

Status of Environmental Degradation in India

Suhas Shripati Mane*

Assistant Professor-Agricultural Extension, Shri Vaishnav Institute of Agriculture, Indore, MP, India

***Corresponding Author:** Suhas Shripati Mane, Assistant Professor-Agricultural Extension, Shri Vaishnav Institute of Agriculture, Indore, MP, India.

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Environmental degradation is deterioration of the environment or the disintegration of the earth through consumption of assets, like, air, water, and soil. The destruction of environment and the eradication of wildlife are the major effects of it. Air pollution, water pollution, and soil pollution of the natural environment are all challenges for India. According to World Bank experts, India has made good progress between 1995 through 2010, in addressing its environmental issues and improving its environmental quality. However, Still, India has a long way to go to reach environmental quality like those enjoyed in developed economies. Environmental degradation is one of the primary reasons for causes of several diseases, health issues and long-term livelihood impact for India. Following are some of the significant issues of environmental degradation discussed at a length.

Air Pollution

India is the world's largest consumer of fuel wood, agricultural waste, and biomass for energy purposes hence air pollution in India is a serious issue. Air pollution is also the main cause of the Asian brown cloud, which is causing the monsoon to be delayed. Traditional fuel (fuel wood, crop residue and dung cake) dominates domestic energy use in rural India and accounts for about 90 per cent of the total. In urban areas, this traditional fuel constitutes about 24 per cent of the total. Fuel wood, agril-waste and biomass cake burning releases over 165 million tons of combustion products into India's indoor and outdoor air every year. These biomass-based household stoves in India are also a leading source of greenhouse emissions contributing to climate change.

Based on per capita use, India is a small emitter of carbon dioxide greenhouse. In 2009, IEA estimates that it emitted about 1.4 tons of gas per person, as against United States' 17 tons per person, and a world average of 5.3 tons per person. However, India was the third largest emitter of total carbon dioxide in 2009 at 1.65 Gt per year, after China (6.9 Gt per year) and the United States (5.2 Gt per year). With 17 percent of world population, India contributed somewhat 5 percent of human-sourced carbon dioxide emission; compared to China's 24 percent share.

According to the 2021 World Air Quality Report, India is home to 63 of the 100 most polluted cities, with New Delhi named with the worst air quality in the world. Emissions from vehicles, wastes from industries, smoke from domestic activities like cooking, burning of crop residues, and generation of power are the biggest sources of air pollution in India, making world's third-largest polluter, as India is contributing over 2.65 billion metric tonnes of carbon to the atmosphere every year. Therefore, it can be concluded that one of the most serious environmental issues in India is air pollution.

The lockdown has declined human activities causing less air pollution. It can be seen from the daily average Air Quality Index which was 656 in March-April 2019, came down more than half i.e., 306 in the same months of 2020.

However, this decline in air pollution was temporary, India again becomes world's most polluted country, ranking second only next to Bangladesh in the year 2021. On the basis of other criteria of PM_{2.5} levels (Particulate Matter is defined as particles that are 2.5 microns or less in diameter), it was 58.1 µg/m³ in 2021, we can say that India has reached at severe levels. This fact will be clearer with following data about air quality.

Top 15 Cities with Worst Air Quality in the World

Global Rank	Country	State	City	Average PM2.5
1	India	Rajasthan	Bhiwadi	106.2
2	India	Uttar Pradesh	Ghaziabad	102
3	China	Xinjiang	Hotan	101.5
4	India	Delhi	Delhi	96.4
5	India	Uttar Pradesh	Jaunpur	95.3
6	Pakistan	Punjab	Faislabad	94.2
7	India	Uttar Pradesh	Noida	91.4
8	Pakistan	Punjab	Bahawalpur	91.0
9	Pakistan	Khybar Pakhtunkhwa	Peshawar	89.6
10	India	Uttar Pradesh	Bagpat	89.1
11	India	Haryana	Hissar	89
12	India	Haryana	Faridabad	88.9
13	India	Uttar Pradesh	Greater Noida	87.5
14	India	Haryana	Rohtag	86.9
15	Pakistan	Punjab	Lahore	86.5

(Source: World Air Quality Report 2021).

Looking to this serious situation, the State Government of Delhi has initiated few stringent steps to keep a restriction on air pollution such as the Odd-Even Regulation - a traffic rationing measure under which only private vehicles with registration numbers ending with an odd digit will be allowed on roads on odd dates and those with an even digit on even dates. Another important decision taken is ban on the use of coal as fuel in industrial and domestic units in the National Capital Region (NCR) which will be effect from January 2023.

