Solar Irrigation for Agricultural Resilience in South Asia (SoLAR-SA)

8th Project Steering Committee (PSC) Meeting | 18 September 2023

14:00 to 15:30 (IST)

Venue: Hybrid/IWMI Delhi Office, NASC Complex, New Delhi-110012

Agenda:

Time	Heads	Speaker
5 minutes	Welcome Remark	Alok Sikka
10 minutes	Opening Remarks	Jonathan Demenge/Mark Smith
40 minutes	Progress and Workplan 2023	Darshini Ravindranath
20 minutes	Discussion	PSC members
5 minutes	Remarks on Progress and Workplan 2023	Divya Sharma
10 minutes	Closing Remarks	Jonathan Demenge/Mark Smith

Attendees:

Name and Designation	Designation at PSC
Jonathan Demenge, Head of SDC, New Delhi	Chair
Mark Smith, Director General, IWMI	Co-Chair
Divya Kashyap Sharma, Deputy Head and Project Manager, SDC	Member
Cornelia Hett, Program Officer, SDC	Invited Guest
Vidhisha Samarasekara, Strategic Program Director, Water, Climate Change and Resilience, IWMI	Invited Guest
Alok Sikka, Country Representative, India, IWMI	Member
Darshini Ravindranath, Senior Researcher, Solar Energy and Climate Resilience, IWMI and SoLAR-SA Project Lead	Member
P.C. Sharma, Additional Director, International Solar Alliance (ISA)	Member
Tushaar Shah, Emeritus Fellow, IWMI	Member
Arnob Wakil Ahmed, IDCOL [Nominated on behalf of IDCOL]	Invited Guest
Akash Davda, Senior Scientist and Head-Renewable Trainings, GERMI	Guest
Biswajit Roy, Director General, GERMI	Co-opted member

Abbreviations: AEPC: Alternative Energy Promotion Centre; FWMC: Federal Water Management Cell; GERMI: Gujarat Energy Research and Management Institute; IDCOL: Infrastructure Development Company Limited; ISA: International Solar Alliance; IWMI: International Water Management Institute; MNFS&R: Ministry of National Food Security and Research; SDC: Swiss Agency for Development and Cooperation

Welcome Remark

Dr Alok Sikka welcomed all the attendees to the PSC meeting and welcomed Dr Jonathan Demenge, the chair of the meeting and the head of the cooperation. He introduced the new project lead for SoLAR-SA, Dr Darshini Ravindranath and set the context for the meeting by inviting Dr Demenge and Dr Smith to give their brief opening remarks.

1. Opening Remarks

Dr Jonathan Demenge started off by introducing himself to the PSC as the new chair and head of cooperation. He highlighted that the solar project in South Asia aims to contribute to climate resilient, gender equitable and socially inclusive agrarian livelihoods in Bangladesh, India, Nepal, and Pakistan by supporting government efforts to promote solar irrigation. The year 2023 has been extremely encouraging due to policy level announcements by partner countries, notably Bangladesh and Pakistan e.g., Bangladesh Prime Minister's declaration of a complete shift to solar energy, replacing diesel for irrigation pumps. He emphasized the importance of policy briefs generated by the solar project and consultations with key stakeholders, which played an instrumental role in sensitizing the solar policy environment in Bangladesh. He also mentioned the Pakistan government's plans to solarize 100,000 pumps across the country with an allocation of 1.4 billion Swiss francs or dollars.

He reiterated that SDC was happy to note that the solar project findings have served to inform, optimize and justify these national level developments, and that these demonstrate the interest generated by the project, the quality of findings, and involvement of partners and their networks in disseminating key results. It is important that in the coming months the project can provide further support to partner countries in defining these large programs and can sync these to further dissemination because while good knowledge is crucial, to be impactful, this knowledge must be shared. He discussed the project's final progress report while accentuating the importance of actively gearing up and preparing for the project's second phase.

Dr Demenge also spoke about the recent SDC initiated external evaluation of the project which thoroughly assessed the project's outcomes, and demonstrated its high relevance, yielding promising results.

Dr Mark Smith, Director General, IWMI, and Co-Chair of SoLAR PSC, welcomed all members to the 8th PSC Meeting. He has been involved in the steering committee meetings for the last three years, convening every six months. These meetings have provided a valuable opportunity to track project progress. He emphasized that the journey of the project has been quite impressive, highlighting its success in leveraging knowledge, applying it effectively and integrating it into policy. The project has demonstrated signs of influence in shaping policies which is an encouraging development with numerous lessons not only for the solar program but also for IWMI and our approach to bridging the gap between research, knowledge and policy making.

He also spoke about the UN 2023 Water Conference held in New York and the role played more widely by IWMI in bringing together people to advance the water agenda at a political level and across sectors. He emphasized the importance of collaborative efforts across sectors, which aligns with the approach of this program. There is a clear sense of urgency highlighted in the New York Conference and it is hoped that our solar project as well as IWMI`s longstanding work on solar irrigation, contributes to the ongoing global and regional discussions, particularly the robust discourse in South Asia.

As previously outlined, there has been noteworthy progress reported in the past six months, both in terms of project results and their translation into significant policy initiatives across the four countries, which is highly encouraging. As we near the culmination of the first phase and begin preparations for the second phase, it is imperative that we wholeheartedly dedicate ourselves to using the insights from project evaluation as guidance in defining the objectives and scope of the next stage.

