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With special Editorial Articles

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From the Desk of the Editor-in-Chief

Dear Readers, It is with great pride and excitement that I present to you the new edition of Nature Science e-Magazine.

This magazine is a celebration of science, nature, and innovation, aiming to make complex ideas accessible and inspiring for everyone. Through Nature Science e Magazine, we delve into groundbreaking research, sustainable solutions, and stories that reflect the beauty and challenges of our natural world.

Our mission is to foster curiosity, spark dialogue, and contribute to a brighter, sustainable future. I extend my heartfelt thanks to our contributors and editorial team for their dedication, and to you, our readers, for embarking on this journey with us. Together, let us explore, learn, and make a difference.

Anil arora

Warm regards,
Dr. Anil Arora
Editor-in-Chief Nature Science E Magazine

INDEX

Water Management Strategies to Reduce N_2O Emissions in Agriculture

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Abstract

Nitrous oxide (N_2O) emitted from agricultural activities is of major concern due to its high global warming potential. One of the soil factors that affects its emission is soil moisture content. Thus, effective water management strategies are essential for mitigating N_2O emissions while maintaining crop productivity. This article briefly discusses various water management techniques, including subsurface drip irrigation (SDI), sprinkler irrigation, drainage water management (DWM), alternate wetting and drying (AWD), and deficit irrigation (DI). SDI minimizes soil moisture fluctuations, reducing N_2O emissions compared to flood and furrow irrigation. Sprinkler irrigation lowers N_2O emissions by decreasing soil nitrate and ammonium concentrations while enhancing water use efficiency. DWM regulates nitrogen runoff and soil aeration, mitigating excessive N_2O production. Although AWD conserves water, it may increase N_2O emissions, which can be mitigated through soil amendments such as zeolite and rice straw application. DI, particularly when combined with nitrification inhibitors, significantly reduces emissions while optimizing water use efficiency. The integration of these irrigation and drainage strategies could offer promising approach in reducing agricultural N_2O emissions, contributing to climate-resilient and sustainable farming practices.

Introduction

Nitrous oxide (N_2O) is a potent greenhouse gas predominantly emitted from agricultural activities, possessing a global warming potential 273 times that of carbon dioxide over a 100-year period. In agricultural practices, N_2O emissions primarily originate from microbial processes associated with the decomposition of nitrogen-based fertilizers, manures, and crop residues. Effective mitigation strategies include optimizing nitrogen fertilizer application, water management, nitrification inhibitors, water drainage, and sustainable agricultural practices. Soil moisture significantly influences N_2O emissions through its effect on microbial processes in the soil. The optimal range for N_2O emissions is typically between 70% and 80% water-filled pore space, as this range provides conditions that favor microbial activity responsible for N_2O production (Butterbach-Bahl et al., 2013). Water management techniques, including advanced irrigation methods, drainage systems, and alternate Wetting and Drying (AWD), are crucial in mitigating N_2O emissions (Fig. 1).

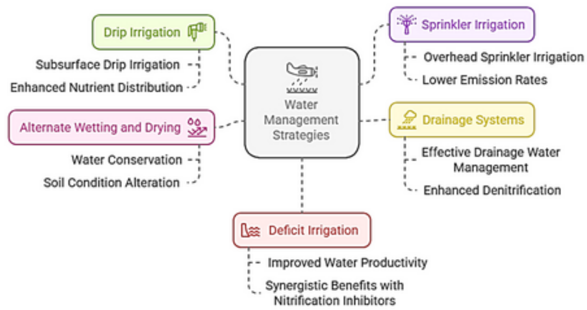

Figure 1. Water management strategies for N_2O emission reduction in agriculture

Drip irrigation

Drip irrigation, particularly subsurface drip irrigation (SDI), has emerged as an effective strategy for mitigating N_2O emissions in agricultural practices. By precisely regulating water and nitrogen delivery, SDI influences soil moisture and nutrient dynamics, which are critical factors in N_2O production. Flood or furrow irrigation causes sudden wet and dry shifts in the soil, leading to high N_2O emissions due to rapid oxygen changes.

