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## SoLAR

### Solar Irrigation for Agricultural Resilience

Issue No 7: January- March 2022

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Dear Readers,

We welcome you to the first newsletter of 2022. Thanks to science and vaccines, the year began with another pandemic wave, but the impacts were much less severe. Our team paused their fieldwork briefly during this wave, only to resume field activities soon. This March was also the hottest in 122 years since India started its meteorological observations. From Pakistan to north India to Bangladesh, a large swathe of the area and people experienced this heatwave, reminding us that climate change is here, and now the impact of this heatwave on global food security is imminent, with reports of crop damage pouring in from countries like India and Pakistan. Such news is worrisome, especially when the Russia-Ukraine war has already disrupted global food supplies.



A SoLAR village in Pakistan

If we factor a looming water crisis into this scenario, the situation is dire. The IPCC's Working [Group II Report](#), where I led the chapter on [water](#), clearly shows that all components of the water cycle and all sectors, including the agriculture sector, have been impacted by climate change. Most of those impacts have been negative. Much of South Asia is already groundwater-stressed. So, the challenge before us is to make the most efficient, sustainable, and inclusive use of our existing groundwater resources.

What role can solar irrigation play in this context? Can solar irrigation programs be designed and implemented to incentivize farmers to use less groundwater? Can it ensure equitable and inclusive access to irrigation? How does it affect farm income distribution? In SoLAR, we endeavour to explore such questions and, in turn, generate a robust evidence base for the solar irrigation policies and programs of the national and state/provincial governments.

So, here's a sneak peek into some of the field activities that we undertook in the January - March quarter. I hope you will enjoy reading about these. Please do share your thoughts with me at [a.mukherji@cgiar.org](mailto:a.mukherji@cgiar.org).

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

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## Highlights from the Quarter

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### 5th PSC meeting emphasized communication and policy outreach efforts



On 2nd March 2022, the fifth project steering committee meeting (PSC) emphasized the need for bolstering communication and policy outreach efforts, with the project being almost halfway through its four-year period. The PSC members unanimously agreed that the key partnerships built through the project would be as instrumental in scaling up the project's knowledge management and dissemination activities as these have been in keeping our field works and data collection running despite the COVID situation. While presenting the work plan for 2022, Dr. Aditi Mukherji, Regional Project Leader, SoLAR-SA, asserted that publications, viz. journal articles, and policy briefs, will be prioritized among other activities of the project for the year. For more details, read the minutes of the meeting [here](#)

### Nepal National Forum on making solar irrigation pump equitable and inclusive



On 4th February 2022, IWMI, in partnership with Alternative Energy Promotion Centre (APEC), hosted a webinar on making solar irrigation pumps (SIPs) equitable and inclusive in Nepal. Fifty participants attended the event. IWMI researchers presented the findings from the impact evaluation studies of SIPs in Nepal. A panel discussion followed the presentations. Dr. Laxman Prasad Ghimire from APEC moderated it. Pooja Sharma (Practical Action), Baburam Paudel (Renewable World), Khem Raj Bhandari (Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ)), Bishwaraj Bhattarai (Gham Power Nepal Pvt.Ltd.), and Sangeeta Giri (Nepal Electricity Authority (NEA)) were the panelists. Dr. Madhusudan Adhikari, Executive Director, APEC, chaired the event. Dr. Manohara Khadka, Country Representative, IWMI Nepal, set the context for SIP interventions for inclusive and gender-transformative outcomes, while Dr. Aditi Mukherjee, Project Leader, SoLAR SA, IWMI, presented the potential of SIPs in reducing diesel usage and increasing farmers' crop revenue. Click [here](#) to read more

## National Forum on the feasibility of upscaling solar irrigation in Bangladesh



On 10th February, 2022, SoLAR Bangladesh organized a webinar on *Co-benefits, equity, and financial viability for upscaling solar irrigation in Bangladesh*. Seventy-three participants attended the event. The presenters were Dr. Syed Mahbubur Rahman (BRAC University), Dr. Marie-Charlotte Buisson (Senior Researcher, IWMI), and Dr. Alok Sikka (IWMI Country Representative, India). While Dr. Rahman presented a qualitative study on the co-benefits of BMDA-operated community-owned solar pumps in the Barind tract, Dr. Buisson presented the impact of IDCOL-supported SIPs, especially for marginal and tenant farmers adopting the "fee for service model". Raquib Ul Mesbah, Assistant Manager, IDCOL, presented an interesting case of grid integration of SI systems for benefitting pump owners by selling unused grid power. Among the panelists were Tanuja Bhattacharjee (World Bank), Nazirul Islam (BMDA), ABM Zahid Hossain (BRRI), and Mohammad Ayub Hossain (BARI)... Click [here](#) to read more.