A consistent theme in the past three years of steering committee meetings for this program has been the significance of translating knowledge into policy. The emphasis has been on bridging the gap between research and its practical application in influencing and shaping policy decisions. Our commitment remains steadfast in this regard with a continuous focus on learning and enhancing our approach while collaborating closely with our partners, partner countries, organizations, and members of our program`s Steering Committee.

Dr. Smith expressed anticipation for the meeting and showed keen interest in receiving the most recent project updates. He extended a warm welcome to Darshini as a new member of the team and expressed excitement about her contributions in further advancing the project, considering the strong foundation laid by three years of previous work. He then invited Darshini to present the project's progress.

2. Progress and Workplan 2023

Dr Darshini Ravindranath started her presentation by introducing herself and highlighting collaboration with country leads in collating findings and accomplishments.

In India, findings from the assessment of farmer responses to solar irrigation indicated that, under specific conditions, the introduction of solar irrigation is unlikely to bring about significant crop transitions across the districts studied. Capacity building efforts led to the successful training of farmers which was imparted to over 1,755 beneficiaries in India (*imparted to 1750 SKY beneficiaries in 45 SKY feeders across 4 DISCOMS from Jan-June 2023)*.

The absence of women in training sessions was highlighted, with optimism that this can be rectified in future sessions. Overall, the impact of the training and initial observations and feedback have been positive. The observations indicated a positive difference in solar energy generation between treatment and control groups.

In Bangladesh, the past six months saw successful completion of the household survey which involved 100 farmers. Results indicated that solar energy systems in off grid areas are not only replacing traditional energy sources but are also providing a number of mitigation and adaptation co-benefits. Adaptation co-benefits include, reduced irrigation costs, increased profits, improved farmers household food security and enhanced dietary diversity.

This work offers valuable insights to the government on scaling efforts; it underscores the importance of government investments in addressing challenges to increased demands on irrigation and subsequently diesel, especially in difficult terrain. The work also showed that it is essential to better target regions for solar irrigation interventions, e.g., regions with primarily water-intensive cropping.

Findings on groundwater sustainability have been collated in India and Bangladesh; it is one of the first studies on understanding the link between solar energy and groundwater usage, both in India and Bangladesh. Based on two years of data until 2023, no significant differences (overall) in irrigation water application between the Solar and Diesel farmers have been observed for Bangladesh; no significant differences in irrigation water

application between the Solar and electric pumps have been observed in India. The differences between and within sites are influenced by sowing dates, crop variety and rainfall. Also, updated SIP upscaling scenarios show no significant changes in GW level in the region.

It is to be noted that these results are based on current scenarios where Solar Irrigation Pumps (SIPs) are primarily introduced in regions with high irrigation use. If SIPs lead to changes in cropping patterns, especially in regions with low irrigation use, it could have different implications for groundwater sustainability. Therefore, further research is required to inform robust policy planning.

A case study on SIP promotion models was conducted to ensure the benefits of cheaper irrigation through solar pumps reaches all farmers. Findings showed that, no diesel was being used in SIP command areas, notably finding the effective use of loan phases in command areas, which gained traction. Secondly, the Tubewell permit system in Bangladesh protects groundwater over extraction, but also runs a risk of creating local monopolies for solar pump owners, which could limit other farmers' access to new electric connections in command areas. To address this, there's a need for appropriate monitoring systems post loan repayment through a call and local administration. Alternatively, it would be beneficial to explicitly clarify tariff limits in contracts or engage with fit sponsors.

In Nepal, findings from the comprehensive GESI case studies were analysed which showed that introduction of SIPs has had no significant impact on gender stereotypes, and that while gender transformative goals are well articulated in national development frameworks, including the Constitution, integration in sectoral policies was less clear. Thus, targeting of irrigation subsidies, services, and technologies tend to be concentrated among privileged groups.

The demonstration pilot of a grid connected SIP was commissioned in January 2023 and four out of eight farmers were shown to have used it to cultivate summer paddy, while the remaining farmers employed it to supplement irrigation during dry periods of the monsoon season. All eight farmers were also selling water to neighbouring farmers, effectively replacing diesel irrigation practices. This project is a collaborative effort involving Ministry of Energy and WWF Nepal, BMZ and Bagmati Rural Municipality. The application for a net metering agreement has been submitted and Dr Mark Smith has personally visited some of these sites.

A need assessment for capacity building took place, where women farmers were enthusiastic and willing participants. The assessment recommended the importance of assessing soil quality, crop water requirements, irrigation timings and technical training on operation and maintenance. Additionally, in terms of capacity building, a bilingual training manual on operations and maintenance of SIPs was prepared and handed over to the AEPC for their use in Nepal's future initiatives.

In Pakistan, the SoLAR team made a key contribution to the development of a groundwater vulnerability index to be tested on a pilot basis through additional funding by the World Bank. The SDC SoLAR project and team in Pakistan is also well positioned to inform recent huge investments by the Government of Pakistan (newly launched PM solarization of Agriculture scheme) and the World Bank’s Agriculture Transformation (PRIAT) projects.