Unlike flood or furrow irrigation, SDI maintains steady soil moisture, avoiding fluctuations and lowering the risk of excessive N_2O emissions from microbial activity. SDI at varying depths (0.05 m, 0.10 m, and 0.15 m) could effectively reduce N_2O emissions, with deeper placements being more efficient due to enhanced nutrient distribution and reduced water-filled pore space (Hamad et al., 2022).

Empirical evidence suggests that while higher irrigation rates can enhance crop yield, they may also contribute to increased N_2O emissions. A balanced approach that integrates moderate irrigation with optimal nitrogen management has been found to improve yield while minimizing emissions. The combination of SDI with appropriate nitrogen management has been particularly effective in reducing N_2O emissions while enhancing crop productivity (Hamad et al., 2022).

Sprinkler irrigation

Sprinkler irrigation has also demonstrated efficacy in reducing N_2O emissions and improves water use efficiency compared to conventional irrigation techniques, particularly in arid regions. A two-year field study revealed that overhead sprinkler irrigation reduced N_2O emissions by 40.72% to 59.65% in potato fields relative to flood irrigation. This reduction is attributed to lower water application rates, which in turn decrease soil nitrate and ammonium concentrations these are key contributors to N_2O production (Yang et al., 2019).

Comparative analyses of sprinkler and furrow irrigation demonstrate that N_2O emissions are substantially lower in sprinkler-irrigated fields, with emission fluxes recorded at 36.53 μg m^{-2} hr^{-1} versus 152.02 μg m^{-2} hr^{-1} for furrow irrigation (Yang et al., 2019). Additionally, optimized irrigation scheduling based on soil gas diffusivity has shown promise in mitigating N_2O emissions, highlighting the significance of precision irrigation techniques (Rousset et al., 2021).

Drainage systems

Proper drainage management is critical for reducing N_2O emissions in agriculture. Effective drainage water management (DWM) facilitates the regulation of nitrogen runoff while mitigating greenhouse gas emissions. By controlling the timing and volume of water discharge from agricultural fields, DWM enhances denitrification processes, thereby minimizing N_2O release. Uncontrolled drainage accelerates nitrate leaching into waterways, whereas DWM slows water movement, giving plants more time to absorb nitrogen and reducing pollution. N_2O is primarily produced through microbial nitrification and denitrification, and DWM helps regulate soil moisture to prevent excessive N_2O production by balancing these processes. In waterlogged conditions, nitrate is converted into harmless N_2 gas instead of N_2O, whereas in well-drained conditions, the process also generates N_2O as a byproduct.

Alternate wetting and drying

Alternate Wetting and Drying (AWD) is a widely studied water management technique that has demonstrated potential in reducing N_2O emissions, particularly in rice cultivation. This method not only conserves water but also alters soil conditions, thereby influencing greenhouse gas emissions. However, studies indicate that AWD may increase N_2O emissions by approximately 18% compared to continuous flooding. To mitigate this effect, soil amendments such as zeolite have been shown to be effective. Additionally, integrating mild AWD with rice straw application has been observed to further regulate N_2O emissions, suggesting that tailored management approaches can optimize emission reductions.

Deficit irrigation

Deficit irrigation (DI) is an effective approach to reducing N_2O emissions in agriculture while maximizing water use efficiency. Applying water in quantities less than full crop water requirement through DI can improve water productivity and lower N_2O, a potential greenhouse gas linked to nitrogen fertilization and irrigation practices. DI can significantly reduce N_2O emissions. For instance, mild DI has been reported to lower emissions by 50% compared to full irrigation in maize fields (Flynn et al., 2022). Additionally, the combination of DI with nitrification inhibitors, such as 3,4-Dimethylpyrazole Phosphate, has produced even greater reductions in N_2O emissions, emphasizing the synergistic benefits of these integrated management strategies. In maize cultivation, controlled deficit irrigation has been shown to decrease N_2O emissions by up to 50% compared to full irrigation, indicating the effectiveness of precise water application aligned with crop growth stages (Flynn et al., 2022).

