

Solar Irrigation for Agricultural Resilience (SoLAR)

Newsletter

Issue No 5: July- September 2021

Dear readers,

In early August, the [Intergovernmental Panel on Climate Change \(IPCC\)](#) released the first of its three Working Group Reports, and the world took notice. This iconic report unequivocally stated that increases in human-caused emissions of CO₂ and other greenhouse gases (GHG) are driving temperature rise and causing climate change. Climate change has already happened, and currently, the global surface temperature is ~ 1.09°C higher than the pre-industrial period (1850-1900). Several of the climate impacts, such as extreme precipitation and droughts, are already observed at 1.09°C, and these impacts will only intensify at higher temperature levels. We describe the water-related impacts of climate change [here](#). To prevent a catastrophic rise in future temperatures, emissions mitigation has become more critical than ever before. The mitigation actions we take in the next decade will determine our collective futures. While mitigating CO₂ and GHG emissions is the need of the hour, we must also pay attention to the water footprints of mitigation to ensure that mitigation does not reduce the capacity of communities to adapt. Irrigation accounts for 10-20% of total agricultural emissions in South Asia, and solar irrigation pumps (SIPs) are the best bet to reduce CO₂ emissions in agriculture without affecting overall production. Yet, promoting SIPs without checks and balances may lead to groundwater over-exploitation. Our researchers and partners in SDC-SoLAR are working towards promoting the uptake of SIPs while also ensuring that mitigation benefits do not come at the cost of adaptation benefits like long term irrigation benefits through sustainable and equitable groundwater use.



In the meanwhile, COVID-19 continues to affect our region. Yet, our colleagues managed to undertake field visits, and our partners continued with their planned activities. Here's a sneak peek into our work for this quarter. I hope you enjoy reading our newsletter. Please share your thoughts by writing to me at a.mukherji@cgiar.org.

Aditi Mukherji, Regional Project Leader, SoLAR-SA, IWMI

2nd Round Of Innovation Fund Grantees Announced

A total of three Innovation Funds Grantees were chosen in the second round from a pool of 56 applications from Bangladesh, India, Nepal and Pakistan. The three grantees are:

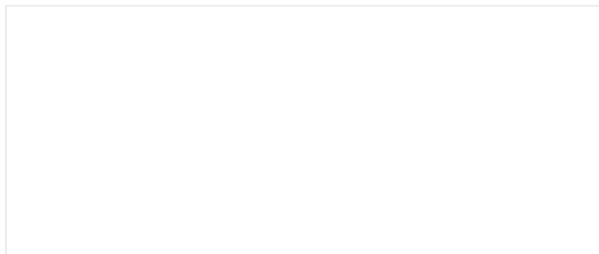
- [Urmul Seemant Samiti](#) is based in Rajasthan, India. They aim to create an inclusive programme for rural development that focuses on livestock management and green fodder production in some of the hottest and arid regions of the state. Their innovation is about using solar technology for growing fodder crops in locally assembled greenhouse facilities.
- [Collectives for Integrated Livelihood Initiatives](#) (CINI) is based in Jharkhand, India. Their innovation is about establishing farmer-managed mini-grids that connect several off-grid SIPs into a centralised grid and use the energy for other productive purposes.
- [MinErgy Initiatives](#) is based in Lalitpur, Nepal. Their innovation is about setting up a system of cooperatives for providing irrigation water services to farmers in one location in Nepal.

Further details can be found [here](#).

Country Highlights

Household Survey in Bangladesh

In August-September 2021, our field partner NGO Forum carried out a survey of 900 farmers across 60 villages in the Dinajpur, Thakurgaon and Bogura districts of Bangladesh. This survey is a part of our impact evaluation study of IDCOL SIPs. Further details can be found [here](#).





Enumerators at a SIP site in Bangladesh.
Photo: NGO Forum

Field Visits in India

In July 2021, IWMI-Delhi researchers visited four feeders in Gujarat's Botad and Anand districts. The purpose of these visits was to assess the pilot installation of instruments for measuring groundwater extraction by farmers and test the Standard Operating Procedure (SOP) developed for monthly groundwater monitoring. Further details can be found [here](#).



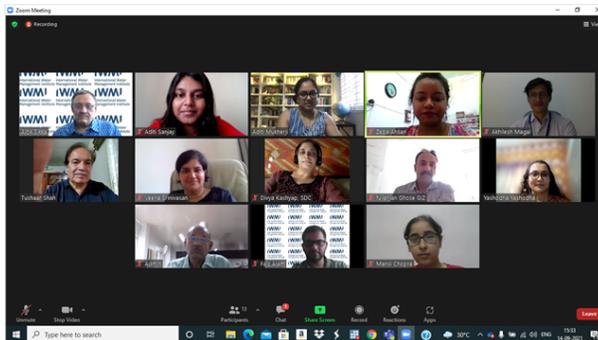
A farmer cleaning solar panels at Parmeshwar Feeder, Botad, Gujarat.
Photo: Yashodha Yashodha/IWMI

IWMI Enters into Agreement with ATREE

IWMI signed an agreement with the Bengaluru-based [Ashoka Trust for Research in Ecology and Environment \(ATREE\)](#). ATREE will help map regions that are best suited for solar irrigation in India. Further details can be found [here](#).

3rd CMPC India meeting held

The third Country Project Management Committee (C-PMC) meeting for India was held virtually on the 14th of September 2021. Further details can be found [here](#).



