Greenovation Agrivoltaics Challenge

Awarding Farmer Groups and DRE Companies to Advance Adoption & Innovation in Agrivoltaics

An Initiative of EarthON Foundation, in collaboration with SwitchON Foundation

Challenge Overview:

The Greenovation Agrivoltaics Challenge is designed to catalyze the simultaneous advancement of climate-resilient agriculture and clean energy generation in India. It directly addresses the critical nexus of climate vulnerability for farmers, who form approximately half of the workforce, and the land-use competition presented by the national goal of 500 GW of renewable energy.

Agrivoltaics, the co-location of solar panels and agriculture, is a transformative solution that boosts land productivity, reduces water use, and diversifies farmer income. Despite a theoretical potential of thousands of gigawatts, India's installed capacity remains a nascent 10.6 MW in 2024, hindered by a lack of awareness and tailored solutions.

This Challenge is engineered to bridge this implementation gap. It is an "Adoption and Innovation Challenge" that strategically targets the two core pillars of the ecosystem:

- Empowering Farmer Groups to adopt and adapt agrivoltaic practices, turning their fields into live demonstrations of synergistic food and energy production.
- Spurring DRE Companies to innovate and deploy efficient, small-scale agrivoltaic systems tailored for smallholder farmers.

Through a package of virtual training, catalytic financial award funding, and support for micro-demonstration plants in focus states, the Challenge will translate gigawatts of potential into megawatts of impact. Our goal is to forge a new, scalable model for rural development where clean energy and climate-smart agriculture grow in powerful synergy.

Challenge Background:

Indian agriculture is under unprecedented stress. Farmers face a water and climate squeeze, with depleted groundwater and erratic monsoons, with heatwaves jeopardizing yields and livelihoods. Climate extremes caused an estimated $112.2 billion[2] in losses from 2014 to 2023. The

overdependence and fragmented nature of the farm sector leads to more catastrophic. Concurrently, India's ambitious commitment to 500 GW[4] of renewable energy by 2030 creates a critical land-use challenge. Agrivoltaics is a direct response to these intersecting crises. It offers the co-location of solar panels and agriculture on the same land and strategically allows farmers to grow food and generate clean energy, boosting land productivity, saving water, and creating a new, reliable income stream.

India's agricultural sector, the primary livelihood for 45.76%[1] of the nation's workforce, is on the frontline of the climate crisis. Rising temperatures and erratic rainfall already threaten crop yields and rural economic stability, with climate extremes causing an estimated $112.2 billion[2] in losses from 2014 to 2023. This vulnerability is compounded by a sector dominated by small and marginal farmers (86%)[3], who have limited capacity to adapt. Concurrently, India's ambitious commitment to 500 GW[4] of renewable energy with solar power as its cornerstone by 2030 creates a critical land-use challenge, directly competing with agriculture, which occupies over 55%[5] of the country's land.

Agrivoltaics emerges as a transformative, dual-land-use solution to this dilemma. By co-locating solar photovoltaic panels with agricultural activities on the same land, Agrivoltaics strategically synergizes food, energy, and livelihood sustainability. This dual-use system delivers key benefits:

- Climate Resilience for Crops: Partial shading creates a moderated microclimate, reducing water irrigation requirements by 15-30%[6].

- Enhanced Land Productivity: Agrivoltaics systems can achieve a Land Equivalent Ratio (LER) greater than 1.0[7], producing more combined value from energy and food than single-use systems.

- Livelihood Diversification: Farmers gain a reliable additional income stream from solar energy generation, buffering them against crop failure and market volatility.

- Balanced Agricultural growth: The system provides a balance between crop production and energy generation that provides sustainable development and growth as well.

India is uniquely positioned for agrivoltaics, with unparalleled solar resources and a vast smallholder farming base. Studies estimate a theoretical potential in the thousands of gigawatts (3,156 GW - 13,803 GW)[8] for India. Yet, as of 2024, cumulative installed capacity stands at a nascent 10.6 MW[9]. This vast implementation gap is hindered by a lack of awareness, the need for specialized technical and business models, and underdeveloped ecosystem linkages.

This Greenovation Agrivoltaics Challenge is designed as a direct response to bridge this gap. It is designed to catalyze on-the-ground adoption and innovation by simultaneously empowering the two essential pillars:

- Farmer Groups (FPOs, Cooperatives, etc.): To pioneer the adoption and agricultural adaptation of climate-resilient practices under solar panels, turning the fields into a balanced synergy of crop production and energy generation.

- Decentralized Renewable Energy (DRE) Companies: To drive technological & business model innovation and deployment in efficient, small-scale Agrivoltaics solutions tailored for smallholder farmers or farmer groups, with a better management of energy usage and crop productivity.

Through this synergy, linking on-farm adaptation with technological innovation and backing it with concrete financial support for micro-demonstrations, the Greenovation Agrivoltaics Challenge provides the catalyst to move from gigawatts of potential to megawatts of impact, forging a new model for rural development.

Who Can Apply:

The Challenge is open to two distinct participant tracks, recognizing the unique roles each plays in the Agrivoltaics ecosystem. We are looking for applicants who are ready to demonstrate innovation in the following areas:

Track 1: Farmer Groups

- Eligible Entities: Farmer Producer Organizations (FPOs), Self-Help Groups (SHGs), Farmer Cooperatives, registered Societies, or NGOs.