Conclusion

Water management plays a crucial role in mitigating N_2O emissions from agricultural practices. Strategies such as subsurface drip irrigation (SDI), sprinkler irrigation, drainage water management (DWM), alternate wetting and drying (AWD), and deficit irrigation (DI) have demonstrated significant potential in reducing emissions while improving water and nitrogen use efficiency. SDI and sprinkler irrigation help maintain optimal soil moisture, preventing excessive N_2O production, while DWM regulates nitrogen runoff and soil aeration to minimize emissions. AWD, though effective in conserving water, requires additional soil amendments to counteract potential N_2O increases. DI, when combined with nitrification inhibitors, offers a promising solution for reducing emissions while sustaining crop productivity. Overall, integrating these water management strategies with optimized nitrogen application can effectively reduce N_2O emissions, contributing to sustainable and climate-resilient agricultural practices.

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Reducing Nitrous Oxide Emissions Through Efficient Fertilizer Application in Agriculture

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Abstract

Indian agriculture has significantly increased food production since the Green Revolution, primarily through high-yielding crop varieties and intensive fertilizer use. However, excessive nitrogen fertilizer application has led to soil degradation and contributed to greenhouse gas emissions, particularly nitrous oxide (N_2O). Agriculture is a dominant source of anthropogenic N_2O emissions, accounting for approximately 60% of global totals. N_2O is a major driver of climate change and also depletes stratospheric ozone. This article explains about the microbial pathways of N_2O production in agricultural soils due to fertilizer application, focusing on nitrification and denitrification processes. Key environmental factors influencing N_2O emissions following fertilizer application, such as soil moisture, temperature, pH, and nutrient availability, are also addressed. Effective mitigation strategies include the 4R Nutrient Stewardship framework (Right Source, Right Rate, Right Time, Right Placement), use of controlled-release fertilizers, nitrification inhibitors, and conservation agriculture etc. An integrated approach involving scientific innovations, government policies, and financial incentives is essential to reduce N_2O emissions while ensuring agricultural productivity and sustainability. Addressing these emissions is crucial for climate resilience, food security, and environmental health.

Introduction

Indian agriculture experienced a significant boost following the Green Revolution, achieving higher production through the adoption of high-yielding varieties and extensive fertilizer use. However, over time, the continuous application of fertilizers has not only degraded soil health but also contributed to greenhouse gas emissions. Agricultural activities are a major source of global N_2O emissions, accounting for approximately 59% to 68% of total anthropogenic emissions. This highlights the critical role of agriculture in the broader context of climate change.
(Smith, 2017) reported that agriculture contributes around 60% of total global anthropogenic N_2O emissions, making it one of the largest contributors. Additionally, N_2O emissions have increased by up to 40% since 1980 due to human activities (Tian et al., 2024). In agricultural soils, N_2O is primarily produced through microbial processes such as nitrification and denitrification, which occur following the application of nitrogenous fertilizers. Therefore, understanding the sources of N_2O emissions in agriculture is essential for developing effective mitigation strategies.

Why Nitrous Oxide Matters?

N_2O is a potent greenhouse gas with a global warming potential 273 times higher than carbon dioxide (CO_2) over a 100-year period. This means it traps significantly more heat, contributing to the warming of the Earth's surface. Additionally, N_2O has a much longer atmospheric residence time compared to other greenhouse gases like methane (CH_4) and carbon dioxide (CO_2), making it a persistent driver of climate change.

Beyond its role in global warming, N_2O also contributes to ozone depletion in the stratosphere, further exacerbating environmental concerns. Although its atmospheric concentration is relatively low, its impact is disproportionately high, highlighting the urgency of addressing its emissions. Furthermore, N_2O plays a role in the formation of tropospheric ozone (bad ozone), which negatively affects air quality and human health. Given these significant environmental consequences, reducing N_2O emissions through efficient fertilizer management is essential for promoting sustainable agriculture and mitigating climate change.

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Understanding Nitrous Oxide in Agriculture

Synthetic fertilizers such as urea and ammonium nitrate are major sources of N_2O emissions in agriculture. However, manure application is also a significant contributor. A large portion of the nitrogen from these fertilizers undergoes microbial transformation, leading to N_2O emissions. Excessive fertilizer application further accelerates microbial activity, increasing emissions. Similarly, organic amendments like manure, when broken down by soil microbes, release nitrogen into the soil, adding to N_2O emissions.

In soils, N_2O is mainly produced through two microbial processes:

1) Nitrification

Nitrification is a two-step aerobic process in which ammonium (NH_4^+) from fertilizers is converted into nitrate (NO_3^-).