Wider highlights

An update on the innovation fund projects – Ghampower and SwitchOn – was provided. Both projects have reached completion and submitted completion reports which will be synthesized alongside the other grantees in the next year. A summary of the regional forum was provided which was held in February in India. It brought

together researchers, policymakers, and practitioners across 70 institutions and 16 nations. Other forums such as the G20 workshop on solar energy highlighted the work of SoLAR. At COP28, IWMI will be curating a session using findings from SoLAR at ISA's pavilion.

Way forward

The key points for the way forward of the project were summarized, emphasizing the need for greater policy outreach and engagement. In the coming months, the team will focus on harvesting lessons learned from the Innovation Fund projects; enhance understanding of the Gender, Equality and Social Impacts of the programme; work on policy briefs to help engage more meaningfully with government counterparts; assess the overall enabling environment of solar irrigation, including looking at the subsidy regimes, private sector implications; improve understanding of the water-energy-food nexus and enhance south to south learnings (e.g., Africa).

3. Remarks on Progress & Workplan

Cornelia Hett

She introduced herself as the program officer responsible for the SoLAR project and congratulated the new project lead. She liked the way forward slide and the focus on taking forward findings from the evaluation report.

She highlighted the numerous opportunities available for the project, particularly in light of recent policy changes in various countries. She expressed her enthusiasm for advancing the key aspects of the project in the future and emphasized that there is still much work to be done in this regard.

Akash Davda

Dr Davda introduced himself and his colleague Biswajit Roy from GERMI and praised the excellent presentation and the valuable insights on what has been done and can be done for Gujarat in India. He emphasized the significance of projects like these, which address the energy-food-water nexus. He mentioned that their organization has successfully trained around 1800 plus farmers, highlighting the importance of such initiatives for the future. He stressed that focusing on the water, energy, and food nexus is crucial, especially in India, where they anticipate potential water scarcity issues.

PC Sharma

Mr Sharma recommended taking into consideration ISA National Focal Points in developing pilot projects on solar irrigation, with a focus on SDC partner countries for transferring learnings and scaling up.

He highlighted that during Cop 28, National Focal Points specifically those countries who are working on solar water pumping systems are being engaged by ISA.

Tushaar Shah

Professor Shah commented on the progress in irrigation policies across project countries and spoke about his visit to Gujarat for the evaluation study and interaction with beneficiaries.

Divya Sharma

Divya Sharma expressed her appreciation for Mr. PC Sharma's proposal and stated that they would review it from SDC's perspective in the coming year. She also mentioned that SDC was considering organizing another forum, with the intention of expanding its reach from a regional event to a global one. This could provide an excellent opportunity to engage with countries from different parts of the world and facilitate knowledge exchange.

Regarding directions provided by the evaluation team for the next phase of the project, she noted that these were not being shared now since it was a draft report and required internal discussions and consideration. She assured the attendees that they would provide this information later.

She briefly spoke about the evaluation process and how the project's strategy and approaches are highly relevant in generating significant achievements and impact on the ground. She emphasized that the greatest impact of this project has been through its component on training and capacity building. She lauded GERMI for its efforts on training and capacity building and thanked all other partners involved in the training component of the project in the other three countries. Along with these valuable efforts, a major impact of the project has also been on its research and knowledge support, including project briefs and research briefs. She highlighted that it was now important that this knowledge and shared learnings find its way to various policy discussions. It is critical that this knowledge is collated and shared with the right actors and finds its space in the policy environments of its countries. She highlighted that the project is providing good regional knowledge integration and appreciated the cross-country experience exchange, especially teams from Nepal and Bangladesh.

She then discussed the Innovation Fund grants and the importance of extracting useful lessons to inform future design, particularly strengthening the management and governance aspects of groundwater. She asked to look at the impacts of SIP adoption on GESI and provide inputs to policymakers on strengthening this component of solar programs in all four countries. She reiterated Mr Davda's point of better defining the role of solar in the energy-food nexus and what opportunities exist to do so. The capacity building aspect of the project aims to build capacities of local communities to ensure that it makes it easy for them to adopt the technologies and not get disheartened because of technical issues related to the technology.

4. Closing remarks

Mark Smith

In his closing remarks, Dr Smith expressed his gratitude to all the participants. He emphasized the significance of emerging knowledge from the project and the increasing traction observed in engaging policy. He also stressed the importance of keeping pace with the evolving policy landscape and continuing efforts to position the project effectively, leveraging the evidence and engagement it generates.

He also raised some critical questions about why the project might not be entirely aligned with its original ambitions, highlighting the potential for delivering more in terms of GESI. He also acknowledged the valuable role played by Dr Sikka in transitioning the project and extended a heartfelt thanks to Corinne Demenge for her guidance in the SoLAR project.

Divya Sharma

She emphasized that the policy landscape has evolved in their partner countries with rapid developments. She stressed the importance of ensuring that the project's valuable work, both its achievements to date and ongoing efforts, finds its rightful place in the policy landscape of these countries. She highlighted how the project has been able to contribute to supporting the country governments in implementing their new programs in this area, expressing confidence in the project team's capacity to continue doing so.

She looked forward to being actively involved in this process and expressed her deep gratitude for the contributions made thus far and anticipated carrying this momentum into the next year. Part of this involves consolidating the project's work, presenting it to policymakers, and crucially, beginning the design of the next phase of the project. She extended her appreciation to Dr. Sikka for his effective leadership during the project's mid-term phase, recognizing the challenges involved and his excellent performance. She now eagerly anticipated close collaboration with Darshini and the rest of the team.

