

MANAGEMENT OF STUBBLE BURNING for Eco-Friendly Environment

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Rice is staple food for half of the world's population, it is primary source of income for people living in rural areas, which is also used as animal feed. Rice is also an important political and economic factor that affects many countries in the world. Annual global production of rice is 115 million metric tonnes and around 509.87 million metric tonnes is global production of rice in the crop year 2020-2022. India and other Asian countries contributes about 90% of global rice production. India is the second largest producer of rice after china. India gained this status following the green revolution of the 1970s, and over time, through the application of cutting-edge technologies and creative agronomic methods, yield has also increased. The green revolution led to a record-breaking grain output of 131 million tonnes which made India one of the largest agricultural producer in the world. No other nation in the world that attempted the green revolution achieved similar levels of success. Around that time, India started to export food grains which was impossible before Green Revolution. India's rice export has progressively increased over the years, in year 2020-21 a record quantity of 46.31 lakh tonnes of basmati rice valued Rs 29,850 Cr and 130.87 lakh tonnes of non-basmati rice valued Rs 35,448 Cr was exported from India. The rice cultivating regions of India are distinguished as the western coastal strip, the eastern coastal strip, covering all the primary deltas, Assam plains and surrounding low hills, foothills and Terai region along the Himalayas and states like West Bengal, Bihar, eastern Uttar Pradesh, eastern Madhya Pradesh, northern Andhra Pradesh and Odisha. But there are some challenges which are faced by farmers in rice cultivation, one of them is management of farm residues. Leaving stubble on field invites many pests like termites which can damage the subsequent crop. That's why farmer choose stubble burning as an option for residue management because stubble burning emerged as cheap, quick and efficient method to clear away massive volumes of paddy and wheat stubble. But this practice has very harmful effects on environment. From April to May and October to November each year, farmers mainly in Punjab, Haryana and Uttar Pradesh burn an estimated 35 million tonnes of crop waste from their wheat and paddy fields after harvesting as a low-cost straw disposal practice to reduce the turnaround time between harvesting and sowing. Rice residue burning results in extensive impacts both on and off farm like losses in soil nutrients, soil organic matter, production and productivity, air quality, biodiversity, and water and energy efficiency and on human and animal health. On December 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. Delhi high court

had also ordered against burning residues. But farmers continue to burn residue every season which makes both soil and air poisonous.

Risk to Environment and Agriculture

Stubble burning directly contributes to global warming. Global temperature is increasing continuously which is responsible for change in seasonal patterns. Temperature have risen across seasons, growing seasons are becoming longer, precipitation patterns are changing and extreme precipitation events have increased in frequency and severity. Changing seasonality of precipitation may result in excess water during off seasons and limited water during critical crop growing period. Because of the sensitivity of agriculture to weather and climate conditions, these impacts can have direct and indirect effects on production and profitability. Early spring thaws and later first frost in autumn could result in greater growth and productivity, but only if temperature do not exceed upper limits for growth, there is enough water, nutrients and diseases are not problem. But earlier spring dormancy breaks can be detrimental to fruit production if early bud development increases exposure to late spring frost. Whole ecosystem is disturbed because of because of this increasing global warming. According

to the recent studies crop residue burning released 149.24 million tonnes of carbon dioxide (CO₂), over 9 million tonnes of carbon monoxide (CO), 0.25 million tonnes of Oxides of Sulphur (SOX), 1.28 million tonnes of particulate matter and 0.07 million tonnes of black carbon. The disastrous haze observed over India during the winter season is also linked to stubble burning, especially in National Capital Region (NCR) experience harsh pollution often reaching the severe levels of the air quality index (AQI). The health effect of air pollution ranges from skin and eye irritation to serve neurological, cardiovascular and respiratory diseases, asthma, chronic obstructive pulmonary disease (COPD), bronchitis, lung capacity loss, emphysema, cancer etc. Melting of Himalayan glaciers is also the result these harmful gases. The heat produced from burning paddy straw penetrates 1 centimeter into the soil, which elevates the temperature to 33.8 to 42.2 degree Celsius. This kills the bacterial and fungal population which is most important for soil fertility. Residue burning also cause damage to micro-organisms present in the upper layer of soil as well as organic quality. Due to the loss of friendly pests, the wrath of enemy pests has increased and as a result crops become more prone to diseases. Stubble burning is also responsible for decline of soil organic carbon, resulting soil degradation. About 5.5 kilograms of nitrogen, 2.3 kilograms of phosphorus, 25 kilograms of potassium and more than 1 kilograms of Sulphur are lost when one tonne of stubble is burned. This can impact soil quality for very long period of time which can result in poor yield production. Global population



is increasing year by year, to fulfil its food demands it is required to produce more and more yield but because of these practices soil fertility is decreasing which can lead to major food crises in future.