- Step 1: Ammonium is oxidized to nitrite (NO_2^-) by ammonia-oxidizing bacteria (AOB) such as Nitrosomonas spp. and Nitrosococcus spp.

$$NH_4^+ + 1.5\ O_2 \rightarrow NO_2^- + 2\ H^+ + H_2O \quad (1)$$

- Step 2: Nitrite is further converted to nitrate (NO_3^-) by nitrite-oxidizing bacteria (NOB) such as Nitrobacter spp., with N_2O released as a by-product.

$$NO_2^- + 0.5O_2 \rightarrow NO_3^- + N_2O \quad (2)$$

2) Denitrification

Denitrification is a reductive process that occurs in low-oxygen (anaerobic) conditions. In this process, bacteria such as Pseudomonas spp. and Bacillus spp. Convert NO_3^- into nitrogen gas, with N_2O as an intermediate by-product.

$$NO_3^- \rightarrow NO_2^- \rightarrow NO \rightarrow N_2O \rightarrow N_2 \quad (3)$$

Factors Influencing N_2O Emissions in Soil

Several environmental and soil factors influence the rate of nitrification and denitrification:

Soil Moisture: Waterlogged soils create anaerobic conditions, increasing denitrification, while dry soils support nitrification due to better oxygen availability.

Temperature: Warmer temperatures stimulate microbial activity, accelerating both nitrification and denitrification.

pH: Acidic soils (pH < 5) suppress nitrification, while neutral pH favors denitrification.

Nutrient Availability: The presence of carbon (C) and nitrogen (N) compounds enhances microbial activity. Organic amendments such as manure, compost, and crop residues provide readily available nitrogen, further increasing N_2O production.

Understanding these processes and factors is crucial for developing effective strategies to reduce N_2O emissions while maintaining soil fertility and agricultural productivity.

Strategies to Reduce N_2O Emissions

Farmers can reduce N_2O emissions while improving crop productivity and soil health by adopting efficient fertilizer management techniques. These strategies benefit both the environment and farm profitability. Key mitigation approaches include matching nitrogen supply with crop demand, using controlled-release fertilizers, applying nitrification inhibitors, and optimizing soil management practices.

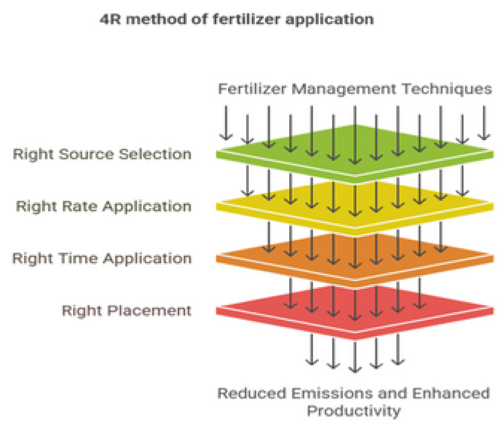

Figure 1. Sustainable fertilizer management practices to improve fertilizer efficiency and reduce N2O emission loss

4R Nutrient Stewardship: Enhancing Fertilizer Efficiency

The 4R approach helps maximize fertilizer efficiency while minimizing N_2O emissions:

Right Source: Select fertilizers that are less prone to rapid N conversion and N_2O loss, such as ammonium nitrate or slow-release fertilizers.

Right Rate: Apply fertilizers based on crop nutrient requirements and soil test recommendations to prevent excessive nitrogen application.

Right Time: On-time fertilizer application in synchronization with crop growth stages to optimize nitrogen uptake and minimize losses.

Right Placement: Use banding and injection methods to place fertilizers near plant roots, reducing volatilization and runoff losses.

