

# STUBBLE BURNING: A DISTRESS TO ENVIRONMENT

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## INTRODUCTION

Stubble is the left over material on the soil after harvest of the crop and Stubble burning is the practice of intentionally setting fire to the straw stubble remaining in the field after harvesting.

Stubble burning has become a major issue in the northern part of the country (Punjab, Haryana, western UP). The stubbles generated from the wheat-rice rotation are contributing a major role in air pollution, along with the nutrient depletion in the soil. According to the Ministry of New and Renewable Energy, India produces around 500 million tons of crop residue each year, out of which 92 Mt is burnt each year which results into the mixing of different hazardous pollutant gases (CO<sub>2</sub>, CO, NH<sub>3</sub>, NOX, SOX, Non-methane hydrocarbon, volatile organic compounds) and particulate matter (PM) directly into the air causing air pollution.

## CAUSES OF STUBBLE BURNING

- Grains being only economic part of rice and wheat, farmers of northern part of India are less concerned about the stubbles, produced after the harvesting of the crop.
- Particularly in the northern part of India, farmers are following the rice-wheat cropping system, which produces more output along with a huge amount of crop stubble.
- Another reason behind the farmers burning the crop residue hastily just after the harvesting is the act of Punjab Preservation of Subsoil Act (2009), where June 20 is fixed for the paddy transplantation date. This forces the farmers to do the harvest early, which is around 15 days between the harvest of rice and the sowing of wheat.



# ENVIRONMENTAL AND HEALTH HAZARDS

According to the report of the Central Pollution Control Board, a public health emergency was faced on 1st Nov. 2019 in New Delhi.. Delhi recorded a peak of AQI (Air Quality Index) of 487, along with Ghaziabad and Greater Noida having the AQI of 493 and 480 respectively. Not only air pollution but it also causes soil health degradation by killing the beneficial micro-organisms present in the soil, nutrient depletion, and soil water level decrease. It is estimated that the burning of the rice stubbles causes nutrient losses of around 3.85 million tons of organic carbon, 59000 t of nitrogen, 20000 t of phosphorus, and 34000 t of potassium.

The harmful gases released from the burning stubble cause environmental pollution. The ill effects caused by uncontrolled stubble burning are stated below-

- **Air pollution-** Global air quality, 2019 showed that 14 out of 20 most polluted cities in the world are from India itself (out of which Ghaziabad, UP is the most polluted) . The major cause of this found to be stubble burning.
- **Degrade soil fertility-** The organic carbon in Punjab soil has been decreasing to a very low extent, due to insufficient application of organic matter and burning of rice stubbles can lead to loss of about 0.445 Mt NPK.
- **Affect plant health-** Depletion of different macro and micro elements from the soils leads to improper growth of the plant, which may lead to the appearance of deficiency symptoms in the plant causing poor yield.

- **Affect human health-** Polluted air caused by stubble burning can harm human health, ranging from skin disease to eye irritation. If it is severe then neurological, cardiovascular, respiratory diseases, even hypoxia (oxygen deficiency) may also occur.



## MANAGEMENT

- The stubbles produced after the harvesting of the crop can be utilized properly in many ways viz. for the preparation of compost, biofuel, biochar, and raw materials for the paper industry, and also can be used as a blend for the production of cement and bricks.
- **Composting-** Properly decomposed agricultural stubble can be used as manure, as it contains nitrogen, phosphorus, potassium, and other micronutrients as well hence it will also improve soil productivity.

- **Biochar production-** Biochar can be produced from crop stubble through the process of pyrolysis. It improves the organic carbon content in soil.
- **Fodder-** Crop stubbles can be used as fodder also especially the wheat stubble, because of its high nutritive value.
- **Biofuel and Biogas production-** Biofuels can be prepared from crop stubbles. This can be a viable option for managing the crop stubble. Crop stubble has enough amount of cellulose, which is required for the production of biofuel (methanol, ethanol).
- **Production of Briquettes-** Biomass like crop stubbles are used for the production of briquettes, which can be used as replacement for the coal in the combustion process, where heat energy is converted into electrical energy.

## CONCLUSION

Every year in India a large amount of crop residue is produced due to rice-wheat cultivation, especially in Northern part of the country. Farmers burn these crop stubbles in the field itself, which causes immense pollution leading to conspicuous health hazards among all living beings in the vicinity. Instead of burning, these crop stubbles can be used for the production of biochar, biofuel, biogas, briquettes, paper-making industries, feed for livestock, etc. which the farmers are unaware of. By making them aware of the alternatives this esoteric practice of stubble burning can be avoided from its roots.