

# STUBBLE BURNING IN INDIA

**Dr. Shabnam Kaur Sodhi**

Associate Professor

Department of Zoology

Government College Girls, Patiala, India.

**Abstract:** Stubble burning is a practice of removing paddy crop residues from the field for sowing next crop viz. wheat. A convenient way to get rid of the whopping 23 million metric ton of grass and hay left behind by rice cultivation is to burn them. However, this practice contributes to air pollution in cities like Delhi, where the air quality is already the worst in the world. In 2017, researchers from The Nature Conservancy (TNC), an environmental organization headquartered in the US, met with a few collaborators from different institutes in India, to discuss this 'burning' problem and find alternatives to the practice. Although crop burning is prohibited, farmers continue to defy the ban, due to a lack of greener alternatives that are feasible, affordable and scalable. In a new study, Dr Shyamsundar and her collaborators from India, Mexico and the USA, have evaluated the impact of alternative practices to stubble burning on the environment, and their profitability. The analysis, published in the journal Science, finds that using Happy Seeder—a machine that can sow wheat in the presence of rice straw—is profitable for farmers and can also help the environment. The researchers found that using the Happy Seeder led to a nearly 10-20% increase in farmer profits on average. Thus, farmers can, on average, reap a benefit of INR 11498 per hectare by switching from the most common burning practices to the use of a Happy Seeder for mulching. The machine can be mounted on a tractor, and it cuts and lifts rice straw, sows wheat into the bare soil, and deposits the straw over the planted area as mulch. However, not all farmers currently have access to equipment like the Happy Seeder. The researchers suggest that the government and the private sector can play an active role in increasing the adoption of no-burn practices.

**Index Terms:** Stubble, Pollution, Burning And Happy Seeder.

## INTRODUCTION

Around 23 million tons of residue is burnt in paddy fields every October-November to clear the field for conventional wheat sowing because of the narrow window between paddy harvesting and wheat sowing. If monsoon arrives late, this window narrows further, prompting farmers to set the residue on fire to clear the field for winter crops. Crop residue burning in Punjab, Haryana and western Uttar Pradesh has been known, but nowadays it's spreading more frequently in other parts of country. Wheat stubble burning is a relatively new issue which started with mechanized harvesting using combine harvesters. In the last four to five years, farmers from UP's Ghazipur district, especially Zamania and Chandauli areas, have been burning wheat stubble at a large scale. Although the actual amount of fines charged was not available; farmers continue to burn residues every season — this making both the soil and air poisonous. In addition to wheat and paddy, sugarcane leaves are most commonly burnt. According to an official report, more than 500 million tonnes of parali (crop residues) is produced annually in the country, cereal crops (rice, wheat, maize and millets) account for 70 per cent of the total crop residue. Of this, 34 per cent comes from rice and 22 per cent from wheat crops, most of which is burnt on the farm. According to an estimate, 20 million tons of rice stubble is produced every year in Punjab alone, 80 per cent of which is burnt. Instead of burning of the stubble, it can be used in different ways like cattle feed, compost manure, roofing in rural areas, biomass energy, mushroom cultivation, packing materials, fuel, paper, bio-ethanol and industrial production, etc.