Alok Sikka

Dr. Sikka concluded the session by expressing his heartfelt gratitude to everyone involved in the project. He specifically acknowledged SDC as an exceptional donor and emphasized that working with SDC had always been a seamless and collaborative experience.

He offered his continued support to the new Project Lead (PL) while transitioning from the project and also took a moment to extend his appreciation to Divya Sharma for her dedicated work and unwavering support.

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International Water Management Institute

SoLAR Solar Irrigation for Agricultural Resilience

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

CGIAR

8th PSC meeting: SDC – SoLAR

18th September 2023

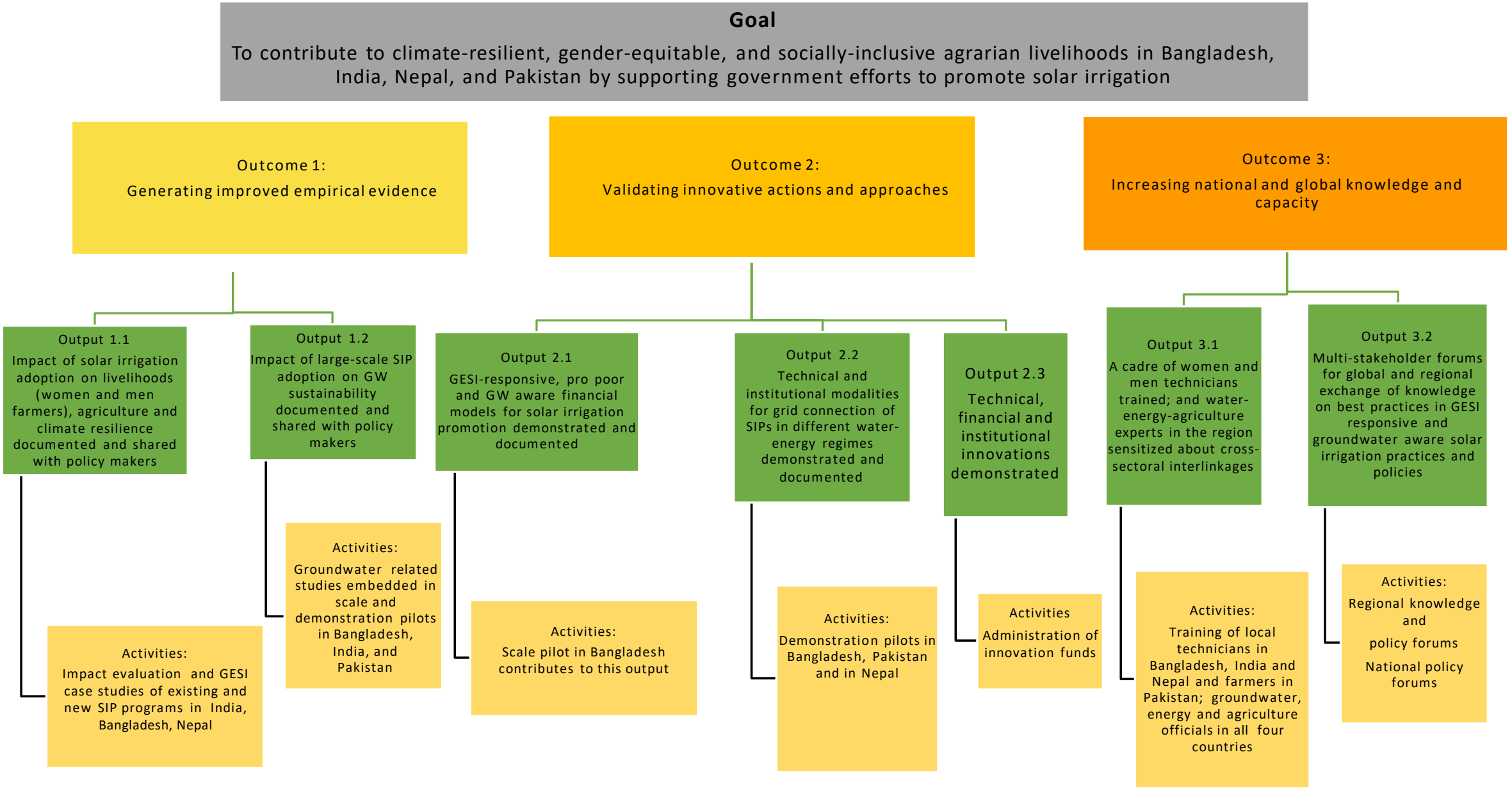
Highlights

In the past 6 months, the SDC-SoLAR work has demonstrated that it is a programme with real impact:

1. SoLAR research findings are **supporting shifts in policy changes** in all four countries;

2. **Bilateral and development partners** are increasingly seeing IWMI and SDC-SoLAR as key stakeholders and change-makers on solar irrigation;

3. **Successful pilots on grid integration launched and commissioned,** which provides an excellent framework for south-south collaboration and expansion of the SDC-SoLAR programme into other countries.