Additional Strategies to Reduce N_2O Emissions

Beyond fertilizer management, several innovative approaches can further reduce emissions:

- Conservation agriculture to minimize soil disturbance and enhance soil organic matter.
- Application of biofertilizers to improve nitrogen fixation and reduce dependency on synthetic fertilizers.
- Use of nitrification and urease inhibitors to slow nitrogen conversion and decrease emissions.
- Organic amendments such as compost and manure, which improve nitrogen use efficiency and soil health

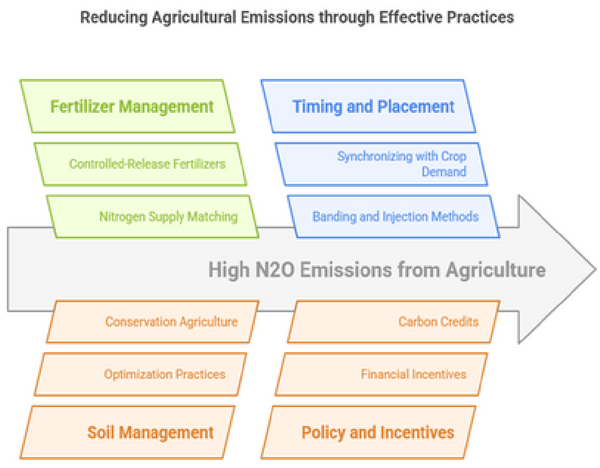

Figure 2. Integrated approach of scientific fertilizer use, soil management, and global policy initiatives to reduce N2O emissions from agricultural soil

Integrated Approaches for Sustainable Fertilizer Use

A combination of scientific mitigation strategies, policies, and incentives is essential for effective emission reduction (Figure 2). The Intergovernmental Panel on Climate Change (IPCC) plays a key role in estimating GHG emissions and developing national emission inventories. Crop modelling technologies can also help predict N_2O emissions based on different fertilizer sources and application rates.

Government initiatives, including carbon credits, financial incentives, and direct investments, further support sustainable farming practices, promoting organic agriculture and climate-smart solutions.

Conclusion

Mitigating N_2O emissions from agriculture is essential for achieving climate resilience and sustainable food production. As discussed, efficient fertilizer management through the 4R Nutrient Stewardship (Right Source, Right Rate, Right Time, Right Placement) is a practical and effective strategy to reduce N_2O emissions while maintaining soil health and crop productivity.

Additionally, innovative approaches such as controlled-release fertilizers, nitrification inhibitors, biofertilizers, conservation agriculture, and organic amendments further contribute to emission reductions. Addressing N_2O emissions requires a holistic approach, combining scientific advancements, farmer education, policy support, and financial incentives. Governments, research institutions, and farmers must work together to implement sustainable agricultural practices that not only reduce greenhouse gas emissions but also ensure long-term food security and environmental health.

By integrating these strategies, agriculture can transition towards a climate-smart and sustainable future.

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Dynamic Agricultural Price Optimization Model for Stable Farm Incomes

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Abstract

Agricultural price volatility poses a significant challenge to farmers, affecting their income stability and decision-making. Traditional pricing mechanisms often fail to respond effectively to market fluctuations, leading to inefficiencies in the supply chain. The Dynamic Agricultural Price Optimization (DAPO) Model offers a data-driven approach to ensure fair and stable pricing by integrating real-time market trends, artificial intelligence, and predictive analytics. This model helps in minimizing price shocks, improving market efficiency, and supporting informed decision-making for farmers, consumers, and policymakers. Despite its advantages, challenges such as data availability, technology adoption, and infrastructure constraints must be addressed for widespread implementation. With proper policy support and digital advancements, the DAPO Model has the potential to revolutionize agricultural pricing and enhance the economic sustainability of farmers.

Introduction

Agricultural prices fluctuate due to unpredictable factors like weather conditions, market demand, and government policies. These price variations create uncertainty for farmers, often leading to financial instability. Traditional pricing mechanisms fail to address these issues effectively, as they rely on static models that do not adapt to real-time changes in the market.

The Dynamic Agricultural Price Optimization (DAPO) Model offers a smarter approach to price determination by integrating real-time data, market trends, and technology-driven analytics. This model helps ensure that farmers receive fair and stable prices for their produce while improving efficiency in the supply chain.

By reducing price volatility and enhancing market predictability, the DAPO Model has the potential to transform agricultural pricing into a more sustainable and profitable system for all stakeholders.

Understanding the DAPO Model

The DAPO Model is a data-driven approach designed to ensure fair and stable pricing for agricultural products. Unlike traditional methods that rely on fixed pricing or delayed market responses, the DAPO Model dynamically adjusts prices based on real-time factors such as demand, supply, weather conditions, and global market trends.

How the DAPO Model Differs from Traditional Pricing?

