



**KAMARAJ IAS ACADEMY**  
Only IAS Academy by Grandson of "Perunthalsivam Kamarajar"

# AIR POLLUTION IN INDIA

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## Definition:

Air pollution is the contamination of the indoor or outdoor environment by any chemical, physical, or biological agent that modifies the natural characteristics of the atmosphere.

## India's Air Pollution Snapshot

### **Health & Human Cost**

In 2021, roughly 2.1 million Indians died prematurely due to air pollution.

India's average life expectancy is estimated to be shortened by about 5.3 years, and up to 8 years in the most polluted regions.

### **Pollution Levels & Trends**

According to IQ Air, India had an annual average PM<sub>2.5</sub> concentration of 50.6 µg/m<sup>3</sup> in 2024, a ~7% decline from 54.4 µg/m<sup>3</sup> in 2023.

Indian NCAP cities experienced an average 24% reduction in PM<sub>2.5</sub> between 2019 and 2024; overall monitored cities saw a 27% decline.

### **National Clean Air Programme (NCAP)**

NCAP (launched 2019, extended to 2026) targets a 40% reduction in PM<sub>10</sub> vs. 2017 levels.- Out of 97 cities with good data, only 41 achieved the 20–30% interim decline, and 29 saw increases?energy and clean air.

In 2024, 206 out of 253 cities monitored exceeded PM<sub>10</sub> NAAQS; only 47 were within norms.

### **Very Recent Global Policy & Economy Context**

Only 7 countries met WHO air quality standards in 2024; India ranked fifth globally in PM<sub>2.5</sub> exposure in 2024.

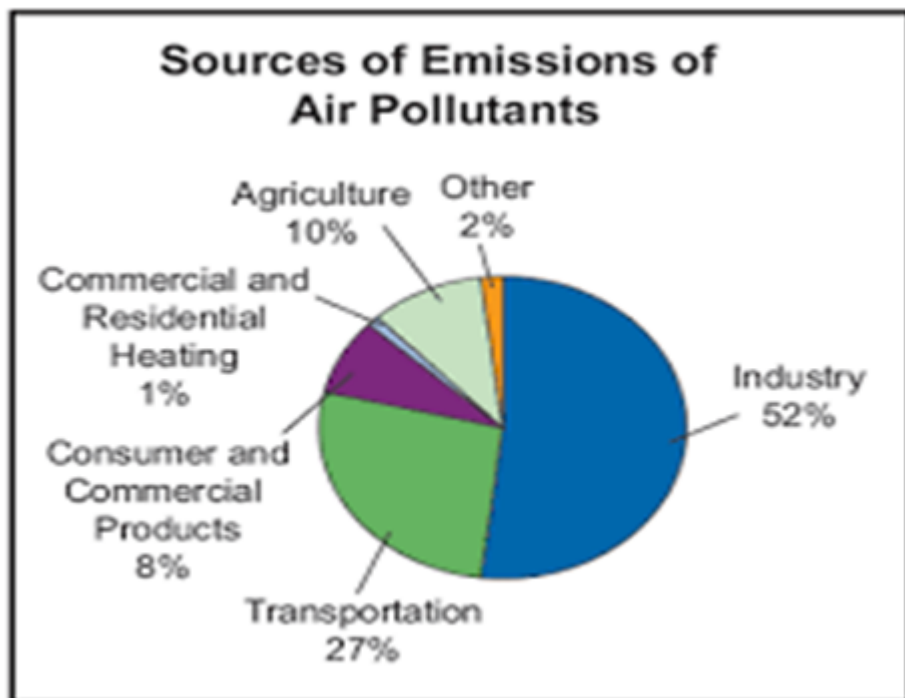
At the WHO's second global conference in March 2025, a shared global commitment was made to cut health impacts of air pollution by 50% by 2040, supported by policy pledges and funding streams.

## Major sources contributing to air pollution in India:

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### **1.Vehicular Emissions:**

Emissions from internal combustion engines—mainly diesel and petrol vehicles—release large quantities of nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), hydrocarbons, and particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>).

Eg. According to a 2025 report by CPCB, vehicular emissions alone contribute to over 38% of PM<sub>2.5</sub> concentrations in Delhi during winter.

### **2.Stubble Burning (Crop Residue Burning):**

large-scale burning of paddy stubble in Punjab, Haryana, and western Uttar Pradesh severely impacts the air quality of the Indo-Gangetic Plain.

Eg. In November 2024, Punjab alone witnessed over 25,000 fire incidents, contributing significantly to Delhi's Air Quality Index (AQI) breaching the "Severe" category.

### **3.Industrial Emissions:**

Emissions from coal-fired thermal power plants and industries like cement, steel, and chemical manufacturing remain underregulated despite norms.