Goal
To contribute to climate-resilient, gender-equitable, and socially-inclusive agrarian livelihoods in Bangladesh, India, Nepal, and Pakistan by supporting government efforts to promote solar irrigation
Outcome 1:
Generating improved empirical evidence
Outcome 2:
Validating innovative actions and approaches
Outcome 3:
Increasing national and global knowledge and capacity
Output 1.1
Impact of solar irrigation adoption on livelihoods (women and men farmers), agriculture and climate resilience documented and shared with policy makers
Output 1.2
Impact of large-scale SIP adoption on GW sustainability documented and shared with policy makers
Output 2.1
GESI-responsive, pro poor and GW aware financial models for solar irrigation promotion demonstrated and documented
Output 2.2
Technical and institutional modalities for grid connection of SIPs in different water-energy regimes demonstrated and documented
Output 2.3
Technical, financial and institutional innovations demonstrated
Output 3.1
A cadre of women and men technicians trained; and water-energy-agriculture experts in the region sensitized about cross-sectoral interlinkages
Output 3.2
Multi-stakeholder forums for global and regional exchange of knowledge on best practices in GESI responsive and groundwater aware solar irrigation practices and policies
Activities:
Impact evaluation and GESI case studies of existing and new SIP programs in India, Bangladesh, Nepal
Activities:
Groundwater related studies embedded in scale and demonstration pilots in Bangladesh, India, and Pakistan
Activities:
Scale pilot in Bangladesh contributes to this output
Activities:
Demonstration pilots in Bangladesh, Pakistan and in Nepal
Activities
Administration of innovation funds
Activities:
Training of local technicians in Bangladesh, India and Nepal and farmers in Pakistan; groundwater, energy and agriculture officials in all four countries
Activities:
Regional knowledge and
policy forums
National policy forums

India

8th PSC meeting: SDC – SoLAR Updates and Results Jan-Jun 2023 and Plans July-Dec 2023

Lead: Deepak Varshney
Team: Faiz Alam, Kriti Sharma, Pramod Dubey
Partners in implementation: INREM, and GERMI with support from GUVNL

Current achievements and Results: Jan-Jun 2023

Impact Evaluation

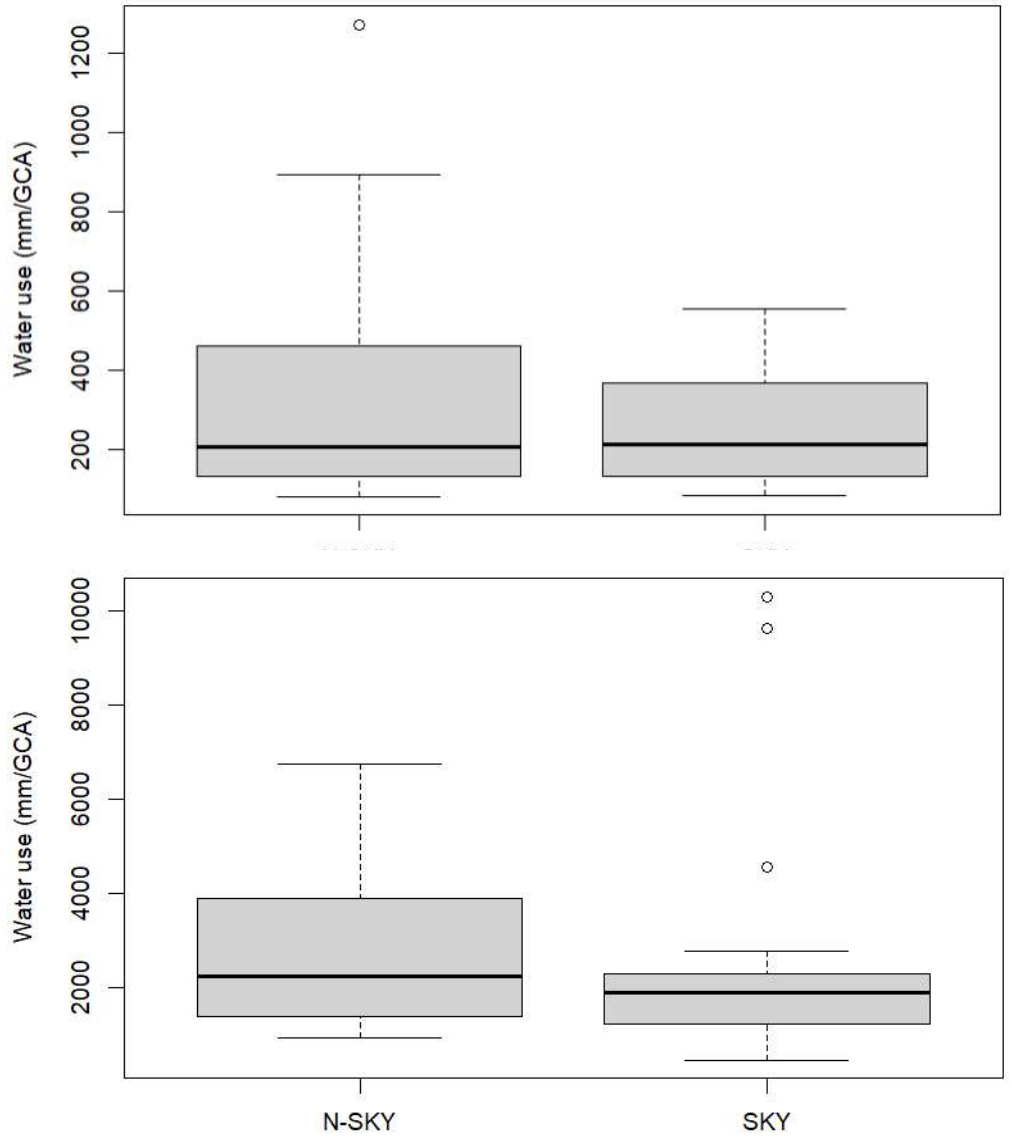
1. **An assessment of Mukhyamantri Saur Krishi Vahini Yojana (MSKVY)** showed low uptake and raised concerns regarding the participation of private players due to rising costs, unviable tariffs, and land availability for the private sector

