

5. Air Pollution in Delhi – Environment

The Commission for Air Quality Management (CAQM) has invoked Stage II of the Graded Response Action Plan (GRAP) across Delhi-NCR as the city's air quality slipped into the "very poor" category

Air Quality Index (AQI) – Overview

Definition – AQI is a tool to communicate the quality of air in terms easy for the public to understand.

Categories – Good, Satisfactory, Moderate, Poor, Very Poor, Severe.

Health Breakpoints – Each AQI category corresponds to specific pollutant concentration thresholds and their health impacts.

AQI Parameters – India's AQI measures eight major pollutants – PM_{2.5}, PM₁₀, NO₂, SO₂, CO, O₃, NH₃, and Lead.

Scale – 0–500, with higher values indicating worse air quality.

AQI Category	AQI Range
Good	0–50
Satisfactory	51–100
Moderate	101–200
Poor	201–300
Very Poor	301–400
Severe	401–450

Common Sources – Household combustion, vehicles, industries, forest fires.

Major Pollutants of Concern – Particulate matter (PM_{2.5} & PM₁₀), CO, NO₂, SO₂, O₃.

Monitoring Agency – Central Pollution Control Board (CPCB), 2014 framework.

Graded Response Action Plan (GRAP)

Objective – Provides stage-wise action plans to control air pollution in Delhi-NCR based on AQI levels.

Implemented By – Commission for Air Quality Management (CAQM).

Stages –

Stage 1 – Poor (201–300)

Stage 2 – Very Poor (301–400)

Stage 3 – Severe (401–450)

Stage 4 – Severe+ (451+)

Stage II Key Actions (Very Poor AQI) –

1. Daily road sweeping and watering.
2. Dust control at Construction & Demolition (C&D) sites.
3. Control pollution in hotspots; ensure uninterrupted power supply to reduce diesel generator use.
4. Traffic management to reduce vehicular emissions.
5. Public advisories through mass media.
6. Discourage private vehicle usage via higher parking fees.
7. Expand CNG/electric bus and metro services.
8. Reduce open burning of biomass and municipal waste.

Commission for Air Quality Management (CAQM)

Constitution – Under CAQM Act, 2021.

Jurisdiction – Delhi, Haryana, Punjab, Rajasthan, Uttar Pradesh.

Leadership – Chairperson with 15+ years in environmental protection or 25+ years administrative experience.

Role – Enforcement of GRAP, monitoring pollution sources, policy recommendations.

Factors Behind Delhi's Air Pollution

1. Anthropogenic Sources

Stubble Burning – Punjab, Haryana, western UP; contributes ~10–35% of PM_{2.5} during Oct–Dec.

Vehicular Emissions – Delhi's vehicles grew from 2.2 million (1994) to 7.6 million, causing 50% of local pollution.

Construction Dust – C&D activities are major PM_{2.5} & PM₁₀ contributors.

Industrial Emissions – Contribute ~22% of annual PM_{2.5} load.

Firecrackers & Landfill Fires – Increase particulate pollution during winter and festivals.

2. Natural & Geographical Factors

Stagnant Winds & Low Air Inversion – Trap pollutants in winter.

Geography – Landlocked with Himalayas to the north, blocking pollutant dispersal.

Dust Transport – Northwesterly winds bring dust from Pakistan and Afghanistan.

3. Administrative & Policy Factors – Low emphasis on public transport alternatives. Delhi had 20.7 lakh private cars out of 79.5 lakh vehicles (2023).

Impacts of Air Pollution

1. Health Impacts – respiratory diseases, cardiovascular issues, premature mortality. Bronchitis, cough, breathlessness, and wheezing in vulnerable groups. Developmental issues in children and growth impairment in babies. Air pollution caused 7.9 million premature deaths globally in 2023.

2. Economic & Social Costs – Increased healthcare expenditure, school closures, workforce productivity loss. 2019 study – air pollution cost \$95 billion to Indian businesses.

3. Environmental Impacts – Damage to crops and vegetation; affects food security. Reduced visibility, impacting air traffic and transportation.

Measures to Tackle Delhi's Air Pollution

1. Controlling Stubble Burning

Subsidized farm machinery to reduce burning.

Happy Seeder – Sows wheat without removing paddy straw.

Pusa Decomposer – Bio-solution for faster stubble decomposition.

Biochar & Pelletization – Converts stubble into soil-enriching or energy resources.

2. Urban Pollution Mitigation

GRAP Stage-II & Dust Control – 376 anti-smog guns, 266 sprinklers, 91 mechanised sweepers.

Vehicular Enforcement – 5.95 lakh PUC challans, stricter commercial vehicle norms.

Peripheral Roads – Reduce pollution by bypassing city traffic.

3. National Clean Air Programme (NCAP) – Launched in 2019 for 131 cities; target PM₁₀ reduction 20–40% by 2025–26. Engages states, industries, and citizens for air quality improvement.

4. Emission Standards & EV Promotion

Bharat Stage (BS) norms – Vehicle emission standards based on European models.

EV Policy 2.0 – Phase out fossil fuel 2- & 3-wheelers by 2026.

5. Technological Interventions

Cloud Seeding – Uses silver iodide or NaCl to induce rainfall, washing out PM_{2.5} & PM₁₀.

Benefits – Short-term relief, emergency measure, research opportunity.

Limitations – Dependent on clouds, short-lived, scientific uncertainty, potential environmental risk.

Satellite & AI Integration – Real-time pollution tracking, early warning, predictive management.

6. Public Participation & Green Infrastructure – Incentives for civil society and farmers to adopt cleaner practices.

Urban Greening – Parks, rooftop gardens, tree plantations, and Harit Ratna awards for environment-friendly initiatives.

7. Source-Control & Structural Measures – Year-round measures for vehicles, industries, construction dust.

National Research Centre – Conduct standardized source apportionment studies.

Focus on sustainable lifestyles aligned with government's LiFE initiative.

Source – <https://thewire.in/environment/three-out-of-four-households-in-delhi-ncr-facing-health-issues-because-of-polluted-air>