Stubble Burning [UPSC Notes]

Stubble burning is a term that is frequently seen in the news nowadays. It is one of the major causes of winter pollution in northern India, particularly, Delhi and adjoining areas. It is an important topic for the UPSC exam, and comes under the environment, governance, and agriculture segments.

What is Stubble Burning?

Stubble burning is the intentional burning or setting on fire of crop residue to remove them from the field in order to sow the next crop.

- Leaving stubble on the field will invite termites and other pests which can damage the subsequent crop.
- In Punjab and Haryana, farmers burn the stubble (rice chaff) left after the rice harvest so that the field may be readied for the next Rabi (winter) crop like wheat.
- In these areas, it begins around October, the same time at which the southwest monsoon withdraws.
- Section 188 of the Indian Penal Code (IPC) makes stubble burning a crime. Additionally, it was notified as an offence under the Air (Prevention and Control of Pollution) Act, 1981.
- Despite being banned, the practice continues in India, where farmers cite a lack of viable alternatives to clear their fields of stubble.

Why do farmers burn stubble?

Stubble burning has been practiced by farmers from all over the world although many governments have prohibited the practice in various degrees. In this section, we will see why farmers in northern India burn stubble.

- In the 1960s, as part of the Green Revolution, farmers in Punjab and Haryana were encouraged to do wheat-paddy crop rotation to make India self-reliant in grains production.
- As a result and because of assured procurement of rice and subsidies, rice acreage increased.
- The Punjab Preservation of Subsoil Water Act (2009) made it mandatory for farmers to transplant paddy late during the Kharif season to prevent loss of water.
- This gives the farmers very little time between harvesting the rice crop and preparing the field for the next winter crop.
- Hence, stubble burning is a quick, cheap and easy way to clear the field of any rice chaff residue.
- One reason for the large quantity of rice stubble left behind after harvesting is the increased modernisation and mechanisation of agriculture. Mechanised harvesting extracts the rice grains only leaving behind huge residue. Manual harvesting is not an option for farmers because of the huge labour charges and the increased time taken.
- Earlier, the stubble used to be used by farmers as hay to keep animals or homes warm, and even for cooking. However, these uses of stubble have now become outdated.
- Also, rice straw is not considered suitable as fodder for animals because of its high silica content (this is true for the non-basmati variety of rice).
- Despite the Punjab government making available tractor-mounted ‘happy seeders’ to cut down the rice stubble and sow wheat seeds simultaneously, many farmers find the prices of these machines or their rents prohibitive. So, they continue to burn stubble.
    - To use a ‘happy seeder’ machine, farmers have to shell out Rs.1000 per acre of land as machine rent and a further Rs.2000 for diesel.
- A few other machines/devices have been introduced by the government. However, many farmers cite suitability as an issue.

- Also, stubble burning requires only a matchbox whereas the adoption of these machines incurs additional costs for the farmers.

Advantages of Stubble Burning

- It is the cheapest and quickest way to deal with crop waste.
- It destroys weeds including those that are resistant to herbicides.
- It kills other pests also, such as slugs.
- It can decrease nitrogen tie-up.

What are the effects of stubble burning?

Stubble burning has very adverse effects on the environment.

- Pollution: According to a study, the burning of crop residue released about 149 million tonnes of carbon dioxide, more than 9 million tonnes of carbon monoxide, 0.25 million tonnes of oxides of sulphur (SOX), 1.28 million tonnes of particulate matter (PM) and 0.07 million tonnes of black carbon. As evident, it contributes to a lot of greenhouse gas emissions.
    - In particular, the stubble burning across Punjab and Haryana contributes to the winter haze in Delhi where about 40% of the near-surface PM can be attributed to the stubble burning.
    - It also contributes to the winter smog seen in these parts of the country.
- Soil fertility: Burning stubble also adversely affects soil fertility. It destroys the soil's nutrients making it less fertile. This is because the heat generated during the burning kills the bacterial and fungal populations which are crucial for fertile soil.
- Stubble burning can also cause an increase in 'enemy' pests because, during the burning, many microorganisms in the air are killed. The loss of these organisms leads to an increase in the pests, in turn, causing increased diseases in crops.

