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The environmental impact of Stubble burning

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Abstract

This paper aims to emphasize the environmental impacts of stubble burning, also known as 'parali' burning, and to raise awareness among farmers about its harmful effects. In Northern India, particularly after rice and wheat harvests, farmers often burn crop residue to clear fields quickly for the next season. This agricultural practice significantly contributes to air pollution and nutrient loss from the soil. Stubble burning releases greenhouse gases such as carbon dioxide, carbon monoxide, methane, nitrous oxides, and particulate matter into the atmosphere, posing various health risks to humans and animals. The stubble burning causes a significant increase in the air pollution and decrease in visibility. The government has implemented several policies and initiatives to educate farmers about the adverse effects of stubble burning. Recent studies have shown a decrease in stubble burning cases in 2024.

Keywords: Green house gases; Stubble; Impact; Particulate Matter; Nutrients; Significant

1. Introduction

From the last few decades, we have been facing a challenging environmental issue called stubble burning. Stubble burning, also known as stubble burning or 'parali' burning, is a widespread agricultural practice primarily observed in Northern India following rice and wheat harvests. This practice involves farmers burning crop residues in their fields to clear them quickly for the next planting season. While intended to manage agricultural waste efficiently, stubble burning has profound environmental consequences. It releases significant amounts of greenhouse gases such as carbon dioxide, carbon monoxide, methane, and nitrous oxides, along with particulate matter, into the atmosphere. These emissions contribute to air pollution and pose health risks to both humans and animals. Furthermore, stubble burning leads to the loss of essential nutrients from the soil, impacting soil fertility and agricultural productivity. Despite efforts by governments and organizations to mitigate its effects through awareness campaigns and policies, stubble burning remains a significant environmental challenge in India.

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Source own picture

Figure 1 Stubble burning image

1.1. Stubble Burning Management

Central Government has released funds of Rs. 3,333 crore under the Crop Residue Management Scheme for management of paddy straw. These initiatives of government have started to show results. According to Ministry of Environment, Forest and Climate Change “Stubble burning incidents in Haryana, Punjab, NCR – UP, NCR- Rajasthan and Delhi comes down to 6,391 in the last 45 days period (15th September, 2023 to 29th October, 2023) from 13,964 in the corresponding period in 2022”

2. Environmental impact of Stubble burning

The stubble burning is harmful because of many reasons listed below

- **Air Pollution:** The stubble burning process releases harmful pollutants like particulate matter, carbon dioxide, and methane, smoke contributing significantly to air pollution. This compromises respiratory health and worsens existing respiratory conditions.
- **Greenhouse Gas Emissions:** Stubble burning releases greenhouse gases, such as carbon dioxide (CO₂) and methane (CH₄), etc. significantly contributing to global warming and climate change. This will further aggravate the environmental issues faced by the planet earth.
- **Soil quality Impact:** Burning stubble reduces soil fertility by depleting essential nutrients present in crop residues. This negatively affects long-term agricultural productivity.
- **Health Risks:** The smoke produced contains harmful substances, posing health risks to humans and animals, including respiratory issues, allergies, and eye irritations.
- **Water Quality Concerns:** Ash and pollutants from burnt fields can contaminate water bodies, impacting water quality and harming aquatic life. and have cascading effects on ecosystems dependent on these water sources.
- **Stubble burning management:** To mitigate the stubble burning we should switch to alternative Practices encouraging sustainable agricultural methods. Here are some measures:

Mechanical Residue Management: it may be controlled by Encourage the use of modern farm machinery, such as straw balers and choppers, to manage crop residues effectively. These machines can process stubble into mulch or bales, providing an eco-friendly alternative to burning. Numerous companies worldwide utilize stubble agricultural waste to create innovative products. Stubble serves as a valuable resource for various applications, including paper and board production, bio-based oils, leather alternatives, catering disposables, fuel, and plastics.

Incentives for Residue Utilization: Governments and agricultural organizations can provide financial incentives or subsidies to farmers adopting residue management techniques that do not involve burning, such as incorporating stubble into the soil.

Awareness Campaigns: Conduct education and awareness programs to inform farmers about the environmental and health hazards of stubble burning. Promote the benefits of sustainable agricultural practices and provide training on alternative methods.

Crop Diversification: Encourage farmers to diversify crops, as some crops leave less residue after harvest. This reduces the need for extensive stubble management.

Research and Development: Invest in research and development of innovative technologies for residue management, making it easier and more cost-effective for farmers to adopt sustainable practices.

3. Conclusions

Addressing the issue of stubble burning demands a united and persistent approach. Northern states in India, such as Punjab, Haryana, Uttar Pradesh, and even Delhi, are confronted with the environmental repercussions of this practice. Although policy initiatives and awareness programs are in progress, the shift towards sustainable agricultural practices is crucial. It requires concerted efforts from farmers, policymakers, and communities to embrace alternative residue management techniques. This collective action is essential to mitigate the adverse impacts on air quality, soil health, and overall ecosystem sustainability. Moving towards a greener, healthier future necessitates a commitment to change and the adoption of innovative, eco-friendly agricultural methods.

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