- Core Requirement: The applicant entity must be farmer-led or primarily comprise farmer groups. The team lead applying must be a practicing farmer.
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Track 2: Decentralized Renewable Energy (DRE) Companies

- Eligible Entities: For-profit and non-profit companies specializing in decentralized renewable energy solutions.

- Core Requirement: Companies must demonstrate technical capability and a viable plan for deploying and managing small-scale agrivoltaics systems.

Challenge Features and Benefits:

Selected participants and winners will gain access to a comprehensive support package designed to ensure success and scalability:

- Virtual Training & Capacity Building: A specialized curriculum for farmers on agrivoltaics practices about what to grow, how to grow, and the application of solar in the field.
- Catalytic Award Money: Significant financial grants of a total of 5cr. to the selected winners to support project implementation and scaling.
- Micro-Demonstration Plants: A select number of winners (across both tracks) will receive full support for the installation of a micro-demonstration agrivoltaics plant, covering core costs.
- Technical Consultancy: Access to expertise for system design and optimization.
- Visibility & Networking: Platforms to showcase work to a national audience of policymakers, investors, and industry leaders.

Focus Areas:

The challenge will prioritize applications and demonstrations within the following states to maximize impact and create regional hubs of excellence: Maharashtra, Madhya Pradesh (M.P.), Andhra Pradesh (A.P.), and Telangana.

Core Objectives:

1. Catalyze Adoption: To incentivize and enable farmer groups to adopt and adapt agrivoltaics, integrating climate-resilient agricultural practices with solar energy generation.

2. Spur Innovation: To challenge DRE companies to innovate in the design, business models, and energy management of small-scale, cost-effective agrivoltaics systems tailored for smallholder farmers.

3. Bridge the Ecosystem Gap: To create formal linkages and synergies between the agriculture and renewable energy sectors, fostering a collaborative ecosystem for agrivoltaics.

4. Demonstrate Scalability: To generate tangible, replicable case studies and data through micro-demonstration plants that prove the viability of agrivoltaics in the Indian context.

Challenge Outcomes:

By the conclusion of the challenge, the following concrete outcomes will be delivered:

- 10 Micro-Demonstration Plants installed and operational across the focus states.
- A cohort of trained and empowered farmer groups actively practicing agrivoltaics.
- A pipeline of innovative DRE solutions vetted and ready for deployment.
- A validated portfolio of business and technical models for small-scale agrivoltaics.
- A robust network of partners and stakeholders committed to advancing the agrivoltaics sector in India.

Eligibility Criteria:

Farmer groups including Farmer Producer Organizations (FPOs), Self-Help Groups (SHGs), farmer cooperatives, and NGOs or societies that are farmer-led or work directly with farmers are encouraged to apply.

- These groups must be farmer-led or have active participation from farmers in their operations.
- The team submitting the application must include at least one farmer, and the team leader must be a farmer.
- Applicants should demonstrate how their initiative promotes innovation in agriculture within an agrivoltaic setting for instance, by proposing how crops will be cultivated under solar panels, how the land will be optimally utilized, or how the system can enhance farm productivity.

Dairy companies are also welcome to apply.

- Eligible applicants include registered dairy enterprises that have the interest and capacity to integrate agrivoltaic systems within their operations.
- Participating companies should demonstrate their technical capability and readiness to adopt such systems, and outline how they intend to use the solar power generated whether by connecting to the grid, using it for on-site operations, or powering on-farm activities.
- They are also encouraged to highlight ongoing or proposed projects that reflect their innovation and commitment to sustainable energy use.

Geographic focus:

- The challenge is open to applicants from across India, but preference will be given to those working in selected focus states, such as Maharashtra, Madhya Pradesh, and Telangana.
- Organizations may be based anywhere, as long as their proposed project activities are located within these focus regions.

Judging Criteria:

1. **Innovation / Effective Adaptation and Feasibility:**
   Novelty and practicality of the Agrivoltaics solution, including innovative integration of solar energy and agriculture, and its technical and operational feasibility on the field.
2. **Scalability and Affordability:**
   Potential for widespread adoption of the Agrivoltaics model, its cost-effectiveness for farmers, and inclusivity in reaching diverse agricultural communities.
3. **Environmental and Biodiversity Impact:**
   Contribution of the Agrivoltaics system to biodiversity enhancement, reduction in carbon emissions, improvement of soil health, microclimate balance, and overall ecosystem restoration.
4. **Farmer Empowerment and Livelihood:**
   Impact of Agrivoltaics on improving productivity, resilience to climate variability, and income diversification for smallholder and women farmers.

Opportunities for Impact:

Successful participants will be positioned to leverage the challenge for transformative growth:

- For Farmer Groups: Unlock new, resilient income streams; reduce farming costs; gain energy independence; and become benchmark leaders in climate-smart agriculture.

- For DRE Companies: Access a new, massive market segment of smallholder farmers; validate and refine innovative technologies; attract further investment; and shape the standards for a nascent industry.

- For the Ecosystem: The challenge will directly contribute to national goals for renewable energy adoption, climate change adaptation, food security, and sustainable rural development.

Endnotes:

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