



Advancing Agroforestry and Carbon Finance for Climate Resilience



The **National Workshop on ‘Synergizing Carbon Credits and Agroforestry Models for Climate-Resilient Livelihoods’** was held at ICAR–Central Agroforestry Research Institute (**CAFRI**), Jhansi on *October 15, 2025*. The event was jointly organized by the Society for Science of Climate Change and Environmental Sustainability (**SSCE**), Indian Society of Agroforestry, IIT Madras (Centre for Atmospheric and Climate Sciences), ICAR–CAFRI, and the South Asian Forum for Environment (**SAFE**), with active collaboration from the Progyan Foundation for Research and Innovation (**PFRI**), Kolkata.



The workshop brought together researchers, policymakers, and practitioners to explore the intersection of agroforestry, carbon finance, and sustainable livelihoods. Through intensive sessions, participants delved into diverse agroforestry systems including silvi-pastoral, agri-silvicultural, and horti-silvicultural models across varied agro-ecological zones. Technical discussions focused on carbon measurement and monetization, MRV (Measurement, Reporting and Verification) processes, validation standards, and the legal aspects of carbon rights and benefit-sharing.

These deliberations offered a forward-looking perspective on strengthening carbon credit mechanisms in India's agroforestry sector, enabling community-led climate action and resilient livelihoods.



HIGHLIGHTS OF THE WORKSHOP

- Comparative analysis of agroforestry systems across agro-ecological regions
- Technical pathways for carbon quantification and project development
- Sessions on MRV frameworks, carbon markets, and benefit-sharing mechanisms
- Discussions on policy frameworks supporting agroforestry and carbon finance
- Recognition of exemplary contributions to environmental leadership



Honouring the Spirit of Sustainability



The **Progyan Foundation for Research and Innovation (PFRI)**, Kolkata, has received the **Outstanding Contribution to Environmental Leadership and Social Responsibility (Institutional Category)** award for 2025 from the **Society for Science of Climate Change and Environmental Sustainability (SSCE)**, held at ICAR– Central Agroforestry Research Institute (CAFRI), Jhansi, on *October 16, 2025*.

This national recognition highlights PFRI's pioneering contributions to climate research, environmental policy integration, and community-based conservation across India and South Asia. Over the past decade, PFRI has led applied research and participatory innovations in climate-resilient agriculture, ecosystem valuation, and adaptive resource management. Collaborative initiatives with IIT Madras, the South Asian Forum for Environment (**SAFE**), and the Asia-Pacific Network for Global Change Research (**APN**) have strengthened regional cooperation in sustainability science.

Adding to this distinction, **Dr. Malancha Dey, Director of PFRI**, was honored with the **Best Woman Scientist Award 2025 (Above 45 Years Category)** by **Society for Science of Climate Change and Environmental Sustainability (SSCE)**. The award recognizes her outstanding contributions to Agriculture and Environmental Sciences, notably her leadership in developing climate-resilient livelihood models, pioneering agroforestry innovations, and advancing participatory policy frameworks.

Dr. Dey's interdisciplinary work bridges science and society through a focus on data-driven research, community adaptation, and inclusive environmental governance. Under her guidance, PFRI's field initiatives have delivered tangible outcomes in soil and water conservation, biodiversity restoration, and local climate adaptation across several Indian states. Her research and leadership underscore a lifelong commitment to scientific excellence serving sustainability and social transformation.

The Pyrotechnic Paradox:

NAVIGATING THE HAZE OF TRADITION AND HEALTH IN INDIA

Every November, as the last lamp of Diwali is lit, a different, toxic veil descends upon India’s cities. It is the acrid haze of tradition, an annual, predictable, and self-inflicted environmental crisis. What is meant as a celebration of light becomes, for millions, a fight for breath. This is not just an environmental issue; it is a complex policy failure, a public health emergency, and a profound economic drag rolled into one.



THE ‘ACUTE-ON-CHRONIC’ CRISIS

India already suffers from a baseline of the world's worst air. Diwali, however, represents an ‘acute-on-chronic’ event. In a matter of hours, the bursting of firecrackers injects a highly concentrated cocktail of PM2.5, heavy metals (like barium, strontium, and arsenic), and toxic gases (SO₂ and NO_x) into an already-strained atmosphere. The data from the last five years tells a stark story, especially in the Indo-Gangetic Plain. Delhi, the perennial epicenter, consistently sees its Air Quality Index (AQI) leap from ‘Very Poor’ to ‘Severe’ or ‘Hazardous’ (>400) overnight.