A glimpse from 3rd CMPC India Meeting
Photo: Aditi Sanjay/IWMI

IWMI Enters into Partnership with IRMA

To augment IWMI's efforts in providing climate-friendly solutions at the intersection of water, energy and food security, IWMI signed an agreement with the [Institute of Rural Management Anand \(IRMA\)](#). The IRMA Water Centre (WC) will carry out a quick assessment of the Chief Minister's Saur Krishi Vahini Program in Maharashtra. Further details can be found [here](#).

Feasibility Survey for Solar Micro-Grid in Nepal

IWMI conducted a survey at two sites in Nepal Tarai to assess the feasibility of installing a micro-grid connected SIP as a part of the ongoing SDC-SoLAR project in Nepal. The site at the Chhipaharmai Rural Municipality (RM) in Parsa was found to be a potential site based on the feasibility survey. Further details can be found [here](#).



An interview session with partner officials at Nepal.
Photo: Shisher Shrestha/IWMI

Rapid Enumeration of Farmers in Pakistan

624 farmers who used solar and diesel pumps were interviewed during a rapid enumeration survey in the districts of Chakwal, Jhang and Rahim Yar Khan in the Punjab province of Pakistan. The objective was to understand the difference between farmers who use SIPs and diesel pumps on several indicators. This quick enumeration study will form the basis of a detailed survey of farmers which will be carried out during the rabi season of 2021. Further details can be found [here](#).

What keeps the IWMI- SoLAR staff busy?

Here's what Shisher Shrestha (National Researcher-Renewable Energy, Water & Climate Change) at IWMI-Nepal has to say



What is your role in the project?

As the Country Lead for the SDC-SoLAR project in Nepal, I am involved in the overall progress of the activities. I support the team members to keep track of the signs of progress and deliverables, and I also lead the grid-connection pilot in the country with an aim to train SIP technicians frequently.

What are the important policy questions that your country team is trying to answer?

The work that we are doing under the SoLAR project in Nepal aims to answer two broad policy questions, i.e.,

- What are the impacts of the SIP program and the investment made by the government in subsidising SIPs? How can we improve the program to make the subsidies accessible for the poor and marginalised groups?
- What can be done to ensure that the currently installed SIPs does not become obsolete once the farmers have access to the grid in the future? How can grid-connection of these off-grid SIPs aim to provide the farmers with an additional source of income through net-metering while addressing the groundwater sustainability issues, and improve the Capacity Utilisation of these SIPs?

What keeps you motivated?

One of my main motivations for working on this project is that my work could lead to positive policy changes that would help in improving access to SIP for the poor and marginalised farmers. The project findings are directly fed to the government policymakers to improve upon the program.

What keeps SoLAR partners engaged?

Here's what Anjali Neelakantan, from ATREE, our valuable partner of the SoLAR project, has to say



How can this project contribute to the mission of your organisation?

The Centre For Social & Environmental Innovation or CSEI's food futures initiative aims to improve farmers' income through regenerative agricultural practices, including practices that don't deplete soil quality or groundwater resources. Through this project with IWMI, we are answering that question for solar irrigation - how is the introduction of solar irrigation likely to impact groundwater (GW) abstraction, and how is the ratio of electricity generated versus groundwater pumped likely to change with different feed-in tariffs (FITs). As solar irrigation projects go to scale across multiple states, answering this question will allow us to implement solar irrigation projects in the right locations with the right FITs without depleting groundwater resources.

Which component of the project are you most excited about?

All three components of the project are exciting because they contribute to our understanding of how to create solutions without unintended consequences. The three components of this project are:

- Through a systematic review, we are converting crop water production functions into crude demand functions for groundwater to understand how these demand curves match against the feed-in tariffs (that are the supply curves),
- We are developing a theoretical framework to determine where solar irrigation is likely to be a good choice for improving water availability and access, without at the same time depleting groundwater resources, and
- We are developing map layers at a district level, pan India, to show where solar irrigation is physically feasible (based on groundwater sustainability). We will then see how the groundwater levels vary at different FITs.

Research Papers of interest published in this period:

[Agriculture and Climate Change in Nepal: GHG Emissions, Mitigations, Indications of Climate Change, Impact on Agriculture, Adaptation And Co-Benefits](#)

[A Grid-Connected Solar Photovoltaic Hybrid System for Reliable Power and Water Supply in Modern Irrigation Application](#)

[Breaking the mould: Understanding the Practicality of Solar Water Pumps Among Small Tea Planters in a South Asian State of India](#)

[Solar PV powered water pumping system- A review](#)

Other news from the solar space:

[India's Solar Capacity Additions Grew By 251% With 4.6 GW Added in 1H 2021](#)

[Feasibility Assessment Of Agriculture Solar Micro-Grids: A Case Study Of TP-DDL Discom In North Delhi](#)

[Government To Provide 50pc Subsidy On Solar System For Drip Irrigation Projects](#)

In partnership with



We thank Shisher Shrestha, Mohammad Faiz Alam, Archisman Mitra, Md Zain bin Akbar and Anjali Neelakantan for contributing to this newsletter.

For further information, please get in touch with Ms Zeba Ahsan, Communications Consultant, SoLAR Project, IWMI at z.ahsan@cgiar.org

[Visit the SoLAR website](#)

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