## Environmental and health risk

A study estimates that crop residue burning released 149.24 million tons of carbon dioxide (CO<sub>2</sub>), over 9 million tons of carbon monoxide (CO), 0.25 million tons of oxides of Sulphur (SOX), 1.28 million tons of particulate matter and 0.07 million tons of black carbon. These directly contribute to environmental pollution, and are also responsible for the haze in Delhi and melting of Himalayan glaciers. The heat from burning paddy straw penetrates 1 centimeter into the soil, elevating the temperature to 33.8 to 42.2 degree Celsius. This kills the bacterial and fungal populations critical for a fertile soil. Burning of crop residue causes damage to other micro-organisms present in the upper layer of the soil as well as its organic quality. Due to the loss of 'friendly' pests, the wrath of 'enemy' pests has increased and as a result, crops are more prone to disease. The solubility capacity of the upper layers of soil have also been reduced. According to a report, one ton stubble burning leads to a loss of 5.5 kilogram nitrogen, 2.3 kg phosphorus, 25 kg potassium and more than 1 kg of sulfur — all soil nutrients, besides organic carbon. A study conducted by Vitull K Gupta, professor of medicine, Bathinda, in 2016, revealed that 84.5 per cent people were suffering from health problem due to increased incidence of smog. It found that 76.8 per cent people reported irritation in eyes, 44.8 per cent reported irritation in nose, and 45.5 per cent reported irritation in throat. Cough or increase in cough was reported by 41.6 per cent people and 18.0 per cent reported wheezing. Another study by the Institute for Social and Economic Change, Bengaluru, estimated that people in rural Punjab spend Rs 7.6 crore every year on treatment for ailments caused by stubble burning. Studying the source of [air pollution in New Delhi](#), a team of researchers from Stockholm University and the Indian Institute for Tropical Meteorology found that emissions from burning crop residues or other biomass in rural areas neighboring the city contribute nearly half of the airborne black-carbon particulate matter—soot—in New Delhi during the fall and winter. A third, recent study estimates the cost of burning crop residues to Indian society in terms of respiratory infections. Stubble burning increases the risk of acute respiratory infections three-fold in India's northern regions, according to research led by Samuel P. Scott of the International Food

Policy Research Institute (Int. J. Epidemiol. 2019, DOI: [10.1093/ije/dyz022](https://doi.org/10.1093/ije/dyz022)). Children younger than 5 years of age are particularly susceptible to such infections. Scott and colleagues estimate the related economic cost to be more than \$30 billion annually.

## Solutionsto the burning problem

The Centre Govt. had in 2018 launched a Rs 1,150-crore scheme to support farmers for machinery, capacity development, knowledge sharing and awareness creation. “The Centre is giving up to 8% subsidy on purchase of machines like Super SMS, Happy Seeder, Paddy Straw Chopper and zero till drill used for residue management. Those farmers who don’t want to buy these machines can easily get them on rent from Custom Hiring Centers (CHCs) in their neighborhood,” he said. The government officials are not paying attention toward this. Ramnagina Kushwaha, a farmer from Zamania, Ghazipur, recently died in a field after being set ablaze while burning wheat stubble. The state government has not implemented the National Policy for Management of Crop Residues to protect the parali (crop residue). On December 10, 2015, the National Green Tribunal (NGT) had banned crop residue burning in the states of Rajasthan, Uttar Pradesh, Haryana and Punjab. Burning crop residue is a crime under Section 188 of the IPC and under the Air and Pollution Control Act of 1981. However, government’s implementation lacks strength. The Delhi high court had also ordered against burning residues, while Punjab government imposed a penalty of Rs 73.2 lakh farmers in 2016 for burning of crop residue. In 2014, the Union government released the National Policy for Management of Crop Residue. Since then, crop residue management has helped make the soil more fertile, thereby resulting in savings of Rs 2,000/hectare from the farmer’s manure cost. Farmers can also manage crop residues effectively by employing agricultural machines like: Happy Seeder (used for sowing of crop in standing stubble) Rotavator (used for land preparation and incorporation of crop stubble in the soil) Zero till seed drill (used for land preparations directly sowing of seeds in the previous crop stubble) Baler (used for collection of straw and making bales of the paddy stubble) Paddy Straw Chopper (cutting of paddy stubble for easily mixing with the soil) Reaper Binder (used for harvesting paddy stubble and making into bundles) On other hand, these machines are too costly and the state governments should come forward and provide better subsidy so that farmer can afford these machines. Former Agriculture Minister Radha Mohan Singh had said that the government is providing subsidy at 50-80 per cent for crop residue management machinery. A provision of Rs 1,151.80 crore for two years has been made under this scheme for states like Punjab, Haryana, Uttar Pradesh and the National Capital Region.

## References:

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