
SoLAR

Solar Irrigation for Agricultural Resilience

Issue No 8: April - June 2022

Dear readers,

After prolonged heatwaves since March, South Asia has been desperately waiting for the monsoons. Despite the official prediction of a normal monsoon, rainfall has been lower than expected. Some parts of the country experienced heavy floods early in the monsoon, and some are still experiencing high levels of rainfall deficiency. I was in rural Bangladesh recently and witnessed farmers' distress due to the late onset of rains. It is too early to say whether this monsoon season will see 'normal' rainfalls as predicted. However, it is clear from observational data that rainfall patterns have changed. The region is now seeing more extreme rainfall events and longer gaps between rain spells even when average rainfall is still the same. It is becoming more challenging for farmers to adapt.



(Image Credit: Waresul Haque)

Human-made global warming is changing the earth's hydrological cycle, and the urgency of reducing emissions (mitigation) is well recognized. Yet, these extreme events like heat waves, followed by rainfall deficits, often lead nations, even developed ones, to increase their reliance on fossil fuels. Take the case of Japan, for instance, the worst hit by the joint onslaught of heat waves during June end and the shortest rainy season ever recorded since 1951. The Japanese government plans to resort to more gas and coal-based energy production to evade a looming energy crisis. But can we not convert this crisis into an opportunity for Just Energy Transition (JET)? While energy transition from fossil fuel to renewable sources reduces emissions of greenhouse gases, JET involves strategies for systemic changes to happen in fair and equitable ways. It is, therefore, critical for South Asia - a climate change hotspot due to its high exposure to climate-related hazards and high vulnerabilities stemming from developmental deficits – mainly in the agricultural sector. With that thought, I solicit your attention to the current edition of our newsletter. Apart from the general updates on our research, implementation, and outreach activities, we are glad to provide you with a sneak peek into our impact stories from this issue onwards. I hope you will enjoy reading about these. Please do share your thoughts with me at a.mukherji@cgiar.org.

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

Highlights from the Quarter

Consultation Workshops in Pakistan



(Image Credit : IWMI Pakistan)

On March 10, April 01, and April 13, 2022, IWMI-Pakistan organized three stakeholder consultation workshops in Rahim Yar Khan, Islamabad, and Multan, respectively. These workshops were funded by the [World Bank](#). [Khawaja Fareed University of Engineering and Information Technology \(KFUEIT\)](#), Rahim Yar Khan, and the [Muhammad Nawaz Shareef University of Agriculture \(MNS\), Multan](#), co-hosted these events. The deliberations reviewed the status and [potential](#) for solar irrigation in the Punjab Province to inform the government's policy and legislative shifts towards improved groundwater management. Read more about the workshops in [Islamabad](#), [Rahim Yar Khan](#) and [Multan](#) here.

(Sustainable Development Goal) and Groundwater in Paris



SoLAR project researchers [Dr. Marie - Charlotte Buisson](#) and [Dr. Alok Sikka](#) presented their research findings at the [International Conference](#) on Groundwater, Key to Sustainable Development Goals, held at Sorbonne University, Paris, from May 18-20, 2022. [Read more here.](#)



Nepal MUS (Multiple Use Services) Network – Annual Meeting, 2022 in Kathmandu
[Gitta Shrestha](#) from [IWMI –Nepal](#) presented the findings from the SoLAR project's work in the Tarai region of Nepal. She drew from her research on the gendered impact of solar irrigation pumps. She emphasized the need for pro-active inclusion of gender and inclusion

principles in the implementation of solar irrigation programs. [Read more here](#)

(Image Credit: IWMI Nepal)

Country Highlights

From the Fields

Nepal

The SoLAR-Nepal team interviewed 32 farmers in Parsa in June, for a baseline study to support the micro-grid integration pilot within the Chhipharmai Rural Municipality.

A grid integration of the existing SIPs in the Chhipharmai village of the Terai region of Nepal began under SoLAR-Nepal's supervision.

(Image Credit IWMI Nepal)



Bangladesh



(Image Credit Zeba Ahsan)

[NGO Forum](#), our field partner in the SoLAR project in Bangladesh, conducted a telephonic survey between April 11 and May 26, of 85 solar irrigation pump operators (SIP) to collect information on

the SIP coverage and utilization of the 2021-22 *Rabi*. This survey was the 5th of nine such seasonal surveys being conducted to understand the temporal patterns in using SIPs over three years. Between May 29 and June 18, 2022, [NGO Forum](#) conducted 28 key informant interviews and 18 focus group discussions across 12 villages in Northwestern Bangladesh. This exercise aims to feed into the SoLAR project's qualitative study that would compare various SIP models operating in Bangladesh and their respective impacts on informal groundwater markets. In June 2022, grid integration of the IDCOL SIPs began at seven sites in Bangladesh.

