



## Bringing an End to Stubble Burning

This article is based on [“Bringing an end to stubble burning”](#) which was published in Hindu Business Line on 22/10/2022. It talks about the issues related to Stubble Burning and Ways to address the issue.

**For Prelims:** Stubble burning, Air pollution in Northern India, Subsidies for electricity and fertilisers, Polycyclic Aromatic Hydrocarbons (PAH), Carbon Monoxide (CO), Happy Seeder, Bioethanol, Pusa Basmati-1509.

**For Mains:** III Effects of Stubble Burning, Alternatives to Stubble Burning.

The need for providing food grains for a growing population, while sustaining the natural resource base, has emerged as one of our main challenges for India. **Foodgrains are a major source of energy and are thus vital for [food and nutritional security](#).**

But harvesting of various crops generates a **large volume of residues both on and off farm**. The **Ministry of New and Renewable Energy** estimated that about **500 Mt of crop residues are generated annually**.

The problem of **‘on-farm’ burning or [stubble burning](#) is intensifying in recent years** due to shortage of human labour, high cost of removing the crop residue from the field and mechanised harvesting of crops, contributing majorly to **[air pollution in Northern India](#)**.

**Therefore**, there is a need to find **innovative solutions** that curb the menace of stubble burning, in order to foster **healthy, sustainable, pollution-free farming practices**.

### What is Stubble Burning?

- Stubble burning is a process of setting on fire the **straw stubble**, left after the harvesting of grains, like **paddy, wheat**, etc.
- In India, stubble (parali) burning is practised to **remove paddy crop residues** from fields to sow wheat, which occurs **around the end of September** and beginning of **November**.
  - The practice is prevalent especially in **Punjab, Haryana, and Uttar Pradesh in October and November**.

### What are the III Effects of Stubble Burning?

- **Damage to the Environment:** Burning stubble emits toxic gases such as **[Carbon Monoxide \(CO\)](#), [Methane \(CH<sub>4</sub>\)](#), [Polycyclic Aromatic Hydrocarbons \(PAH\)](#), and [Volatile Organic Compounds \(VOC\)](#)**.
  - A thick blanket of smog is formed from these pollutants dispersing into the surrounding area, **ultimately affecting air quality and health**. This is one of the **primary causes**

of Delhi's air pollution.

- **Impact on Soil Properties:** Heat from burning residues [elevates soil temperature](#) causing death of beneficial soil organisms.
  - **Frequent residue burning leads to complete loss of microbial population** and reduces levels of **Nitrogen and Carbon** in the soil, which is important for crop root development.
- **Impacts on Human Health:** There have been several health effects caused by the resultant air pollution, **ranging from skin irritation to severe neurological, cardiovascular, and respiratory problems.**
  - Research shows that pollution exposure also has an adverse effect on mortality rates - the [life expectancy of Delhi residents has decreased by about 6.4 years as a result of high pollution levels.](#)
- **Insufficient Stubble Management Infrastructure:** Farmers burned almost 15.4 million metric tons (out of 19.7 MMT) in open fields due to the lack of stubble management infrastructure (**Punjab government 2017**).
  - Also, it is preferred by farmers because it is **cheaper and faster**, helping them to **clear the land in time for the next cropping season.**
- **Negative Effects of Subsidies for Agriculture:** [Subsidies for electricity and fertilisers](#), along with easier **access to credit in agriculture**, have led to substantial increases in **crop yields and agricultural productivity** in subsequent decades, which has in turn **exacerbated stubble burning.**

## What can be the Alternatives to Stubble Burning?

- **Bio Enzyme-PUSA:** A [bio-enzyme called PUSA](#) has been developed by the **Indian Agriculture Research Institute** as a solution to stubble burning.
  - As soon as it is sprayed, this enzyme starts decomposing the stubble in 20-25 days, turning it into manure, which further improves the soil.
    - It also increases organic carbon and soil health while reducing fertiliser expenses for the **next cropping cycle.**
- **Palletisation:** Paddy straw can be dried and converted into [pellets](#) can be mixed along with coal which can be used in thermal power plants and industries as fuel. This can **save coal as well as reduce carbon emissions.**
- **Happy Seeder:** Instead of burning the stubble, a tractor-mounted machine called the [Happy Seeder](#) can be used that **“cuts and lifts rice straw**, sows wheat into the bare soil, and deposits the straw over the sown area as mulch.
- **Chhattisgarh Innovative Model:** It is an innovative experiment that has been undertaken by the Chhattisgarh government which involves the setting up of **gauthans.**
  - Gauthans are **five-acre plots owned by each village where unused stubble or parali is collected** through parali daan (people's donations) and turned into **organic fertiliser by mixing cow dung with natural enzymes.**
- **Additional Alternative Uses:** Stubbles can be used in various ways; cattle feed, compost manure, roofing in rural areas, for packing materials, for preparation of papers and for preparation of [bioethanol](#) as well.

## What Should be the Way Forward?

- **Revitalising Stubble Management:** Similar schemes like the [MGNREGA](#) should be replicated for harvesting and composting stubble burning, as well as regulating post-harvest management at the ground level.
    - **Incentives can also be offered to farmers** who reuse and recycle their stubble.
  - **New and Improved seed varieties:** Recent studies has pointed out that the use of new and improved varieties of rice and wheat crop particularly short duration crop varieties like **Pusa Basmati-1509 and PR-126**, could be seen as a measure to **overcome the problem of stubble burning** as they mature quickly and also improve the quality of the soil.
  - **Farmer Awareness:** Behavioural change is also needed to achieve this goal. Farmers need to be **educated and informed about how stubble burning poses a threat to human life** as well as the fertility of the soil and should be encouraged to adopt [eco-friendly technologies.](#)
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### **Drishti Mains Question**

Discuss the ill effects of stubble burning in India. And suggest innovative measures how this menace can be tackled.

## **UPSC Civil Services Examination, Previous Year Question (PYQ)**

### **Prelims**

**Q. Consider the following agricultural practices: (2012)**

1. Contour bunding
2. Relay cropping
3. Zero tillage

**In the context of global climate change, which of the above helps/help in carbon sequestration/storage in the soil?**

- (a) 1 and 2 only  
(b) 3 only  
(c) 1, 2 and 3  
(d) None of them

**Ans: (b)**

### **Mains**

**Q. What are the major factors responsible for making the rice-wheat system a success? In spite of this success, how has this system become bane in India? (2020)**

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