



## STUBBLE BURNING IN INDIA: A HOLISTIC APPROACH

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### Abstract:

Stubble burning, a prevalent agricultural practice in India, holds both agricultural significance and environmental repercussions. This article provides a holistic examination of stubble burning, delving into its necessity for farmers and the multifaceted impacts it imposes on the environment and public health.

The necessity of stubble burning is explored, emphasizing its role in efficient field preparation and agricultural benefits such as nutrient recycling and pest control. However, the harmful effects are meticulously highlighted, particularly its contribution to air pollution and its associated health risks. The article elucidates the global implications, showcasing stubble burning as a contributing factor to climate change through the emission of greenhouse gases.

In addressing the issue, potential alternatives and solutions are presented, including the promotion of mechanical harvesting and the provision of incentives for adopting sustainable practices. Government initiatives aimed at mitigating stubble burning are also discussed.

This comprehensive exploration underscores the urgent need for a balanced approach, urging a shift towards sustainable agricultural practices to safeguard environmental well-being, air quality, and public health.

*Keywords: Stubble burning, climate change, greenhouse gas emissions, sustainable agriculture*

### Introduction:

Stubble burning, a traditional agricultural practice in India, poses a delicate balance between agricultural necessity and environmental consequences. This article, titled "Stubble Burning in India: A Holistic Approach," navigates through the dual nature of this practice, exploring its essential role for farmers and the multifaceted impacts it inflicts on the environment and public health.

The article delves into the necessity of stubble burning, emphasizing its importance in efficient field preparation, nutrient recycling, and pest control. Simultaneously, it meticulously highlights the harmful effects, particularly its contribution to air pollution and associated health risks. The global implications of stubble burning, as a contributor to climate change through greenhouse gas emissions, are also addressed.

In addressing the issue, potential alternatives and solutions are presented, including the promotion of mechanical harvesting and incentives for sustainable practices. Government initiatives aimed at mitigating stubble burning are discussed, underscoring the urgent need for a balanced approach. This comprehensive exploration emphasizes the shift towards sustainable agricultural practices to safeguard environmental wellbeing, air quality, and public health.

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**Necessity of Stubble Burning:**

1. **Quick Field Preparation:** Research indicates that stubble burning facilitates rapid field preparation for subsequent crops, saving time for farmers during the busy planting seasons.
2. **Pest and Disease Control:** Stubble burning has been observed to assist in controlling pests and pathogens, reducing the risk of diseases affecting the following crop cycle. This practice may contribute to maintaining crop health and yield.
3. **Nutrient Recycling:** Studies suggest that the ash generated from stubble burning can act as a natural fertilizer, recycling nutrients back into the soil and potentially benefiting the subsequent crops.

**Harmful Effects of Stubble Burning:**

1. **Air Quality Degradation:** Survey data from Punjab indicates that stubble burning significantly affects air quality, leading to smog and respiratory issues for the population. Studies report a three-fold increase in respiratory diseases due to crop residue burning.
2. **Economic Losses:** A study reveals that air pollution resulting from stubble burning in India leads to economic losses amounting to USD 1.5 billion. This highlights the broader financial impact beyond health consequences.
3. **Visibility Reduction and Road Accidents:** Burning crop residues causes poor visibility, contributing to road accidents. House surveys indicate a correlation between stubble burning and increased accident rates.
4. **Environmental Impact:** Crop residue burning contributes to poor air quality, imposing a health burden on India. Despite government interventions, research emphasizes the persistence of air quality issues and environmental damage due to this practice.

**Impact on Climate Change:**

1. **Emission of Greenhouse Gases:** Stubble burning releases large amounts of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases into the atmosphere. This contributes to the enhanced greenhouse effect, a key driver of global warming.
2. **Black Carbon Emission:** The black carbon emitted during stubble burning has direct implications for climate change. It contributes to the absorption of sunlight, leading to regional warming and impacting the overall radiative balance in the atmosphere.
3. **Environmental Challenges:** Stubble burning exacerbates climate challenges, particularly impacting air quality. Studies emphasize the intricate relationship between stubble burning and environmental issues, contributing to broader climate concerns in regions like Punjab, India.

**Alternatives and Solutions to Stubble Burning:**

1. **Happy Seeder Technology:** Instead of burning crop residue, the Happy Seeder technology allows



2. farmers to sow seeds directly into the field without removing the stubble. This helps in conserving soil moisture and reducing the need for burning.
3. Bio Enzyme-PUSA: A bio-enzyme called Bio Enzyme-PUSA has been developed by the Indian Agricultural Research Institute as an alternative to stubble burning. It helps in decomposing crop residues and turning them into organic matter.
4. Technology-Enabled Smart Revolution: Leveraging technology for smart agriculture practices, including precision farming and modern equipment, can reduce the need for stubble burning.
5. In-Situ Treatment of Stubble: Applying in-situ treatments involves managing crop residues within the field itself, avoiding the need for burning. Techniques like mulching or incorporating residues into the soil fall under this category.
6. Ex-Situ Treatment of Stubble: This approach involves treating crop residues outside the field before sowing the next crop. It includes techniques such as composting or using residues for bioenergy production.
7. Regenerative Agriculture: Promoting regenerative agriculture practices that focus on improving soil health and reducing the dependence on burning. This approach emphasizes sustainable farming methods for long-term environmental benefits.

**Government Initiatives:**

1. Crop Residue Management (CRM) Scheme: The government has been emphasizing the Crop Residue Management Scheme, introduced in 2018-2019. This scheme aims to promote alternative methods for managing crop residue, discouraging farmers from resorting to burning.
2. Commission on Air Quality Management: The establishment of the Commission on Air Quality Management demonstrates the government's commitment to addressing pollution caused by stubble burning. This body focuses on implementing measures to improve air quality, including reducing stubble burning incidents.
3. Zero Stubble Burning Commitment: The government has expressed its commitment to achieving zero stubble burning, as stated in August 2023. This commitment underscores a determined effort to eliminate this major source of pollution during the winter months.
4. State Action Plan in Haryana: Haryana has developed and implemented a State Action Plan to substantially bring down fire counts related to stubble burning. The plan involves effective enforcement to reduce stubble burning incidents in the state.
5. Promotion of Alternatives: Various initiatives focus on promoting alternatives to stubble burning, such as the use of Happy Seeder technology, Bio Enzyme-PUSA, and other innovative approaches. These alternatives aim to provide practical and sustainable options for farmers.

**Conclusion:**

Stubble burning, a common practice in India, particularly after the harvest season, has been identified as a significant contributor to environmental degradation and air pollution. Despite government efforts to address the issue, it remains a menace, emitting toxic pollutants such as carbon monoxide and methane into the atmosphere.

Research indicates that stubble burning is not only a source of air pollution but also poses health risks. While reductions have been observed in some regions due to government interventions, challenges persist in effectively curbing this practice.

Alternative solutions and policy challenges surrounding crop residue burning have been explored, emphasizing the need for a comprehensive approach. Holistic policies and alternatives for crop residue usage are essential to mitigate the environmental impact and improve air quality.

Studies have highlighted the effects of stubble burning on health, the environment, and air quality. The practice has been linked to increased air pollution, necessitating continuous efforts to find sustainable alternatives and enforce stricter regulations.

In conclusion, addressing stubble burning requires a multi-faceted approach, involving not only policy interventions but also awareness, technological solutions, and community participation. Collaborative efforts are crucial to mitigating the adverse effects of stubble burning on the environment, agriculture, and human health.

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