Loss of wealth from stubble

Another ill-effect of stubble burning is the loss of 'wealth' from the stubble.

- High-grade organic fertilizers can be prepared by mixing the stubble with cow dung and some natural enzymes.
    - This has been initiated by the Chhattisgarh government which has set up gauthans in many villages. In these, gauthans, farmers bring their stubble to a 'gauthan' where it is mixed with cow dung and enzymes to obtain organic fertilizer. This initiative also provides employment to the rural youth.
- A lot of nitrogen, potassium, sulphur, phosphorous as well as organic carbon are destroyed every year on account of stubble burning. They should ideally be used to make organic manure. This will also reduce the dependency and use of chemical fertilizers.
- Straw can also be used in electricity generation.

Measures to curb stubble burning

The administration has taken several measures to curb the practice of stubble burning by farmers.

- In 2019, the Supreme Court directed the governments of Haryana, Punjab and Uttar Pradesh to pay farmers a financial incentive to curb the practice.
- In 2020, the Government of Punjab appointed 8000 nodal officers in villages that grow paddy in order to put a check on stubble burning.

- Already, penalties for stubble burning are imposed on farmers who break the law and resort to burning crop residue.
- More than 23,000 crop residue management machines are being given to farmers for on-site management of straw.
- The state had been demanding the Centre to give ₹100 per quintal to farmers for managing the paddy straw without burning. However, the Environment Pollution (Prevention and Control) Authority or EPCA had said that this was not viable.
- Under a 100% centrally-funded scheme, in-situ residue management machines are given to individual farmers at 50% subsidy and to CHCs (custom hiring centres) at 80% subsidy.
- The states of Punjab and Haryana are also providing such machines and setting up more CHCs.
- In October 2020, the Centre informed the Supreme Court that it would bring in a law to curb stubble burning.
- The SC had also decided to form a one-man committee chaired by Justice Madan Lokur to monitor/prevent stubble burning in Uttar Pradesh, Haryana and Punjab. This order has been kept in abeyance as of 28 October 2020.

Solutions to stubble burning problem

A few solutions to the problem of stubble burning are discussed below.

- Incentivise farmers for not burning the stubble and provide economic value for the crop residue. The stubble can be converted into fodder or organic fertilizer or fuel. The government should also subsidise or incentivise the industries that are engaged in converting stubble into economically viable products.
- Efforts should be made to improve the combine harvester that farmers use to harvest the crop. The current machine used leaves behind a huge residue. Improvement should be made in the technology used in such machines so that minimal residue is left behind.
- Encourage and incentivise the farmers to go for early paddy, so as to give them enough time to harvest and thereafter prepare their fields for the next Rabi crop.
- Encourage farmers to sow alternate crops and shift them away in the long run from paddy to maize, fruits, vegetables and cotton.
- Use machinery like the Happy Seeder to remove the stubble. The government should make these machines available and economically viable for farmers.
- Penalise farmers that indulge in stubble burning. Despite penalties, many farmers engage in this practice because they find it cheaper to pay the fines rather than incurring the expenses for the alternatives for stubble burning. The government can also consider reinterpreting the MSP scheme to disallow the benefits of the scheme to farmers who practice crop residue burning.
- The government has to increase monetary incentives for avoiding stubble burning and also make machines that counter stubble burning an affordable, viable and accessible option for farmers.
- Farmers have a difficult time unlearning the practice of stubble burning and they should be educated about its ill-effects and also offered attractive alternatives.
- Eminent agricultural scientist M.S. Swaminathan has suggested that the Delhi, Haryana and Uttar Pradesh governments could set up ‘Rice Bio Parks’, where farmers could convert stubble into products including paper, cardboard and animal feed.