2. **An assessment of farmer responses to solar irrigation** was conducted using Agent-based modeling followed by consultations with technical experts.

Current achievements : Jan-Jun 2023

Groundwater Sustainability

- **No statistically significant difference between solar and non-solar farmers**

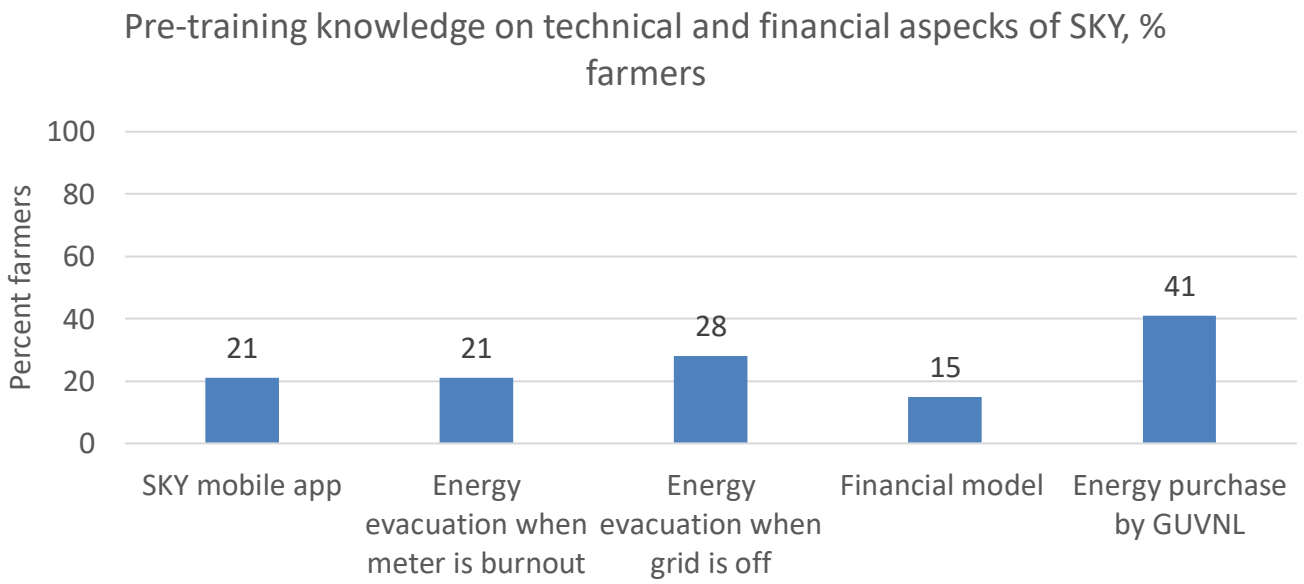


Current achievements : Jan-Jun 2023

Training of Farmers

Pre-training assessment of farmers' knowledge about the SKY scheme

Farmers possess poor knowledge of the technical and financial aspects of the SKY scheme