- Real Time Adjustments: Traditional pricing systems often fail to respond quickly to market changes, while the DAPO Model continuously updates prices based on current data.

- Data Driven Decision Making: Instead of relying solely on historical trends, this model uses AI, machine learning, and big data to predict price movements.

- Market Efficiency: The model reduces price distortions by aligning production with actual demand, ensuring better price stability for both farmers and consumers.
- Risk Management: By analyzing risks like extreme weather or supply chain disruptions, the model helps farmers and traders make informed pricing decisions.

The DAPO Model represents a shift from reactive to proactive pricing, allowing farmers to plan better and reduce losses caused by sudden market fluctuations.

How the DAPO Model Works?

The DAPO Model operates by continuously analyzing real-time data and adjusting prices accordingly. It integrates technology, market intelligence, and predictive analytics to ensure fair and stable pricing for agricultural products.

1. Data Collection and Analysis

The model gathers data from various sources, including:

- Market demand and supply trends: Tracks consumer demand and available stock.
- Weather patterns: Uses climate data to predict yield fluctuations.
- Government policies: Considers subsidies, trade restrictions, and support prices.
- Global commodity markets: Monitors international price trends to align domestic prices.

2. Real-Time Price Adjustments

Based on the collected data, the model dynamically updates prices to reflect market conditions. If demand rises or supply drops due to adverse weather, the model ensures that prices adjust accordingly, preventing excessive losses or unfair pricing.

3. Use of Technology

The DAPO Model leverages:

- Artificial Intelligence (AI) and Machine Learning: Predicts price movements based on historical and real-time data.
- Big Data Analytics: Processes large datasets to detect patterns and trends in pricing.
- Blockchain Technology: Ensures transparency in price determination and prevents market manipulation.

4. Integration with Market Trends

By continuously monitoring economic indicators, inflation rates, and global trade patterns, the model fine-tunes agricultural pricing to align with long-term market trends. This proactive approach minimizes price shocks and ensures greater income stability for farmers.

The DAPO Model transforms agricultural pricing from a reactive system to a smart, adaptive framework, benefiting farmers, consumers, and policymakers alike.

Benefits of the DAPO Model

The DAPO Model offers multiple advantages to farmers, consumers, and the overall agricultural market. By using real-time data and advanced analytics, this model creates a more stable and efficient pricing system.

1. Increased Income Stability for Farmers

Price volatility is a major challenge for farmers, often leading to financial uncertainty. The DAPO Model minimizes sudden price crashes by ensuring that prices reflect real-time market conditions. This stability allows farmers to plan their production and investments more effectively.

2. Better Market Efficiency

Traditional pricing methods often lead to supply-demand mismatches, causing losses for both producers and consumers. The DAPO Model enhances market efficiency by aligning prices with actual demand, preventing wastage and reducing inefficiencies in the supply chain.

3. Reduced Price Volatility

Sudden price fluctuations can disrupt agricultural markets and impact farmer incomes. By using AI-driven forecasting and real-time data analysis, the model reduces extreme price swings, ensuring a balanced and predictable pricing environment.

4. Improved Decision-Making for Stakeholders

***Farmers**:* Can make informed decisions about crop selection, harvesting time, and storage strategies.

Consumers: Benefit from fairer prices and a more stable supply of agricultural products.

Policymakers: Gain insights into market trends, enabling better policy decisions on subsidies, trade regulations, and food security.

Challenges and Limitations

While the DAPO Model offers significant advantages, its implementation comes with certain challenges. Addressing these limitations is crucial for its widespread adoption and effectiveness.

1. Data Availability and Accuracy Issues

The DAPO Model relies heavily on real-time data from multiple sources. However, in many regions, especially in developing countries, reliable data on market prices, weather conditions, and production estimates may be limited or inconsistent. Inaccurate data can lead to flawed price predictions, affecting farmers' incomes.

2. Implementation Barriers for Small Farmers

Many small and marginal farmers lack access to digital tools and reliable internet connectivity. The cost of adopting new technologies, such as AI-based forecasting systems, can be high, making it difficult for small-scale farmers to benefit from the model. Training and awareness programs are needed to bridge this gap.

3. Technology Adoption Challenges

- Limited digital literacy: Many farmers are unfamiliar with AI, big data, and automated pricing models.