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## Meeting of Committee IWMI-Nepal Consultative



On 11th February 2022, IWMI-Nepal held a meeting of the Consultative Committee. The purpose of the meeting was to discuss: (i) IWMI's strategic engagement for policy support to the Government of Nepal for sustainable and inclusive farmer-led irrigation development (FLID) and (ii) the role of the SoLAR-SA project therein in advancing the roles, agency, and knowledge of women and marginalized communities. Click [here](#) to read more about IWMI's research approaches and outcomes for scaling up FLID in Nepal.

## IWMI collaborates with Gujarat Energy Research and Management Institute (GERMI)



GERMI entered into a service agreement with IWMI to impart training on the operation, maintenance, metering, and billing of solar pump systems installed under the Suryashakti Kisan Yojana (SKY), the Gujarat government's solar power scheme for enabling farmers to generate electricity for their captive consumption

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## Country Highlights

SIPs have emerged as a viable alternative to diesel pumps . But what are the opportunities and challenges of solar irrigation in ? To know more see our documentary:

[\*Solar irrigation in Nepal: Opportunities and challenges | IWMI\*](#)



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## From the Fields

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### *Nepal*

SoLAR researchers visited Chitwan, Chhipaharmai, and Pokhariya between

February 20th and 23rd, 2022, first to attend a community workshop organized by Gham Power, a SoLAR Innovation Fund Grantee, and then to coordinate activities for implementing micro-grid pilots ... Click [here](#) to read more



### *Bangladesh*



Between 11th and 13th January 2022, IWMI researchers joined IDCOL personnel to visit SIP sites in Gaibandha, Dinajpur, and Birganj districts to assess the design and operational modalities of IDCOL's solar irrigation scheme.... Click [here](#) to read more

Between 21st February and 1st March 2022, a team of IWMI researchers and NGO Forum staff visited 10 SIP implementation sites across Northwest and Southwest Bangladesh. This was their first visit since NGO-Forum had installed flowmeters to measure flow rates of SIPs vis-à-vis diesel pumps in the catchment area.... Click [here](#) to read more



### *Pakistan*



From 7th March to 11th 2022, IWMI researchers traveled to the Chakwal, Jhang, and Rahim Yar Khan districts with Buraq Integrated Solutions' personnel. The purpose of these visits was to identify the sites with in-situ instrumentation for monitoring actual discharge and duration of operation of tube wells, power generation and capacity utilization by the installed PVs, and the amount of water applied to the farmer fields via soil moisture sensors... Click [here](#) to read more.

## India



From 22nd to 26th March 2022, a 13-member delegation team from the SoLAR-SA project in Nepal visited the Dhundi Saur Urja Utpadak Sahakari Mandali (DSUUSM) and Suryashakti Kisan Yojana (SKY) in Gujarat, India. With SoLAR Nepal planning to implement a Micro Grid (MG)-connected Solar Irrigation Pump (SIP) pilot in 2022, the purpose of the visit was to learn from these micro-grid exercises in India ..... Click [here](#) to read more.

From 20th to 24th March 2022, IWMI post-doctoral fellow, Yashodha, traveled to the Sunderanagar, Rajpipla, and Surat districts in Gujarat to pre-test the household survey questionnaire for an impact evaluation study of the Suryashakti Kisan Yojana (SKY) feeders... Click [here](#) to know more



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## SoLAR in News

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*“Solar irrigation ensures food security and livelihoods in Nepal’s Terai.”*

- Manohara Khadka, IWMI-Nepal

Speaking at the World Water and Weather Week 2022, organized by the Water and Energy Commission Secretariat, Government of Nepal, on 22nd March 2022, Dr. Manohara Khadka, Country Representative, IWMI-Nepal, cited the importance of solar irrigation in food security and livelihoods improvement in the Terai region of Nepal – “ a fifth of the farmers receiving solar irrigation pumps have diversified their crop production and have earned incomes from sales of off- seasonal vegetables”. Click [here](#) to read more







*“ Gender equality and social inclusion... depends... on the design of solar irrigation technology projects.”*

– Gitta Shrestha and Labisha Uprety, SoLAR-SA, Nepal

Access to irrigation technology underpins easy and reliable access to water. However, land ownership is a prerequisite for access to water sources, and so is the access to finance for securing irrigation technologies. Can solar irrigation technology play a transformative role in the face of exploitative gender and caste relations prevalent in Nepal's Terai? To know [more](#), read Gitta Shrestha and Labisha Uprety's article on [news@myrepublica.com](mailto:news@myrepublica.com)

### *IPCC reports mention the mitigation and adaptation potential of solar irrigation pumps*



The recently published [IPCC Report on Mitigation](#) notes the declines in prices of solar photovoltaic cells by up to 85% between 2010-19, making many solar technologies cost-effective and socially acceptable. It also notes that solar energy is now cheaper than fossil fuel-based energy in many regions, including South Asia. In addition, the [water](#) chapter of the [IPCC Report on Vulnerability and Adaptation](#) noted the increasing use of solar irrigation pumps (SIPs) in Africa, Europe, and South Asia; mainly, its potential to reduce carbon emissions in South Asia. However, it is also noted that SIPs can lead to groundwater over-exploitation without proper incentives in place, and elite farmers can corner the benefits of adoption.