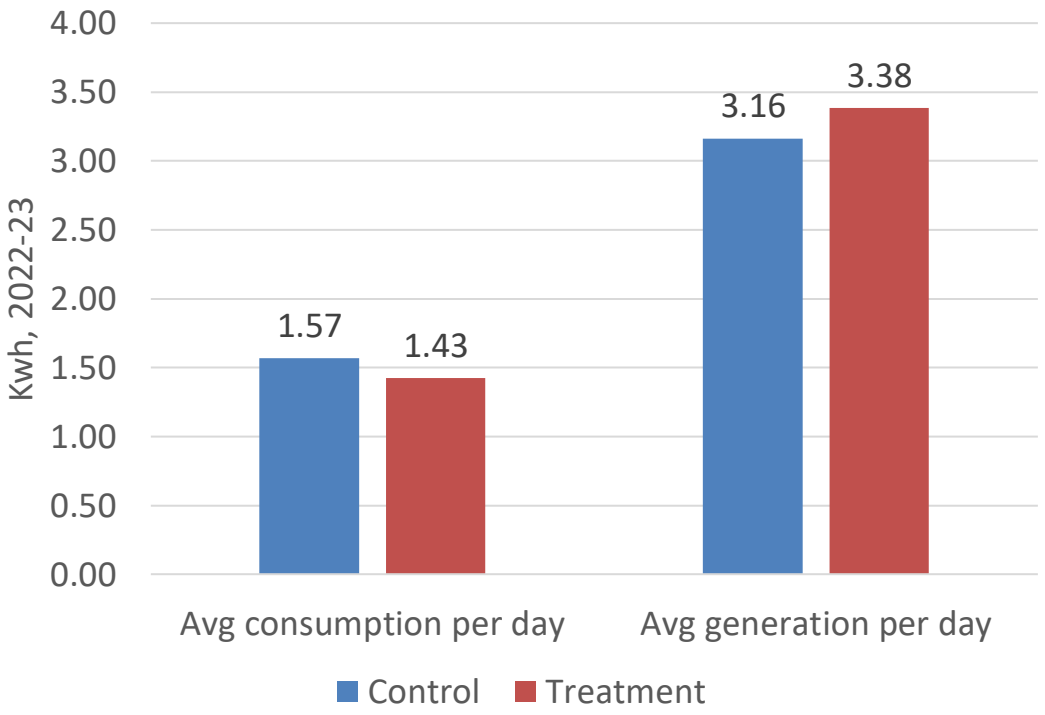


Current achievements : Jan-Jun 2023

Training of Farmers

A day-long training is imparted to 1750 SKY beneficiaries in 45 SKY feeders across 4 DISCOMS

Impact of training, preliminary observations



Bangladesh

8th PSC meeting: SDC – SoLAR Updates and Results Jan-Jun 2023 and Plans July-Dec 2023

Lead: Archisman Mitra
Team: Marie-Charlotte Buisson, Faiz Alam, Smaranika Mahapatra, Alok Sikka, Manikanta Radhakrishna, Shisher Shrestha
Partners in implementation: IDCOL; NGO Forum for Public Health

Current achievements and Results : Jan-Jun 2023

Impact Evaluation

Follow-up household survey with 900 farmers organized (now completed); 8th round of telephonic survey completed

- ❑ Impact of IDCOL SIPs at farmer level
  - Increase in the profit of farmers by ~5400 BDT/acre;
  - Increase in household food security and dietary diversity
  - Lower crop-diversity and marginal increase in share of cultivated area under boro (~6%)

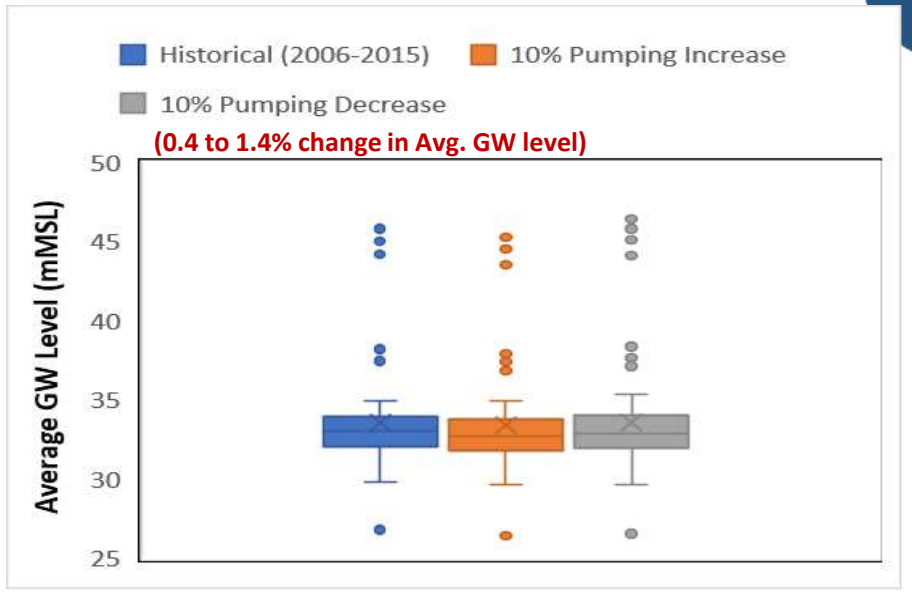
Groundwater Sustainability

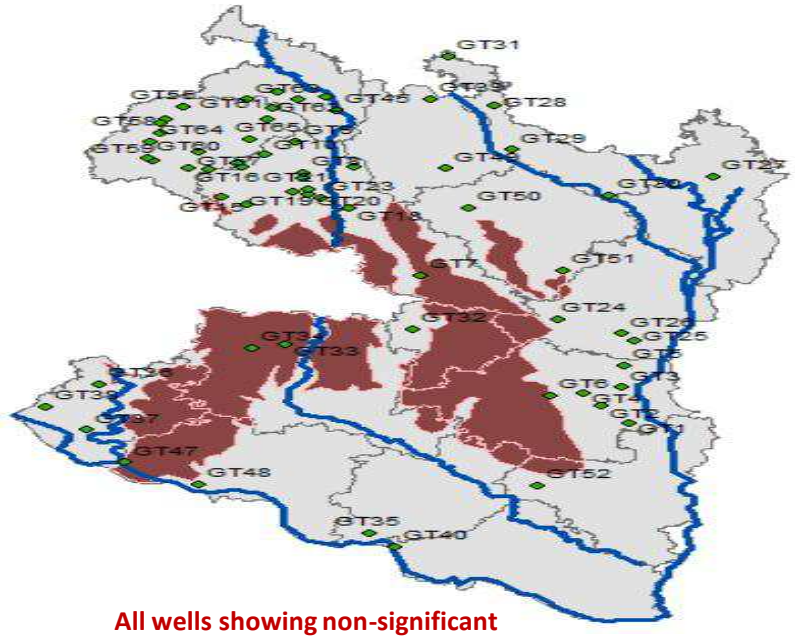
1. GW Monitoring data for Boro season 2023 collection completed