- Resistance to change: Traditional pricing methods have been used for decades, and some stakeholders may be reluctant to shift to a new model.

- Infrastructure issues: Reliable internet, digital payment systems, and market integration platforms are essential for the DAPO Model to function effectively. In regions lacking these facilities, implementation becomes difficult.

4. Risk of Market Manipulation

Although the model is designed to prevent price manipulation, large agribusinesses or market intermediaries could try to exploit data sources or influence pricing mechanisms for their benefit. Strong regulatory frameworks and transparent data governance are required to maintain fairness.

Conclusion

The DAPO presents a transformative approach to agricultural pricing by leveraging real-time data, AI-driven analytics, and market intelligence. It offers farmers better income stability, reduces price volatility, and improves overall market efficiency. However, challenges such as data availability, technology adoption, and implementation barriers must be addressed for its successful integration. With the right policy support and infrastructure, the DAPO Model can create a more stable, transparent, and fair agricultural pricing system, benefiting all stakeholders in the value chain.

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Innovators Spotlight in Science

An Interview With Grassroot Innovator

Gaurav Sharma

Nature Science e-Magazine recently interviewed Gaurav Sharma, an award-winning innovator whose groundbreaking work on Dhoopan therapy is redefining wound care. His Portable Dhoopan Yantra, developed under the Dhoopan project, integrates Ayurvedic wisdom with modern technology to provide effective solutions for chronic wounds.

Gaurav, what inspired you to explore Dhoopan therapy for wound healing?
Gaurav: My journey began with a deep interest in combining traditional Ayurvedic practices with modern science to address public health challenges. Dhoopan therapy, an ancient fumigation technique with antimicrobial and wound-healing properties, had untapped potential in managing chronic wounds. This inspired me to develop the Portable Dhoopan Yantra, a device that standardizes the process while maintaining therapeutic efficacy.

How does your innovation work, and what makes it unique?
Gaurav: The device works in combination with specially formulated Dhoopan Sticks that I've developed to ensure a standardized and consistent fumigation process. This innovation delivers medicated smoke effectively, enhancing antimicrobial action and promoting faster wound healing. The portability and ease of use of the device allow it to be used in both clinical and home settings, making Dhoopan therapy more accessible.

You've received notable recognition for this work. Could you tell us more about that?
Gaurav: Yes, I'm grateful for the recognition by Zydus Lifesciences, who expressed strong interest in the innovation. I was honored to secure 2nd runner-up at the Zydus Innovation Programme, where I received invaluable mentorship from Dr. Bhavin Parekh and Dr. Anupama Modi. Their insights were instrumental in refining the device.

NS e-Magazine: How has the journey been so far?
Gaurav Sharma: It's been a journey full of learning and challenges. While developing the device and herbal sticks, I realized that making things simple is a complicated task—especially when trying to maintain the integrity of traditional knowledge. Sometimes, you get good results, and other times, unforeseen challenges delay progress. Staying optimistic during these times has been essential.

A defining moment came during a commercial shoot for my device. While on set, I was informed that someone wanted to meet me. I went to the reception and met two women who had brought along a newspaper article featuring my work. One of them asked if I could guide her regarding her diabetic foot ulcer, which was becoming increasingly difficult to manage.

I only suggested her to consult experienced Ayurveda doctors, as I wasn't in a position to offer any kind of direct treatment. That moment made me realize how crucial it is to address wound care effectively, especially in cases where conventional treatments may not be sufficient. It reaffirmed my commitment to making Dhoopan therapy a reliable, accessible solution.

Are you conducting any clinical studies to validate the therapy?

Gaurav: Yes, we are currently conducting clinical studies to evaluate the effectiveness of the device and Dhoopan therapy. So far, we're observing encouraging progress, with promising data emerging through molecular approaches that highlight its potential in improving wound healing outcomes.

What's next for Dhoopan therapy?
Gaurav Sharma: Our next step is to expand clinical validation and explore customized Dhoopan formulations to address specific infections and wound types. I envision Dhoopan therapy becoming a scientifically validated and accessible solution that bridges ancient practices with modern healthcare.

Gaurav Sharma's work is a testament to how tradition and technology can come together to create impactful healthcare solutions. With continued research and mentorship, his innovations are set to transform the future of wound care.

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