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## Meet our SoLAR Champions

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**Gitta Shrestha**

**Researcher – Gender, Social and Environmental Justice, IWMI - Nepal**

### **What is your role in the project?**

I am leading empirical research investigating the impact of solar irrigation pumps (SIP) on women and marginal farmers in Nepal. In addition, I am also responsible for mainstreaming gender equality and social inclusion (GESI) in the three work packages of the project, including various survey instruments and research outputs. My contribution extends to investigating GESI in water-food-energy policies and the impact of SIP on women and marginal farmers in Bangladesh.



## **What critical policy questions are your country team trying to answer?**

Women in Nepal form the bulk of the agriculture labour force in Nepal, yet the gender gap in agriculture and particularly in technology remains vast. Women have lesser access and control over technology and other services than men, influencing their choice and adoption capabilities. This, in turn, put them in a disadvantaged position to contribute effectively to agriculture in Nepal. Technologies like SIP irrigation must be accessible and favourable for women and marginal farmers, thereby minimizing the gender gap in technology use, benefit and supporting the inclusive transformation of rural agricultural economies. Through our work, we are striving to contribute towards the goal of GESI inclusive policies in the Water-Food-Energy sector in Nepal and respond to SDG 5 (gender equality), SDG 10 (reduced inequalities), SDG 2 (sustainable agriculture), SDG 6 (sustainable water management) and SDG 13 (Climate Action).

## **What keeps you motivated?**

This project allows me to work towards my passion - contributing to and building an inclusive, just, and equal society for women and those at the margins. My biggest motivation is to engage in quality research and generate evidence that can aid in formulating transformative policies and action-oriented solutions empowering women and the marginalized.

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**Dr. Akash Davda**

**Sr. Scientist and Head-RE Trainings OR, GERMI Capacity Building Team**

## **How does this project contribute to the mission of your organization?**

Training farmers about solar PV water pumping systems directly resembles one of the institute's missions, which focuses on training and skill development in the Renewable Energy sector. As GERMI is a not-for-profit organization endeavouring to create a social impact, this project gives us an incredible opportunity to train the farmers in the renewable energy sector, keeping them in line with the pace of technology and, in turn, help in raising their standards of living. This project will cater to the urge to promote renewable energy and create an economic impact on the upliftment of society.





## Which component of the project do you find most exciting?

The overall project is exciting to execute, from visiting farmers for content development to conducting actual on-ground training in the field. We are more excited about the potential social, technical, and economic impacts of the training, such as:

1. Improvement in power generation of the solar PV system installed at farmers' premises and their use as a good source of income, adding surplus to their livelihood.
2. To bridge the gap between technological advancements in the industry and their on-ground implementation to the root level via awareness training to farmers that directly impact the optimal usage and reliability of the technology.

## What have been the key challenges and learnings while working on this project?

**Key Challenge:** A key challenge would be to convey all the relevant and valuable information during actual training sessions to farmers in a short period of a day.

**Learning:** A key learning from this project would be developing the skill to train the people with comparatively huge technical knowledge gaps with effective transfer of knowledge in the most efficient manner to make an actual difference in their day-to-day lives.

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## On the Reading List

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Islam MT, ME Hossain. 2022. Economic feasibility of solar irrigation pumps: A study of northern bangladesh. *International Journal of Renewable Energy Development*, 11 (1), pp.1–13, doi: 10.14710/IJRED.2022.38469

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Raza F, M Tamoor, S Miran, W Arif, T Kiren, W Amjad, MI Hussain, GH Lee. 2022. The Socio-Economic Impact of Using Photovoltaic (PV) Energy for High-Efficiency Irrigation Systems: A Case Study. *Energies*, 15 (3), pp. 1–21, doi: 10.3390/en15031198

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**In partnership with**



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*For further information, please get in touch with Ms. Sunipa Das Gupta, Communications Consultant, SoLAR Project, IWMI at [s.dasgupta@cgiar.org](mailto:s.dasgupta@cgiar.org)*

*Images courtesy: IWMI -SDC-SoLAR Project*

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