
AIR POLLUTION AND ITS EFFECTS ON CITIZENS AND ENVIRONMENT

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ABSTRACT

Air pollution is described as the presence of any chemical, physical, or biological substance in the interior or outdoor environment that alters the atmosphere's normal properties. It is to blame for a lot of the health issues in cities. Regarding the amounts of pollutants and the steps taken to remove them, Delhi's air quality has undergone numerous modifications. The condition of air pollution in Delhi, its sources, its effects on human health and the environment, and the control mechanisms put in place are all discussed in this study paper. India is the fifth most polluted country in the world in terms of air pollution, and Delhi is among the top 50 most polluted cities worldwide. The annual average PM_{2.5} level in Delhi was higher in 2021 than it was in 2020, although it was still lower than the levels of 98.6 g/m³, 113.5 g/m³, and 108.2 g/m³ recorded in 2019, 2018, and 2017. November saw the city's highest PM_{2.5} level (224.1 g/m³) and the lowest (30.2 g/m³). The average concentration was almost six times the WHO recommendation of 5 g/m³ even at its lowest point. Delhi's interior and outdoor air pollution was caused by industrial operations and vehicle emissions. Numerous studies have shown that air pollution in Delhi contributed to an increase in all-natural cause death and morbidity. While Delhi has made several hopeful improvements in the last 10 years to lower the city's air pollution levels, more work needs to be done in this area if the levels of air pollution are to be further reduced.

Status of Air Pollution in Delhi

The greatest metropolis in India and its capital is called Delhi. According to the UN World Population Prospects, 31.7 million people would live in Delhi in 2022. Governments at the federal and state levels jointly manage it. Delhi experiences the worst environmental pollution, much like any other big metropolis on the planet. According to a WHO survey, Delhi's average PM10 concentration in 2010 was 286 g/m³. The PM2.5 concentration was 153 g/m³ in 2013. These values are seen as being very unhealthy. As the PM levels deteriorated, US embassy monitors in Delhi recorded an average PM2.5 level of 226 g/m³ in 2015. The specialists have detected further deterioration, and by October 2017, it has apparently been measured at many monitoring sites that the air quality index has reached 999. The effects of this are comparable to someone smoking 45 to 50 cigarettes per day. Delhi began to be known as the "gas chamber"

Effects of Air Pollution in Delhi on human

Reduced lung capacity, headaches, sore throats, coughing, exhaustion, lung cancer, and early mortality are all effects of poor air quality. When air pollution reaches high enough concentrations, it can be harmful to humans. This is also known as particle pollution or smog. Significant health risks are posed by toxic contaminants. High levels of exposure to these air pollutants might irritate the eyes, nose, and throat. breathing issues, chest tightness, coughing, and wheezing. existing lung and heart conditions getting worse, as well as a higher chance of heart attacks.

Due to the bad air quality in Delhi, 2.2 million kids have irreversible lung damage. Additionally, studies reveal that pollution can weaken kids' immune systems and raise their risk for diabetes, cancer, epilepsy, and even adult-onset illnesses like multiple sclerosis. Due to their growth and development, children breathe more air per kilogramme of body weight than adults do, making them more susceptible to the harmful effects of air pollution. Additionally, they spend more time outside, which increases their exposure.

Effects of Air Pollution on Delhi environment

In addition to harming human health, air pollution also has a number of negative repercussions on the environment. There are numerous ways in which it might harm trees and crops. Reduced growth and survival of tree seedlings, decreased yields of agricultural crops, and increased