But this is not just a Delhi-NCR problem. In 2025, cities like Kaithal, Baghpat, Meerut, and Jind all reported ‘Very Poor’ to ‘Severe’ air, demonstrating a regional catastrophe. Beyond the air, the impact is four-fold:

Noise Pollution: Major metros like Mumbai and Kolkata report peak noise levels between 75 dB and 125 dB, far exceeding the 55 dB residential limit, causing acute distress to infants, the elderly, and urban wildlife.

Land & Water: Post-festival, tons of firecracker debris, rich in unburnt perchlorates and nitrates, are swept into drains, eventually contaminating local water bodies and soil.

Post-Diwali AQI (24-hour average) – Delhi		
Year	Diwali Day AQI (Delhi)	Key Pollutant
2021	● 312 (Very Poor)	PM _{2.5}
2022	● 218 (Poor)	PM _{2.5}
2023	● 328 (Very Poor)	PM _{2.5}
2024	● 345 (Very Poor)	PM _{2.5} , PM ₁₀
2025	● 400+ (Severe)	PM _{2.5} , PM ₁₀

Source: CPCB & news reports

THE REAL COST: HEALTH AND FINANCE

The 'Loss and Damage' from this single event is staggering. On the health front, hospitals in the top 10 cities (*e.g., Delhi, Mumbai, Kolkata*) routinely report a 30-40% surge in emergency room visits for respiratory and cardiovascular distress in the days following Diwali. Pulmonologists' wards become front lines, treating acute asthma attacks, COPD exacerbations, and bronchitis. Financially, this translates to lost productivity, increased healthcare expenditure, and a diminished quality of life. While isolating the 'Diwali cost' is difficult, it is a significant contributor to India's estimated annual economic loss from air pollution, which tops USD \$100 billion (*or ₹8 lakh crore, as some reports suggest*).

THE POLICY GAP: THE 'GREEN CRACKER' FAILURE

The policy response has been a story of good intentions and poor outcomes. The Supreme Court's solution of banning traditional crackers and allowing only '**green crackers**' (formulated by CSIR-NEERI to be 30% less polluting), was meant to be a middle path. In practice, it has failed. The policy suffers from three critical gaps:

- **Enforcement Failure:** A thriving black market for cheaper, more pollutive, and illegal firecrackers continues to dominate.
- **Socio-Economic Conflict:** The ban directly threatens the livelihoods of lakhs of workers in manufacturing hubs like Sivakasi, creating a social-justice dilemma that policymakers have failed to resolve.
- **Public Perception:** 'Green' is a misnomer. They are not non-polluting, and a 30% reduction is negligible when the baseline AQI is already 300.

THE NEXT DECADE: A GRIM PROJECTION

This is where the IPCC's SSP-RCP scenarios become relevant. The IPCC's Sixth Assessment Report (AR6) is clear: South Asia is a climate vulnerability hotspot. As background environmental stressors worsen over the next decade (under any SSP scenario), the population's resilience will decrease. The acute shock of Diwali pollution will, therefore, land on an ever-more-vulnerable public, turning a manageable health crisis into an annual humanitarian one.





A NEW SOCIAL CONTRACT: A RECOMMENDATION FRAMEWORK

A new approach is imperative, one that respects culture while protecting life.

- **Shift the Market:** Instead of blanket bans, implement a 'Just Transition' for the Sivakasi cluster. Provide massive state subsidies and re-skilling programs to pivot this workforce to new industries (e.g., battery technology, solar panel assembly).
- **Innovate the Celebration:** Aggressively promote and fund community-based alternatives. Make publicly-funded drone shows, laser-light spectacles, and sound-and-light-art installations the 'new tradition.'
- **Targeted Governance:** Move from judicial orders to consistent, emissions-based regulations on pyrotechnics, enforced at the manufacturing source, not the end user.

Ultimately, India must decide if the momentary thrill of a firecracker is worth the weeks of poisoned air, the burdened hospitals, and the irreversible damage to its citizens' health.

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