IWMI International Water Management Institute

SoLAR Solar Energy for Agricultural Resilience

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

# Community-Based Solar Irrigation in Chimkatola, Mandla, India

Context: Chimkatola has approximately 118 households and its population is heavily reliant on agriculture, consisting primarily of marginal and small farmers.

There has been no solar irrigation pump (SIP) adoption prior to SoLAR due to high upfront costs and poor awareness levels. The baseline survey showed that only 30% women were aware of SIPs.

The self-help group (SHG) network in Chimkatola is well-established and provides a strong foundation for mobilizing women farmers under this pilot intervention.

Approach: The upfront cost of owning a SIP was reduced to 10%, with the project covering 90% of the installation costs. To enhance adoption, a Women-led Water User Association (WUA) was formed and formally registered under the State Rural Livelihoods Mission (SRLM) with the dual aim of building their entrepreneurial capacity and improving their access to irrigation.

Objectives:

- To demonstrate that a tailored financial model, designed in accordance with farmers' financial capacities, can effectively address financial barriers to the adoption of SIPs.
- To explore the potential use of surplus solar energy generated by SIPs for other productive activities such as operating solar-powered rice mills integrated with SIP systems.

## Intervention-1: Community-Based SIP Model

Location: Chimkatola village, under Mandla in Madhya Pradesh
Upfront Cost: 10% of the total Solar PV installation cost; the remaining 90% was covered via the project
Beneficiaries: 15 women farmers
Management: Women-led WUA

## Key Features

- Farmers contributed 10% of the upfront cost (INR 2,000–3,000), with the project covering the remaining 90%.
- Dedicated bank accounts were established for WUAs to manage funds and irrigation revenues.
- Water was sold at INR 50/hour to member farmers and INR 60/hour to non-members, as decided by the association to cover operational costs.
- Repayments were maintained as a revolving fund to finance future agricultural technology investments.

[Top] Location of Mandla in Madhya Pradesh.Map Source: Wikipedia [Bottom] Kusum Devi, a member of the Water User Association. operates the solar-powered rice mill in Kevlari, Mandla. (*Photo*: Tanmoy Bhaduri/IWMI)

## Intervention-2: Rice Milling Machine

Location: Chimkatola village, under Mandla in Madhya Pradesh
Model Type: Community-operated semi-automatic rice mill linked to unused generated solar energy
Upfront Cost: The total cost was INR 90,000; INR 10,00 was the upfront cost paid by farmers. The project funded the remaining INR 55,000; a loan of INR 25,000 was taken through cash credit facility (CCL) of SRLM[1]
Beneficiaries: All SIP users; 15 women SHG members
Management: WUA

## Key Features:

- Saves time for women who previously travelled 15–20 km and spent an entire day on paddy milling.
- Utilizes surplus solar energy (50–60%) efficiently.
- Reduces transportation costs for smallholder farmers.
- Generates additional income through rice milling and bran sales.

## Lessons learned and Way forward

- These pilots demonstrate that community-based SIP models can enhance adoption among marginal and small farmers facing financial constraints.
- The existing SRLM infrastructure can be leveraged to improve women farmers' access to credit for SIP adoption.
- Women-led WUAs function as platforms for peer learning and community engagement, integrating locally relevant income-generating activities.
- Strengthen women's collectives to promote technology adoption and economic empowerment.

## Early outcomes

- Reliable irrigation alongside expanded irrigation coverage.
- WUA led by women; enhanced decision-making skills.
- Crop diversification into pulses and vegetables.
- More than INR 10,000 earned via water sales since July-24 till Feb-25.
- Surplus energy used for paddy milling.

[1] The State Rural Livelihoods Mission (SRLM), under India's National Rural Livelihoods Mission (NRLM), operates across all states of India to organize millions of rural women into Self-Help Groups (SHGs) and link them with banks through a Cash Credit Limit (CCL) -a revolving loan facility that allows SHGs to repeatedly borrow and repay funds for small businesses and livelihood activities. It support women's collectives to drive technology adoption and economic empowerment.

### Project

The Solar Energy for Agricultural Resilience (SoLAR) Phase 2 project builds upon learnings and experiences from Phase 1 of SoLAR (2019-2024) in South Asia while expanding its scope to East Africa through meaningful south-south collaborations. The program aims to strengthen the enabling environment and unlock investments for the sustainable scaling of socially inclusive and climate-resilient solar agri-tech solutions in South Asia (India and Bangladesh) and East Africa (Ethiopia and Kenya). Read more: www.solar.iwmi.org


### Acknowledgements

We gratefully acknowledge the Swiss Agency for Development and Cooperation (SDC) for funding this project.


### Disclaimer



### Contacts

Please send inquiries and comments to:


**Deepak Varshney**, India Lead of SoLAR and Regional Researcher, IWMI Delhi, India (D.Varshney@cgiar.org)
**Darshini Ravindranath**, Project Lead, SoLAR and Research Group Leader, Climate Policies, Finance and Processes, IWMI Delhi, India (D.Ravindranath@cgiar.org)

**IWMI India office**
2nd Floor, CG Block C, NASC Complex, DPS Marg, New Delhi 110 012, India. Tel: +91 11 25840811; Email: iwmi-delhi@cgiar.org



IWMI International Water Management Institute

CGIAR RESEARCH CENTER

The International Water Management Institute (IWMI) is an international, research-for-development organization that works with governments, civil society and the private sector to solve water problems in developing countries and scale up solutions. Through partnership, IWMI combines research on the sustainable use of water and land resources, knowledge services and products with capacity strengthening, dialogue and policy analysis to support implementation of water management solutions for agriculture, ecosystems, climate change and inclusive economic growth. Headquartered in Colombo, Sri Lanka, IWMI is a CGIAR Research Center with offices in 15 countries and a global network of scientists operating in more than 55 countries.

International Water Management Institute (IWMI)

**Headquarters**
127 Sunil Mawatha,Pelawatta, Battaramulla, Sri Lanka

Mailing address:
P. O. Box 2075, Colombo, Sri Lanka
Tel: +94 11 2880000
Fax: +94 11 2786854
Email: iwmi@cgiar.org
www.iwmi.org