solid particles from mining areas pollute the neighbouring land to a great extent redering it unsuitable for agriculture.

Many areas near mica and manganese mines in Jharkhand have fallen prey to this type of pollution. Soils near copper smelting units are so polluted that no plant growth is possible there. Main sources of land pollution are briefly described as under:

A. Chemical Fertilizers and Biocides:

The accelerated use of chemical fertilizers and biocides in agriculture is the major cause of soil pollution. They are used to increase the yields and to save the crops from insects, pests and unwanted plant growth. It should be particularly noted that biocides first kill germs and unwanted plants and then degrade the quality of soil.

Among the pesticides, the most widely used are the chlorinated hydrocarbons, e.g. D.D.T., B.H.C., endrin, aldrin, dieldrin and lindane and organophosphorus compounds such as parathion and malathion. When these are used in excess, their remnants are absorbed by soil particles and contaminate crops grown in such soils.

They are further transferred into carnivores through herbivores and finally enter the human bodies in course of food chains. They are responsible for several incurable diseases and even cause death. Biocides are, thus, called as creeping deaths.

The use of biocides gained momentum in India with the commencement of Green Revolution in 1966-67. The introduction of high yielding varieties (HYV) of seeds gave birth to heavy doses of chemical fertilizers and biocides.

The overall per hectare consumption of fertilizers rose from a mere 0.55 kg in 1950-51 to 67 kg in 1992-93 and to 89.8 kg in 2003-04. The highest per hectare consumption of N.P.K. fertilizers was in Punjab (189.1), followed by Haryana (167.1), Andhra Pradesh (136.8), Manipur (130.5), Uttar Pradesh (126.7), and West Bengal (122.4). In Arunachal Pradesh, Nagaland, Mizoram and Sikkim, the consumption of N.P.K. fertilizers was less than 4 kg/hectare.

It is estimated that India will require 45-50 million tonnes of chemical fertilizers as against the present consumption of about 17 million tonnes. This means that pollution by increasing use of chemical fertilizers will increase considerably in the years to come.

For reducing the impact of chemical fertilizers, it is suggested that use of organic manures, composts, and agriculture wastes should be encouraged. The composition of NPK in different farmyard manures and composts is given in Table 9.19.

Organic farming refers to farming that does not use any form of chemical fertilizers or other agrochemicals and is dependent entirely on organic sources of crop nutrition and crop husbandry. Organic farming can also be defined as system in which the maintenance of soil fertility and the control of pests and diseases are achieved through the enhancement of biological process and ecological interaction.

The major component of organic farming is the maintenance of soil fertility through maximizing nutrient recycling and minimizing losses. Organic farming also helps in improving the physical properties, microbial production and humus content of soil while increasing its water holding capacity.

Table 9.19 Composition of NPK in different Farmyard Manure and Compost (in percentage):

- Waste Nitrogen Phosphorus Potassium Total Nutrient
- Rural compost 0.75 0.5 0.5 1.75
- Urban composition 1.00 1.00 1.00 3.00
- Neem cake 5.20 1.00 1.40 7.60
- Farmyard Manure 0.60 0.20 0.60 1.40
- Poultry droppings 3.00 2.60 1.40 7.00

Organic farming involves the use of farmyard manure (FYM) which has been used as a resource for plant nutrient since the ancient times. It also includes the application of vermicomposts, green manuring and bio fertilizers. FYM consists of animal dung, waste, crop residue, poultry manure/litter, etc. The urban or rural wastes composted are also sources of plant nutrients.

Green manuring involves cultivation of fast-growing leguminous crops and ploughing them back into the soil as fertilizers. Biofertilizers help leguminous crops fix atmospheric nitrogen into the soil.

B. Municipal Solid Waste:

Municipal solid waste (MSW) is a heterogeneous mixture of various constituents. According to Scavenging and Cleaning Act, MSW includes:

1. Dust ashes, refuse and rubbish.
2. Trade refuses.
3. Carcasses of dead animals and other matter.
4. Stress sweeping, sandstones, leaves and other dead vegetation.
5. Wastes from shops and market areas including paper, straw and cardboard packing, decaying fruits and vegetables and other described items; and
6. Other solid wastes are generated from establishments such as hospitals, schools, offices and small cottage industries.

Depending upon putrescibility municipal solid waste (MSW) can be classified into two categories viz. ‘garbage’ and ‘rubbish. The term garbage is defined as the fraction of waste associated with the preparation and consumption of food (e.g. meat and vegetable scraps), often called putrescible. All other wastes not classified as ‘garbage’ are designated as ‘rubbish’. [Smriti chand]

Prevention of land pollution by

- Reducing Chemical Fertilizers and Pesticides
- Reforesting

- Solid Waste Treatment
- Recovering and Recycling Material

II. Water pollution

Water pollution is the contamination of water bodies (like oceans, seas, lakes, rivers, aquifers, and groundwater) usually caused due to human activities. Water pollution is any change in the physical, chemical or biological properties of water that will have a detrimental consequence of any living organism.

Drinking water, also called Potable Water, is the water that is considered safe enough for human and animal consumption. This is water that is generally used for drinking, cooking, washing, crop irrigation, etc. These days chemicals, bacteria, and other pollutants are even affecting our drinking water.

The sources that cause water pollution are Domestic Waste, Industrial effluents, Insecticides and pesticides, Detergents and Fertilizers.

Some of the water pollution that is caused is by Direct Sources, such as factories, waste management facilities. refineries etc, that directly release waste and harmful by-products into the nearest water source without treating them. Indirect sources include pollutants that enter the water bodies via groundwater or soil or via the atmosphere as acid rain.

