



Shifting Patterns in Stubble Burning

Why in News?

Madhya Pradesh has seen a sharp increase in [Stubble burning cases](#), surpassing Punjab with over 10,000 farm fires reported.

Key Points

- The changing trends in stubble burning have added complexity to the **harvest-season practice**, which heavily contributes to North India's [air pollution](#).
- **Regional Trends:**
 - **Alarming Rise in Madhya Pradesh:** Madhya Pradesh recorded 506 stubble-burning cases surpassing its previous high of 296 cases, indicating a significant rise.
 - **Positive Reduction in Punjab:** Punjab reduced its stubble-burning incidents from 587 to 262, showing a **promising decline in crop residue burning**.
 - **Increases in Uttar Pradesh and Rajasthan:** Uttar Pradesh's cases jumped from 16 to 84 in a day, while Rajasthan's incidents rose from 36 to 98, marking the season's second-highest count.
 - **Progress in Haryana:** Haryana reported a downward trend, with cases dropping from 42 to 13, reflecting **progress in managing stubble burning**.

Stubble Burning

- **About:**
 - **Stubble (parali)** burning is a method of **removing paddy crop residues** from the field to sow wheat from the **last week of September to November**, coinciding with the withdrawal of [southwest monsoon](#).
 - Stubble burning is a **process of setting on fire the straw stubble**, left after the harvesting of grains, like paddy, wheat, etc. It is usually required in areas that use the combined harvesting method which leaves crop residue behind.
 - It is a common **practice in October and November across North West India**, but primarily in Punjab, Haryana, and Uttar Pradesh.
- **Effects of Stubble Burning:**
 - **Pollution:** Emits large amounts of toxic pollutants in the atmosphere which contain harmful gases like [methane \(CH₄\)](#), [Carbon Monoxide \(CO\)](#), [Volatile Organic compounds \(VOC\)](#) and carcinogenic polycyclic aromatic hydrocarbons.
 - These pollutants disperse in the surroundings, may undergo a physical and chemical transformation and eventually adversely affect human health by causing a thick blanket of smog.
 - **Soil Fertility:** Burning husk on the ground destroys the nutrients in the soil, making it less fertile.
 - **Heat Penetration:** The heat generated by stubble burning penetrates into the soil, leading to the loss of moisture and useful microbes.
- **Alternatives to Stubble Burning:**
 - **In-Situ Treatment of Stubble:** For example, crop residue management by zero-tiller machine and Use of bio-decomposers.
 - **Ex-Situ (off-site) Treatment:** For example, Use of rice straw as cattle fodder.

- **Use of Technology:** For example **Turbo Happy Seeder (THS) machine**, which can uproot the stubble and also sow seeds in the area cleared. The stubble can then be used as mulch for the field.

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Air Pollutants

Sulphur Dioxide (SO₂)



It comes from the consumption of fossil fuels (oil, coal and natural gas). Reacts with water to form acid rain.

Impact: Causes respiratory problems.

Ozone (O₃)



Secondary pollutant formed from other pollutants (NO_x and VOC) under the action of the sun.

Impact: Irritation of the eye and respiratory mucous membranes, asthma attacks.

Nitrogen Dioxide (NO₂)



Emissions from road transport, industry and energy production sectors. Contributes to Ozone and PM formation.

Impact: Chronic lung disease.

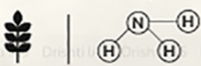
Carbon Monoxide (CO)



It is a product of the incomplete combustion of carbon-containing compounds.

Impact: Fatigue, confusion, and dizziness due to inadequate oxygen delivery to the brain.

Ammonia (NH₃)



Produced by the metabolism of amino acids and other compounds which contain nitrogen.

Impact: Immediate burning of the eyes, nose, throat and respiratory tract and can result in blindness, lung damage.

Lead (Pb)



Released as a waste product from extraction of metals such as silver, platinum, and iron from their respective ores.

Impact: Anemia, weakness, and kidney and brain damage.

Particulate Matter (PM)



PM10: Inhalable particles, with diameters that are generally 10 micrometers and smaller.

PM2.5: Fine inhalable particles, with diameters that are generally 2.5 micrometers and smaller.

Source: Emitted from construction sites, unpaved roads, fields, fires.

Impact: Irregular heartbeat, aggravated asthma, decreased lung function.

Note: These major air pollutants are included in the Air quality index for which short-term National Ambient Air Quality Standards are prescribed.

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