CONTRIBUTION OF PUNJAB IN STUBBLE BURNING

Punjab is well known for its land which is perfect for cropping, but in recent times it is also in popularity because of its increasing stubble burning cases. According to the stats maintained by Punjab pollution Control Board (PPCB), Paddy stubble burning area was 12.9 lakh hectares till November 15, 2021, which is around 43% of the total rice area in the state as per Punjab Remote sensing Centre (PRSC). In 2020, about 17.69 lakh hectares of paddy crop was burnt which resulted in polluting air quality in nearby areas. That's why it was crucial to keep an eye on burning areas because in most cases, it can become destructive to the surroundings. Instead of only keeping track of the number of fire events, it's crucial to monitor the amount of fire events, it's important to monitor the amount of areas where stubble is burning because more burning results in more smoke. According to him stubble burning started in September end and till October 19 farmers had burnt 2.11 lakh hectare, including 1.02 lakh hectares from October 12-19. To date environment compensation of Rs 25.17 lakh has been imposed on such farmers. There has been a noticeable improvement as a result of several reasons, such as increased machinery in the fields and awareness campaign.



NOTIFICATION OF AIR POLLUTION AFFECTING RICE EXPORTS

In response to the ruling on the petition regarding pollution having a severe impact on the air quality in Delhi and the surrounding areas, the O/a Commission of Air Quality and Management (CAQM) recently imposed a ban on operations of all industries/entities not running on PNG or cleaner fuel in Delhi and the NCR via its notification no 46 dated 02/12/2021. This choice has a significant impact on the entire rice industry value chain, including worker livelihood and economic health. However, as a result of the All India Rice Exporters Association's collaborative efforts and in accordance with the Honourable Supreme Court's directive, CAQM reconsidered its decision and provided relief to rice exporters through direction No. 49 dated December 15, 2021, allowing the rice industry to operate five days a week from Wednesday to Sunday. AIREA has also advocated on behalf of the rice industry to Mr. TS.G. Narayanan, Technical Advisor (Boiler), Department for Promotion of Industry and Internal Trade (DPI), to support and seek permission to use rice husk as an alternative fuel instead of PNG. AIREA has expressed its sincere gratitude to



Chairman, Commission of Air Quality and Management (CAQM) for granting relief. Although the Commission of Air Quality and Management (CAQM) permitted the rice industry to operate five days a week from Wednesday to Sunday through its direction no. 49 dated 15.12.2021, this temporary relief is insufficient for continuously operating rice mills to complete the export contracts within the promised time frame. In order to fulfil the export commitments to various destinations listed on its scheduling contracts, the complete paddy procurement is carried out during these months and processing is also done concurrently. AIREA persisted in asking CAQM to allow the rice sector to operate continuously seven days a week and to look into using rice husk as a cleaner fuel and disposing of it. Due to the deadline to deliver on time, the rice business was losing not only money but also markets. The rice industry continued to operate during the Covid-19 lockout because rice is an essential good and is covered by the Essential Commodities Act of 1955 (as amended). Industries follow the state pollution control boards' guidelines for pollution control to the letter. The Central Pollution Control Board has exempted the rice business from moving to PNG in the NCR region since it complies with the required environmental standards, AIREA informed CAQM. Before the authorities, AIREA is eager to further its goal of getting rice husk approved as a greener fuel subject to adherence to pollution standards.