Eg. Jharsuguda recorded PM<sub>10</sub> levels over 120 µg/m<sup>3</sup> in early 2025, attributed to emissions from power plants and smelting operations.

### **4.Construction and Demolition Activities:**

Lack of proper debris management, absence of dust barriers, and the use of outdated construction techniques aggravate pollution.

In Faridabad, for example, PM<sub>10</sub> levels stood at 153 µg/m<sup>3</sup> in 2024–25, far exceeding the NAAQS limit of 60 µg/m<sup>3</sup>.

### **5.Household Biomass Fuel Combustion:**

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Millions of households in rural and peri-urban India still rely on solid fuels like wood, cow dung, and coal for cooking and heating. These fuels release high concentrations of PM2.5, carbon monoxide (CO), and black carbon, contributing to both indoor and outdoor pollution.

### **Impacts of air pollution in India:**

#### **HEALTH IMPACTS:**

##### **Respiratory Diseases and Disorders**

Air pollution significantly increases the risk of asthma, bronchitis, chronic obstructive pulmonary disease (COPD), and lung cancer.

##### **Cardiovascular Complications**

Fine particulate matter (especially PM2.5) penetrates deep into the bloodstream, increasing the risk of heart attacks, strokes, hypertension, and arrhythmias.

Eg. The State of Global Air 2024 report estimated that over 40% of air pollution-related deaths in India are linked to cardiovascular diseases.

##### **Premature Deaths**

Air pollution is a silent killer, causing an estimated 2.1 million premature deaths in India annually. This includes both outdoor and indoor air pollution impacts.

#### **ENVIRONMENTAL IMPACTS:**

##### **Acid Rain and Soil Degradation**

Air pollutants like sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) react with water vapor in the atmosphere to form acidic compounds that fall as acid rain.

##### **Climate Change and Warming Effects**

Certain air pollutants—like black carbon, methane, and ground-level ozone—are short-lived climate pollutants (SLCPs) that contribute to global warming.

Eg. A 2025 IMD report noted that pollution-induced heat absorption and altered aerosol patterns were linked to irregular monsoons and an increase in extreme weather events across north and central India.

##### **Biodiversity Loss and Ecosystem Imbalance**

Pollutants affect pollinators like bees and butterflies, disturb breeding cycles, and disrupt food chains.

Eg. In 2025, ecologists studying urban wetlands near Bengaluru found a decline in amphibian populations due to airborne pesticides and particulate deposition.

### **Why government efforts have failed to control air pollution menace in India?**

**High levels of poverty:** Dependence on fuelwood and kerosene for the purpose of lighting and cooking leads to high levels of pollutants being released in rural and urban periphery.

**Poor governance:** The issue of environment and pollution is still to get the policy priority it deserves. While agencies like CPCB and SPCBs continue to be under-resourced and under-staffed, multiplicity of the state

authorities at the ground level leads to poor coordination, lax enforcement of rules etc.

**Access to technology:** India's industrial landscape continues to be dominated by MSMEs which lack access to cleaner technologies. Agricultural waste burning is also the result of poor access to farm technologies.

**Unplanned urbanisation:** Haphazard growth of urban areas has led to proliferation of slums and poor public transport has increased the burden of personal vehicles on the road.

### **Government initiatives to tackle air pollution in India:**

**National Clean Air Programme (NCAP):** Launched in 2019, NCAP aims to reduce particulate matter (PM2.5 and PM10) pollution in 102 cities by 20-30% by 2024, with strategies focusing on controlling emissions from key sectors like transport, industries, and construction.

**BS-VI Norms for Vehicles:** The Indian government has enforced the Bharat Stage VI (BS-VI) emission standards from April 2020, which are aimed at significantly reducing nitrogen oxides (NOx) and particulate emissions from vehicles.

**Pollution Control and Sustainable Transport :** National Electric Mobility Mission Plan (NEMMP) 2020: Promotes electric vehicles under the FAME India Scheme.

**Vehicular Pollution Control:** Cleaner fuels (CNG, LPG, BS-VI standards), ethanol blending, and promotion of public transport.

**Clean Energy Initiatives:** Targets 50% non-fossil fuel electricity generation by 2030 under Nationally Determined Contributions (NDCs); promotes LPG usage under Pradhan Mantri Ujjwala Yojana for rural households.

### **Conclusion:**

Air pollution in India is not just an environmental concern but a grave public health crisis and developmental challenge. The path ahead requires a shift from reactive to preventive and systemic solutions, emphasizing clean energy transitions, sustainable mobility, and citizen participation. Tackling air pollution is not only crucial for India's climate commitments and economic productivity, but also for ensuring the constitutional right to life and a healthy environment.