vulnerability of plants to disease, pests, and other environmental stresses (such as severe weather) are all effects of ground-level ozone. When fossil fuels are used, nitrogen and sulphur oxides rise in the sky and are transported by the wind hundreds of kilometres at a time, harming plants, soils, and water bodies and even making some fish and other creatures unsuitable for the water. Additionally, it hastens the deterioration of structures, monuments, and artwork that are a part of our national heritage. Wildlife may be negatively impacted by toxic contaminants in the air, on soils, or in surface waters. Animals can have health issues similar to people if they are exposed to air toxics in high enough quantities over an extended period of time. Research demonstrates that air toxics play a role in animal sickness, infertility, and birth abnormalities. In aquatic ecosystems, persistent hazardous air pollutants—those that degrade slowly in the environment—are a particular problem. These pollutants build up in sediments and may biomagnify to concentrations many times greater than in the water or air in the tissues of animals at the top of the food chain. Both at ground level and in the stratosphere, the upper atmosphere of the Earth, ozone is a gas. Ozone is a pollutant that can be harmful to human health at ground level. However, ozone creates a barrier in the stratosphere that shields life on Earth from the sun's dangerous ultraviolet (UV) radiation. However, man-made chemicals known as ozone-depleting agents, such as chlorofluorocarbons, hydrochlorofluorocarbons, and halons, are slowly destroying this "good" ozone. Coolants, foaming agents, fire extinguishers, solvents, insecticides, and aerosol propellants all once employed these compounds, and occasionally still do. Increased UV radiation reaching Earth as a result of the protective ozone layer's thinning may increase the incidence of skin cancer, cataracts, and weakened immune systems. Additionally, delicate crops like soybeans can suffer UV damage, which lowers agricultural output. damage to forests and crops. Numerous ways exist for air pollution to harm trees and crops. Reduced growth and survival of tree seedlings, decreased yields of agricultural crops, and increased vulnerability of plants to disease, pests, and other environmental stresses (such as severe weather) are all effects of ground-level ozone. A delicate balance of naturally occurring gases in the Earth's atmosphere confine part of the sun's heat close to the planet's surface. The Earth's temperature is maintained by this "greenhouse effect". Unfortunately, accumulating evidence suggests that by releasing huge volumes of certain of these greenhouse gases, such as carbon dioxide and methane, humans have upset this ecological equilibrium. As a result, it appears that more solar energy is being trapped by the Earth's atmosphere, raising the planet's average temperature – a phenomenon known as global warming. Many scientists think that the effects of global warming on human health, agriculture, water resources, forests, wildlife, and coastal regions could be considerable.

In response to worries that the environment in Delhi was getting worse, the Indian Ministry of Environment and Forests published a report in 1997. One of the issues that this investigation recognised as being of concern was air pollution. In Delhi, it was estimated that over 3000 metric tonnes of air pollutants were released each day, with vehicles contributing the majority (67%) and coal-based thermal power plants the least (12%). According to data gathered by the Central Pollution Control Board (CPCB), there was an increasing trend between 1989 and 1997. Due to an increase in the number of vehicles on the road, carbon monoxide concentrations from vehicle emissions increased by 92% between 1989 and 1996. Due to limits on lead-handling industrial units and the de-leading of petrol, the particle lead concentrations looked to be under control. In India, Delhi has the largest concentration of small-scale businesses, which together with other industrial facilities account for 12% of the country's air pollution.

Air pollution in Delhi is significantly influenced by vehicular pollution. The Department of Transport, Government of National Capital Territory of Delhi, estimates that there are more than 3.4 million vehicles on the road in this area, with a 7% annual growth rate. Despite being responsible for two-thirds of the air pollution, there has been a noticeable decrease compared to the levels in 1995–1996.

Control measures undertaken by Delhi

In 2016, new planned methods to minimise air pollution were made, but they were either not implemented or implemented slowly, which prevented them from being successful. Since 2016, some of the remedies have included the temporary closure of Delhi's schools, the prohibition of construction and demolition activities during high pollution levels, and the outlawing of all diesel generator sets outside of hospitals and emergency situations. The Environment Department released an app to track leaf burning. roadways are vacuumed and then sprinkled with water. To discourage employees from leaving the office, workplaces should encourage working from home.

The strategy for faster adoption and production of electric vehicles in India has a 2030 goal for all vehicles to be battery-powered, electric, or hybrid. The BS6 emission requirements must be implemented for all combustion-engined cars. Any car with BS6 emissions or an age older than 10-15 years is prohibited. Smog towers will be put in place in the city to clean and purify the air. The Pusa Bio-decomposer aids farmers in harvesting crops to avoid burning stubble.

The Delhi Metro will be entirely powered by solar energy by 2021. A 10-person air pollution control team was formed by Delhi officials in October 2020 to look into complaints submitted via the "Green Delhi" mobile app. There were some longer-term remedies implemented, such as the Supreme Court of India's ban on the sale of firecrackers in Delhi on November 25, 2017, which was done to reduce pollution. Another action was the permanent closure of the incredibly polluting Badarpur power station on October 15, 2018. A commission for Air Quality Management in the National Capital Region and Adjoining Area Ordinance was established by the union environment minister in October 2020.

Air pollution is frequently referred to as a silent killer because of the irrefutable evidence it leaves behind, taking lives and leaving millions of people suffering infections and fatal diseases.