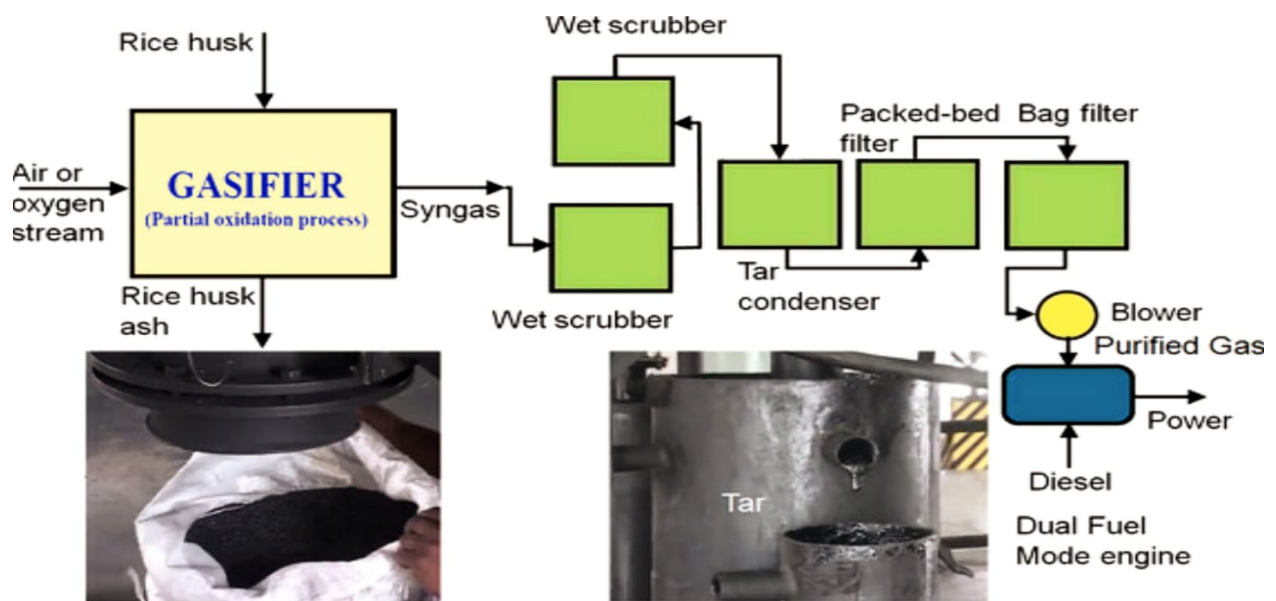
SOLUTIONS FOR THIS PROBLEM

The National Policy for Management of crop residue released by the Union government in 2004. Since then, crop residue management has helped to make the soil more fertile, which results in saving of Rs 2,000/hectare from the farmers manure cost. Many agricultural machines can be used for crop residue management like happy seeder (used for sowing of crop in standing stubble), rotavator (used for land preparation and incorporation of crop stubble in 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 paddy stubble), paddy straw chopper (cutting of paddy stubble for easily mixing with the soil) and reaper binder (used for harvesting paddy stubble and making into bundles). But these machines are too costly and state governments should come forward and provide better subsidy so that farmers can afford these machines. There are some other solutions by which we can manage this problem, one of them is crop diversification. The western Indo-Gangetic Plain is not suitable for rice farming, it is not only responsible for stubble burning but also deteriorates soil quality as well as depletes ground water supplies. The most long term solution for this problem is crop diversification and shifting towards different crops like maize, groundnut and kharif pulses like moong, urad and arhar which are water efficient crops. Crop diversification at this large scale will also require the private sector to invest more in the acquisition of these crops. Other options can also be considered to manage the farm residue like Waste decomposer, it is also a good option for management of farm residues, it is sprayed on post-harvest stalks of crop plants and left for a month. This solution can decompose over 10,000 metric tons of bio waste in 30 days. It can also be sprayed and applied by drip irrigation. Crop residue can also be converted into animal feed

and manure. Many products like paper, cardboard can also be made by these residues. An IIT-Delhi startup has developed a machine by the help of which Crop stubble can be converted into pulp and further that pulp is moulded to produce biodegradable cutlery.