Pakistan



Image Credit: IWMI Pakistan)

IWMI-Pakistan researcher [Muhammad Zain Bin Akbar](#) visited Chakral and Jhang districts between June 16 and 21, 2022, and June 28 and 31, 2022, to supervise the instrumentation work at eight borewells. The primary purpose of the instrumentation is to monitor energy generation and capacity utilization of the installed SIPs.

India



Between May 27 and June 06, 2022, a team of researchers from IWMI and the [Gujarat Energy Research and Management Institute \(GERMI\)](#) piloted training sessions for farmers under the Gujarat government's [Suryashakti Kisan Yojana](#). These sessions took place at five feeders in Gujarat - Mahakali, Sandesher, Bhadali, Balwada, and Vagadiya – across 153 farmers. This training program is part of an IWMI-GUVNL MOU and IWMI-GERMI service agreement for training 2000 farmers in 48 feeders of the Suryashakti Kisan Yojana in Gujarat.

(Image Credit: Aariz Raza)



(Image Credit: Aariz Raza)

SoLAR research for inclusive SIPs subsidy in Nepal

The [Alternative Energy Promotion Centre](#) (APEC), a renewable energy focal point in Nepal, is revising the SIPs subsidy selection criteria to prioritize smallholders and female farmers. Insights from SoLAR-Nepal's work in the Terai region have informed this revision exercise of APEC.

KfW held discussions with SoLAR Researchers.

SoLAR researchers [Archisman Mitra](#) and Dr Marie-Charlotte Buisson were invited to the [KfW](#) Development Bank, Bangladesh, to share their insights on the solar irrigation pumps (SIPs) of the [Infrastructure Development Company Limited](#) (IDCOL). KfW and the World Bank are now in the planning process of their support to IDCOL through a second phase of the [Renewable Energy Programme \(REP\)](#).

SoLAR insights for new CGIAR Initiatives

[One CGIAR](#) has embarked on a series of innovative research initiatives to tackle some of the most pressing problems of our times. [TAFSSA](#) and [MITIGATE+: Research for Low Emissions Food Systems](#) are two initiatives toward that end. The design phase of these initiatives has incorporated findings and insights from the SoLAR project.

SoLAR for resilient and inclusive agriculture in Punjab, Pakistan

IWMI- Pakistan has received funding from World Bank's solar project in Pakistan. The project aims to provide the government of Punjab Province with actionable recommendations for low-carbon and sustainable groundwater use in agriculture. Insights from the SoLAR project in Pakistan will feed into this study, eventually informing the loan agreement between World Bank and Punjab Agriculture Department under the [PRIAT project](#).

Capacity Strengthening

SoLAR helps NEA with grid-integrated SIPs.

[Asha Khanal](#), an engineer at the Nepal Electricity Authority's (NEA) Energy efficiency and Loss Reduction Department, talks to us about the SoLAR project's contribution to NEA's mission of expanding



and strengthening solar electricity generation through solar.

How does IWMI's SoLAR project contribute to your organization's mission?

[Nepal Electricity Authority](#) (NEA) is the sole electricity distributor in Nepal. Its goal is to generate, transmit and distribute electricity to different consumers all over Nepal. The generation of electricity in Nepal is season specific. In the wet season, power generation from existing hydro can fulfil the demand. In contrast, in the dry season, NEA must buy electricity via cross-border trading from India to meet its domestic market. So, in the dry season,

renewable energy like solar, and particularly grid-connected solar, plays a crucial role. IWMI's SoLAR project facilitates us to set up grid connections for distributed generation and a reliable power supply. Also, the surplus solar power can return to the grid via net metering provision.

What lessons have NEA drawn from this project, and how?

This project took us on an exposure visit to Gujarat in India to see the grid-connected solar irrigation systems under the Gujarat government's Suryashakti Kisan Yojana. With this, we had the opportunity to learn about the state's electricity regulation board, Gujarat Urja Vikas Nigam Limited's (GUVNL) dedicated agricultural feeders and their technical aspects.

From the exposure visit, we got an opportunity to understand net metering design, Special Design Transformer, a web portal, and the mobile app developed to monitor the grid status and individual system's performance on a real-time basis. We are sharing this knowledge with the NEA's operation departments to increase the durability of our systems and equipment. Not only the technological knowledge transfer, but this visit has also helped us to build a network with the utility professional at GUVNL for further future communication and guidance.