Water Pollution

Water pollution is also one of the environmental issues India. Many Asian countries has experienced urban expansion and economic growth recently, however, it comes with huge environmental costs. According to WHO, around 70% of surface water of India is severely polluted. Water contaminants are raw sewage, silt, and garbage which are dumped into rivers and lakes. On an average, 40 million litres of wastewater enter rivers and other water bodies every day.

In developing countries like India, according to World Bank report, water pollution may account for the loss of up to half of GDP growth, which costs around USD 6.7 to 7.7 annually. It is also associated with a 9% decline in agricultural revenues as well as a 16% decline in agricultural yields. The consumption of chemicals in the form of fertilizers and pesticides have risen from 1.9 kg/ha in 1960 to 80 Kg/ha in 1994 as a result of increased pressure on agricultural output.

Every year around 40 million Indians are suffering from typhoid like water borne diseases and around 400,000 deaths each year. It also damages crops, as infectious bacteria and diseases in the water used for irrigation prevent them from growing. Undoubtedly, freshwater biodiversity is also severely damaged due to water pollution. A wide range of toxic substances like pesticides and herbicides, oil products, and heavy metals entering in the water bodies can kill aquatic organisms by altering their environment and making it extremely difficult for them to survive.

Construction of water treatment plants that rely on techniques such as flocculation, skimming, and filtration to remove the most toxic chemicals from the water is one of the strategy the country has adopted, with the help of local start-ups, to improve quality of

water sources. One more step the country's largest plants located in Panjrapur, in the state of Maharashtra, expected to produce more than 19 million cubic metres of water per day.

The government is planning for more ways to promote water conservation and reuse of industrial water by opening several treatment plants throughout the country. For example Gujrat state, having more than 70 million citizens, has launched its Reuse of Treated Waste Water Policy, aiming to decrease consumption from the Narmada River. The project also includes the planning of the installation of 161 more sewage treatment plants throughout the state that will supply with treated water to the industrial and construction sectors.

Soil pollution

It refers to the addition of substances to the soil, which adversely affect physical, chemical and biological properties of soil and reduces its productivity.

Sources of soil pollution

Soil pollution may occur directly by dumping and disposal of wastes, application of agro-chemicals or the indirect result of air pollution such as acid rains. The main soil pollutants are.

1. Industrial wastes- both solid and liquid wastes of industries are dumped over the soil. These wastes contains number of toxic chemicals such as mercury, lead, copper, zinc, cadmium, cyanides, thiocyanates, etc. some toxic chemicals reach soil by mining operations also.
2. Pesticides- pesticides i.e. herbicides, insecticides, fungicides, rodenticides are sprayed in agriculture, affects on structure and fertility of soil. They are also killing beneficial organisms too as most of the pesticides are broad spectrum affecting all types of life.
3. Manures and fertilizers- excessive use of chemical fertilizers decreases population of useful bacteria and affect structure of soil. It also increases salt content of the soil and reduces productivity. Excretory products and digested sewage sludge used as manure may pollute soil as it may contains some pathogens. However manures are minor factors in altering soil composition.
4. Discarded materials- a large number of discarded materials such as concrete, leather, plastics, glass, etc. are dumped on the soil by man.
5. Radioactive wastes- radioactive elements from mining and nuclear power plants may come to soil through water.
6. Organic insecticides like DDT, aldrin, benzene hexachloride, used for soil borne pest, accumulates in the soil and have deteriorating effect on plant growth.
7. Other pollutants- many air (acid rain) and water pollutants become part of soil.

Major Pollutants that Contaminate Soil

Heavy Metals- 31%

Mineral oil 20%

Others 7%

Hydrocarbons 42%

Heavy Metals

The presence of heavy metals (such as lead and mercury, in abnormally high concentrations) in soils can cause it to become highly toxic to human beings. Some metals that can be classified as soil pollutants are tabulated below.

Toxic metals that cause soil pollution are: Arsenic, Mercury, Lead, Zinc, Nickel, Cadmium, Chromium, Beryllium etc.

Soil is significant component of biosphere, which is damaged severely due to pollutants such as heavy metals added by natural as well as anthropogenic activities. The countries where unsustainable intensive agriculture, industrial and urban development is in progress, heavy metals are increased in soils due to sudden increase in heavy metal content which is affecting all organisms in terms of biomagnification i.e. residues of heavy metals are transferring from one organism to another through food chain or food web. If we look in scientific literature from last 25 years, it is observed that Zn and Pb have exceeded their limits. Apart from this, As, Cd, Cr, Ni, are also increasing beyond the limits in soils of India. Among these different heavy metals, Cd and As are the major contaminants which needs to be controlled on priority basis.

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