Water Pollution in India

As India grows and urbanizes, its water bodies are getting toxic. It's estimated that around 70% of surface water in India is unfit for consumption. Every day, almost 40 million litres of wastewater enters rivers and other water bodies with only a tiny fraction adequately treated. A recent World Bank report suggests that such a release of pollution upstream lowers economic growth in downstream areas, reducing GDP growth in these regions by up to a third. To make it worse, in middle-income countries like India where water pollution is a bigger problem, the impact increases to a loss of almost half of GDP growth. Another study estimates that being downstream of polluted stretches in India is associated with a 9% reduction in agricultural revenues and a 16% drop in downstream agricultural yields.

The cost of environmental degradation in India is estimated to be INR 3.75 trillion ($80 billion) a year. The health costs relating to water pollution are alone estimated at about INR 470-610 billion ($6.7-8.7 billion per year) – most associated with diarrheal mortality and morbidity of children under five and other population morbidities. Apart from the economic cost, lack of water, sanitation and hygiene results in the loss of 400,000 lives per year in India. Globally, 1.5 million children under five die and 200 million days of work are lost each year as a result of water-related diseases.[weforum]

Prevention of water pollution by

- Sewage treatments
- Prevent river water to get polluted
- Treatment of wastes before discharge

- Strict adherence to water laws
- Treatment of drainage water
- Keep the pond water clean and safe

III. Air Pollution

In a broad sense, air pollution means the presence of chemicals or compounds (called pollutants) in the air which are not naturally occurring, and which lower the quality of air and are harmful to all living things in the atmosphere. Air pollution is majorly caused due to the release of various chemicals into the atmosphere. Air pollution can be both man-made and naturally occurring.

In our current age of industrialisation and modernisation, the biggest source of air pollution is the burning of fossil fuels. For example when we burn petrol or diesel or coal to run our cars, machines, trains, power plants etc. this releases harmful pollutants into the atmosphere, endangering all living things around.There are two major types of air pollutants, gaseous compounds and compounds in solid form. There is actually a laundry list of the various pollutants that are affecting our environment, but the few very dangerous ones are Carbon Monoxide, Sulphur Oxides, Nitrogen Oxides, Carbon Dioxide, Ammonia and Radioactive Pollutants.

Air pollution can be caused by both man-made and natural causes, although the contribution by these natural causes is pretty negligible. The main culprit of air pollution is man-made sources of air pollution. The single most harmful source of air pollution is the unchecked burning of fossil fuels by mankind. Fossil fuels (non-renewable sources of energy such as crude oil, petrol, diesel, coal etc.) are used in almost every process of industrialization, manufacturing, transport and energy generation. In rural areas, a major source of pollution is the practice of unchecked crop burning. In moderation, this is actually a useful tool in farming but uncontrolled crop burning causes significant air pollution. Another source of man-made pollution is military resources such as nuclear arsenal and chemical weaponry. There are a few natural sources of air pollution as well. such as forest fires, volcanic activity and methane discharged from cattle.

Air Pollution in India

A report by the Health Effects Institute on air pollution in India (2018) reports that air pollution was responsible for 1.1 million deaths in India in 2015. Today air pollution has been one of the significant problems to deal with for any nation. In South Asia, it is ranked as the sixth most dangerous killer.

One does not realize the harmful effects of a problem if he/she has not experienced it in the first place. Take Delhi, for instance, we all have experienced what it feels like inhaling in the ‘deadly’ smog that remained for about a week, after Diwali. Citizens were advised not to leave their homes and were asked to wear masks whenever going outside. Looking outside the window made me feel like I was living in a gas chamber. Low visibility, a high number of deaths, etc. were the effects of pollution.

Prevention of Air pollution

- Conserve energy - at home, at work, everywhere.
- Look for the ENERGY STAR label when buying home or office equipment.
- Carpool, use public transportation, bike, or walk whenever possible.
- Follow gasoline refueling instructions for efficient vapour recovery, be careful not to spill fuel and always tighten your gas cap securely.
- Consider purchasing portable gasoline containers labeled “spill-proof,” where available.
- Keep car, boat, and other engines properly tuned.
- Be sure your tires are properly inflated.
- Use environmentally safe paints and cleaning products whenever possible.
- Mulch or compost leaves and yard waste.
- Consider using gas logs instead of wood.

2. Conclusion:

It appears that polluted environment is global an issue and the world community would bear worst results more as they already faced. An effective response to pollution is largely based on a human appraisal of the problem (Kromm, 1973) and the pollution control program evolves as a nationwide fixed cost-sharing effort relying upon voluntary participation (Sharp & Bromley, 1979).

3. Bibliography:

1. · https://www.toppr.com/guides/biology/natural-resources/water-and-water-pollution/
2. · https://www3.epa.gov/region1/airquality/reducepollution.htm
3. · https://towardsdatascience.com/india-air-pollution-data-analysis-bd7dbfe93841
4. · http://www.yourarticlelibrary.com/land-pollution/sources-of-land-pollution-in-india-chemical-fertilizers-and-municipal-solid-waste/19787
5. · https://www.importantindia.com/16243/12-different-ways-to-prevent-water-pollution/
6. · https://aqicn.org/statistics/india/
7. · https://www.rubbishplease.co.uk/blog/land-pollution-facts-statistics/
8. · https://scholar.google.co.in/scholar?q=environmental+pollution+research+paper&hl=en&as_sdt=0&as_vis=1&oi=scholart