How are you implementing these lessons for your country?

NEA already has the net metering provisions for grid-connected solar irrigation systems. We will also coordinate with the Alternative Energy Promotion Council (APEC) to identify sites for implementing agricultural feeders. We will conduct the initial trials for feeder segregation on our existing radial feeder and then amplify the process with further feedback from the GUVNL officials.

Which aspect of this project excites you personally, and why?

In Nepal, the solar cooperative concept is still not realized. Leading such projects by a rural cooperative is one of the most exciting parts of the project.

In another interview, Ms. Jeniya Shakya, an intern at IWMI-SoLAR, Nepal, speaks to Mr. Ambu Ahmed and Mr. Bhulan Sah, Junior Technical Assistants, at the Chhipaharmai Municipality about the exposure visit to Gujarat government's SKY feeders in March 2022. [Read more here.](#)

Innovation Fund



(Image Credit: Sunipa DasGupta)

In 2020 the SDC-SoLAR project started a grant initiative under the [SoLAR Innovation Fund](#) to support innovations for wide-scale and sustainable adoption of solar irrigation pumps (SIPs) in smallholder agriculture of South Asia.

Here we bring to you how the [SDC-IWMI SoLAR IF Grantees Pave Ways for Innovative Use of Solar in Eastern India](#). Read more about their work *here*, [SwitchON](#), [KARMA](#) and [CINI](#).

SoLAR in News



In a [podcast with BBC](#), SoLAR-SA Regional Leader [Dr. Aditi Mukherji](#) talked about the heatwave threats to health and livelihoods in India. Articles in [Down to Earth](#), [Deutsche Welle](#) and the [CBC](#) also quoted her on the same issue.



[Prof. Tushaar Shah](#), Scientist Emeritus, IWMI, spoke to [Water Underground Talks](#) about the role of groundwater governance in poverty reduction and his work on the [water-food-energy nexus](#). In another interview with [Moneycontrol](#), he also spoke about the relevance of the economic prosperity of the people as the solution to India's water crisis than intermediate conservation strategies.



[The National Herald Tribune and Dawn](#), Pakistan, covered World Bank and IWMI-Pakistan's stakeholder consultation workshop at KFUIET, Rahim Yar Khan.

Forthcoming Events



[Asian Development Bank \(ADB\) Asia Water Forum, 8-11 August 2022.](#)

Archisman Mitra, Country Lead, SoLAR-Bangladesh, will present insights from the Infrastructure Development Company Limited's (IDCOL) PPP (Public Private Partnership) model for financing solar irrigation pumps in Bangladesh. [Read more about IDCOL's SIP model.](#)



[Stockholm World Water Week, 2022.](#)

Dr. Aditi Mukerji, Regional Project Leader, SoLAR-SA project will talk at two sessions – [Water, Impacts and Climate Change: Insights and solution from IPCC](#) and [Valuing Groundwater](#) - on August 25 and August 31, 2022, respectively. Her talks will focus on the potential of energy policies, including solar, for emissions reduction, livelihood improvements, and sustainable groundwater use in the context of climate change and sustainable development goals.

On the Reading List

Jain, Pragati, Prerna Jain and Pratyusha Jain, 2022. Implementation perspectives of solar energy irrigation policy in water deficient regions: A case of Rajasthan state in India. *Local Economy*, 37(3): pp.201-218. <https://journals.sagepub.com/doi/abs/10.1177/02690942221099400>

Jay R.S. Doorga, Jim W. Hall, Nick Eyre, 2022. Geospatial multi-criteria analysis for identifying optimum wind and solar sites in Africa: Towards effective power sector decarbonization, *Renewable and Sustainable Energy Reviews*, 158 (2022) 112107, <https://doi.org/10.1016/j.rser.2022.112107>

Chowdhury, H., T. Chowdhury, S. Rahman, H. Masrur, Hasan and T. Senjyu (2022). A simulation study of techno-economics and resilience of the solar PV irrigation system against grid outages. *Environmental Science and Pollution Research*. 1-12. <https://link.springer.com/article/10.1007/s11356-022-20339-2>

In partnership with



We thank Archisman Mitra, Dr Aditi Mukherji, Dr Alok Sikka, Dr Azeem Ali Shah, Gitta Shrestha, Jeniya Shakya, Dr Deepak Varshney, Dr Manish Kumar, Dr Marie-Charlotte Buisson, Md Zain bir Akbar, Shisher Shrestha and Dr Yashodha Yashodha for contributing to this newsletter.

Aariz Raza, Consultant, SoLAR Project IWMI, provides overall technical support in bringing this newsletter out.

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