

Agricultural Residue Burning In India- an Overview

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Introduction

Agricultural residue burning in the fields is a way to dispose the straw and stubbles which are left after harvest so as to make the fields ready for the following season. India, being the second largest agro-based economy with year-round crop cultivation, generates a large amount of agricultural waste, including crop residues. Open burning of crop residues in the agricultural fields has become an environmental concern in India, particularly during paddy harvesting season. About 50 per cent of all crop residue burnt in the country are residues of rice crop (TIFAC, 2018). Harvesting of various crops generates large volume of residues both on and off farm. Ministry of New and Renewable Energy estimated that about 500 Mt of crop residues are generated annually. Among different crops, cereals generate maximum residues followed by fibres, oilseeds, pulses and sugarcane. Cereal crops (rice, wheat, maize, millets) contribute 70%, while rice crop alone contributes 34% to the crop residues. Crop residues are primarily used as bedding material for animals, livestock feed, soil mulching, bio-gas generation, bio-manure/compost, thatching for rural homes, mushroom cultivation, biomass energy production, fuel for domestic and industrial use etc. All the remaining stubbles have been burnt for preparing the field for the next crop. As per available estimates, burning of crop residues is predominant in four states, namely, Haryana, Punjab, Uttar Pradesh and West Bengal.

Generally helpful effects

- Kills slugs and other pests
- Can reduce nitrogen tie-up

Adverse effect of residue burning

- Pollution from smoke
- Damage to electrical and electronic equipment from floating threads of conducting waste
- Risk of fires spreading out of control
- The main adverse effects of crop residue burning include the emission of greenhouse gases (GHGs) that contributes to the global warming, increased levels of particulate matter (PM) and smog that cause health hazards, loss of biodiversity of agricultural lands, and the deterioration of soil fertility
- Loss of nutrients
- Impact on soil properties: Heat from burning residues elevates soil temperature causing death of beneficial soil organisms.
- Emission of greenhouse and other gases: Many of the pollutants found in large quantities in biomass smoke are known or suspected carcinogens and could lead to various air borne/lung diseases.



Various ways to address this issue:

- Promoting conservation agriculture
- Agricultural technology helps farmers in sowing the seeds for the next season without any problem associated with residues of the previous crops and also without affecting the crop productivity
- Create special credit line for financing farm equipment and working capital for private sector participation.

- Setting up biomass depots for the decomposition of crop residues
- Promote use of crop residue-based briquettes in local industries,
- National Green Tribunal in the order, 2015 prohibited agricultural residue burning in any part of the NCT of Delhi, State of Rajasthan, State of Punjab, State of Uttar Pradesh and State of Haryana. Any person that is found violating the directions of National Green Tribunal is liable to pay Environmental Compensation which is collected by the concerned State Governments.
- A new Central Sector Scheme on 'Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi' for the period from 2018-19 to 2019-20 is being implemented. Under this Scheme, the agricultural machines and equipment for in-situ crop residue management such as Super Straw Management System for Combine Harvesters, Happy Seeders, Hydraulically Reversible MB Plough, Paddy Straw Chopper, Mulcher, Rotary Slasher, Zero Till Seed Drill and Rotavators are provided with 50 per cent subsidy to the individual farmers and 80 per cent subsidy for establishment of Custom Hiring Centres.

National Policy for Management 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.

Objectives of NPMCR:

1. Promote the technologies for optimum utilization and in-situ management of crop residue to prevent loss of valuable soil nutrients and diversify uses of crop residues in industrial applications.
2. Develop and promote appropriate crop machinery in farming practices
3. Provide discounts and incentives for purchase of mechanized sowing machinery
4. Use satellite-based remote sensing technologies to monitor crop residue management with National Remote Sensing Agency (NRSA) and Central Pollution Control Board (CPCB)

5. Provide financial support through multidisciplinary approach and fund mobilization in various ministries for innovative ideas and project proposals to accomplish the objectives.

Pusa Decomposer – An Invention of ICAR



The government of Delhi adopted the technology that has been developed by IARI to prevent stubble burning of paddy in about 700 hectares of paddy fields. A proprietary microbial solution is developed by ICAR which can be a breakthrough in solving crop residue burning problem. This invention, named Pusa decomposer is made in the form of capsules which contain an activated package of eight strains of fungi. It decomposes crop residue and turns it into manure within a period of 25 days, thus eliminates the need of burning. Farmers need to add four capsules along with jiggery and chickpea flour to water in order to prepare a solution of 25litres. Within a week, a good layer of fungi admixture will be formed. To decompose paddy stubbles of one hectare, farmer has to spray 25litres of this solution.

Conclusion

Burning of crop residues has become a major environmental concern in India. Educating the farming community and other related stakeholders is crucial to make them realize its adverse effect on soil and human health. Making them aware of several methods to decompose the agricultural residues and also using the waste for other beneficial activities has to be given more importance. It is even more important to empower them with technical as well as socioeconomic assistance.