



Stubble Burning

Why in News?

A study published in **January 2025**, based on **field measurements, airmass trajectories, and chemical transport models**, found **no linear correlation** between **stubble-burning events** in Punjab and Haryana and **PM2.5 concentration** in Delhi-NCR.

Key Points

- **Limited Impact of Stubble Burning:**
 - Researchers found that **crop residue burning in Punjab and Haryana contributes only about 14% of PM2.5 in Delhi-NCR**, making it an insignificant primary source of pollution.
 - Despite a **50% decline in stubble-burning incidents from 2015 to 2023**, PM2.5 concentration in Delhi-NCR remained fairly constant, indicating other major pollution sources.
- **Scientific Observations on Air Pollution:**
 - Researchers from **the Research Institute for Humanity and Nature (RIHN), Kyoto**, confirmed that PM2.5 variations in Delhi-NCR do not directly correlate with fire counts in Punjab and Haryana.
 - Stubble burning largely stops after November, yet Delhi-NCR's air quality index has remained in the "very poor" to "severe" category every winter since 2016 due to stagnant winds, lower mixing heights, and inversion conditions.
- **Key Findings on Pollution Sources:**
 - In 2023, **CO concentration at night was 67% higher** than during the day in Delhi-NCR, compared to 48% in 2022, while Punjab and Haryana showed clear day-night variations only during peak stubble-burning periods.
 - Even during the peak crop residue burning season (October-November), local industrial and anthropogenic sources contribute more to PM2.5 than stubble burning.
 - During **the Graded Response Action Plan (GRAP) Stage III and IV periods**, strict controls on transport and construction significantly reduced PM2.5 levels, but once restrictions were lifted, pollution levels surged again.
- **Major Contributors to PM2.5 in Delhi-NCR:**
 - Transport Sector - 30%
 - Local Biomass Burning - 23%
 - Construction and Road Dust - 10%
 - Cooking and Industry - 5-7%
 - Unaccounted Sources - 10%
 - Stubble Burning - 13% (only in October-November)

The Graded Response Action Plan (GRAP)

- **About:**
 - The **GRAP** consists of emergency measures designed to prevent the deterioration of air quality after reaching specific thresholds in the **Delhi-NCR region**.
 - The **Ministry of Environment, Forests & Climate Change (MoEF&CC)** notified the

GRAP in 2017.

- Commission for Air Quality Management in NCR & Adjoining Areas (CAQM) implements the GRAP.

- **Implementation:** It is implemented under four stages:

The stages and restrictions

Good 0-50	Satisfactory 51-100	Moderate 101-200
Poor 201-300	Very Poor 300-400	Severe 401-500

STAGE I (AQI 201-300)

Agencies to strictly enforce orders by NGT, SC on keeping vehicles older than 10 years (for diesel) and 15 years (petrol) off roads.

STAGE II (AQI 301-400)

- Measures to curb air pollution at hot spots
- Diesel generators of more than 19KW cannot be used unless they run on dual fuel or have emission control devices.

STAGE III (AQI 401-450)

- BS-III petrol, BS-IV diesel private cars to be banned in NCR. Last year, the rule was optional for state governments
- Schools will likely be closed for children up to Class 5.

STAGE IV (AQI OVER 450)

- Light commercial vehicles registered outside Delhi will be restricted except those that are EVs/CNG/ BS-VI diesels. Vehicles carrying essentials or providing essential services to be allowed
- Educational institutions will likely be closed. Non-emergency commercial activities and odd-even vehicle policy may be rolled out.

- **GRAP is incremental in nature** and thus, when the air quality dips from 'poor' to 'very poor,' measures listed under both sections have to be followed.

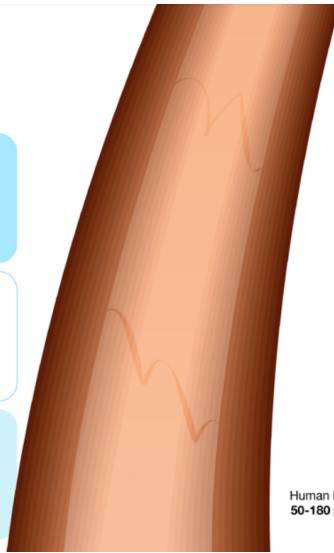
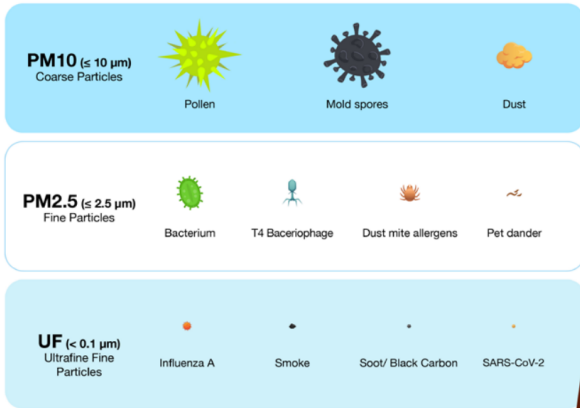
Particulate Matter (PM)

- Particulate matter, or PM, refers to a complex mixture of extremely **small particles and liquid droplets** suspended in the air. These particles come in a wide range of sizes and can be made up of hundreds of different compounds.
 - **PM10 (coarse particles)** - Particles with a diameter of 10 micrometres or less.
 - **PM2.5 (fine particles)** - Particles with a diameter of 2.5 micrometres or less.

Particulate Size Matters: Comparing sizes

Small particles pose the greatest risk to human health. While the nose can filter most coarse particles, fine and ultrafine particles are inhaled deeper into the lungs where they can be deposited or even pass into the bloodstream.

Measurement indicate microns in diameter (μm).



Human hair
50-180 μm

PDF Reference URL: <https://www.drishtias.com/printpdf/stubble-burning-21>