USE OF RICE HUSK AS A CLEAN FUEL BY RICE EXPORTERS, IN PLACE OF PNG

In a letter titled AIREA/Pollution Issue/267 dated December 31, 2021, AIREA requested on behalf of the rice industry that Mr. T.S.G. Narayananen, Technical Advisor (Boiler), Department for Promotion of Industry and Internal Trade (DPI), request authorization to substitute rice husk for PNG. The rice industry was permitted to operate five days a week from Wednesday to Sunday by the Commission of Air Quality and Management (CAQM) pursuant to its direction no. 49 dated 15.12.2021. The short-term relief, however, is insufficient for continuously operating rice mills to fulfil export orders in the allotted amount of time. In order to satisfy the export commitments to destinations specified in contracts, the full paddy procurement process is carried out throughout these months. Regarding this, AIREA has already asked the Chairman of CAQM in a letter dated December 28, 2021, to grant the rice industry permission to operate continuously seven days a week and to look into the use of rice husk as a cleaner fuel and its disposal. In addition to the earlier meetings and correspondences regarding the aforementioned matter, it should be noted that the commission stated in para. 10 of the direction no. 49 of CAQM dated 15.12.2021, "Whereas such industries are however still not operating with PNG/cleaner fuels and continue to use polluting fuels such as coal, HSD, and to a relatively lesser extent with fuels like paddy husk, biomass pallets/ briquettes, wood chips, and bagasse etc. Rice Millers and Exporters look forward to DPII's support in allowing the rice milling industry to continue using rice husk as a fuel because it is less polluting and switching to PNG or an alternative fuel may not be the best option. CAQM recognised this in their order no. 49 dated 15 December 2022. To ensure that the use of rice husk as a fuel instead of PNG and its disposal can be regulated in accordance with pollution standards, the aforementioned matter has been sent to DPII with a request for personal action and support. Additionally, AIREA requested a meeting in January 2022 to discuss in in detail the challenges facing the exporting community and to personally thank you for your ongoing support.



GOVERNMENT POLICIES TO MAKE AGRICULTURE LESS POLLUTING

At the conclusion of the first week of COP26 on Saturday, India became one of the 27 nations to sign the action agenda on sustainable agriculture. Officials said the Center and states were working on a number of options to fulfil the nation's commitment to making farming in the nation more sustainable and less polluting. About 14% of the nation's annual greenhouse gas emissions (GHG) are attributable to farming. Nearly 55% of that originates from the livestock industry. Studies suggest that India's carbon dioxide emissions in 2019 were 2,597.4 million tonnes. Emissions increased significantly over the past 50 years, from 232.8 million tonnes to 2,597,4 million tonnes, with an annual increase rate that peaked in 2009 at 11.65 percent but fell to 1.6 percent in 2019. India pledged to cut global carbon emissions by 1 billion tonnes by 2030 at the COP26. Because it is one of the top five emitters in the nation, agriculture must be included in this. "To minimise GHG emissions in agriculture, work is being done in a variety of formats and ways. That includes conducting in-depth research and field tests on climate-resistant seeds and cultivars, climate-resistant farming methods, managing soil, switching from crops like paddy to others that require less water, widely disseminating direct-seeded rice techniques that need less water, reducing residue burning, etc "according to a senior scientist at the Indian Council of Agriculture Research (ICAR). When it comes to animals, the government is focusing on better cow shelter management so that animal waste is treated properly, and on a more balanced feed for cattle so that methane emission falls down, he said. One of the key commitments made by the participating nations at COP26 on Saturday was the "Sustainable Agriculture Policy Action Agenda for the Transition to Sustainable Agriculture and Global Action Agenda for Innovation in Agriculture." The nations outlined new promises to alter their agricultural policies in order to make them more environmentally friendly and sustainable, as well as to invest in the science required for sustainable agriculture and the defence of food supplies against climate change. Along with India, the following nations have signed the pledge:

Australia, New Zealand, Uganda, Madagascar, Tanzania, Nigeria, Lesotho, Guinea, Ghana, Sierra Leone, Morocco, Ethiopia, Vietnam, Laos, Indonesia, the Philippines, the Netherlands, Spain, Switzerland, the UK, Germany, Colombia, Costa Rica, and the UAE. The commitments include Brazil's intention to reduce its ABC+ low carbon farming programme to 72 million hectares by 2030, saving 1 billion tonnes of emissions; Germany's intention to reduce emissions from land use by 25 million tonnes by 2030; and the UK's intention to engage 75% of farmers in low-carbon practises by 2030, according to a statement. Officials stated that it was unclear at this time if India has made a concrete commitment or set a target to reduce the amount of GHG emissions in agriculture within a specific time frame. Another source added, "I'm not aware whether any specific pledge has been made on sustainable agriculture because our view has always been that Indian agriculture is mostly done by small farmers and we have to keep in mind their welfare." The National Action Plan on Climate Change entrusts the Ministry of Agriculture with the administration of missions and sub-missions on sustainable agriculture. From time to time, the Ministry of Environment and Forests is updated on the development of those goals that are quantifiable, monitorable, and deliverable.