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: Ill 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 Ill Effects of Stubble Burning?

- **Damage to the Environment:** Burning stubble emits toxic gases such as Carbon Monoxide (CO), **Methane (CH_4),** 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.**

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)**