- Based on 2 years of data till 2023 -

    1. **No significant differences (Overall) in irrigation water application between the Solar and Diesel Farmers** - *Differences between and within sites are influenced by sowing dates, crop variety, and rainfall*
    2. Updated SIP upscaling scenarios show no significant changes in GW level in the region

NW Region





All wells showing non-significant changes for 10% changes in pumping

Case study on different SIP promotion models

1. Draft reports on Tubewell permit system and Groundwater market from BSERT submitted.

- ❑ Diesel motors displaced within command area ➔ *Mostly continue using outside command area, some partial use within the command area **OR** sell out **OR** a few converted machine into harvester, thresher, power trolley*

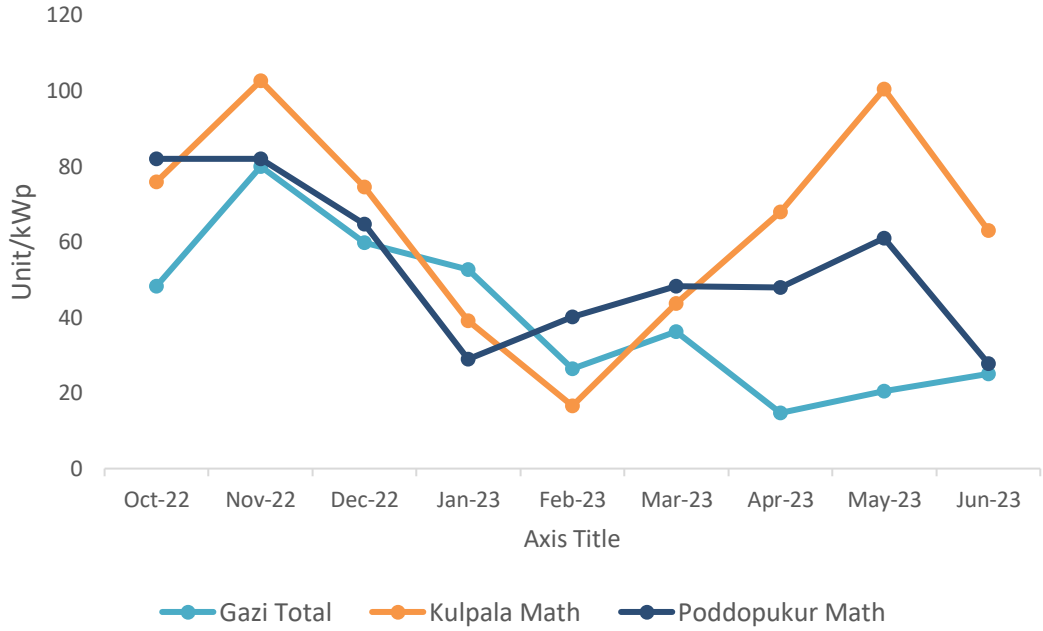
- ❑ GW market in SIP localities
  - *Diesel use in the command area is minimal + fast electrification in non-SIP areas*
  - *Competition between electric and solar on both quality and price - Electric pumps are the benchmark for solar*

- ❑ TW permit system might create local monopolies restricting farmers' access to the new electric connection
  - *Need monitoring of SIP systems post loan repayment through IDCOL, Upazilla Irrigation committee*
  - *Explicit mention of tariff limits in contract with sponsors*
  - *Need for rationalizing permit system to local GW conditions*

Current achievements : Jan-Jun 2023

Demonstration pilots for grid connection of SIPs

1. Monthly data on energy export from 6 pilot sites being collected
2. Technical report submitted for all 6 sites



- ❑ Substantial earning potential, but lots of variation in energy export (crop-type, season timing, technical faults)
  - Each 30 KWp site of Gazi exported ~11000 units & ~53000 BDT in 9 months
  - Each 43.5 KWp site of WAVE generated 23000 units and ~1.2 lakhs BDT in 9 months
- ❑ Cost of recovery could be as low as 8 years or as high as 14 years **(without subsidy)**
- ❑ Incentivize grid integration with higher buy-back tariff and net metering

Current achievements : Jan-Jun 2023

Capacity Building activities

1. 2 trainings with IDCOL covering ~60 solar farmers on improved water management practices, and irrigation scheduling

2. A 10-member delegation of government officials (IDCOL, BARC, BADC, DAE, and BREB) from Bangladesh for an exposure visit to Gujarat, India in Feb 2023 and had meetings with farmers, GERMI, and GUVNL officials.

Pakistan

8th PSC meeting: SDC – SoLAR Updates and Results Jan-Jun 2023 and Plans July-Dec 2023

Lead: Azeem Shah
Team: Novaira Junaid, Zain Akbar
Partners in implementation: PARC, FWMC and KFUEIT

Current achievements & Results : Jan-Jun 2023

- Findings of the behavioural study have led to two further studies under the Nexus Gain Initiative –

(1) on access and use of solar technologies from the gender lens;
(2) on business/financial models

- The IWMI SoLAR team in Pakistan developed a groundwater vulnerability index alongside proposing technical, institutional, and financial models, to be tested on a pilot basis through additional funding of 105K by the World Bank.
- The SDC SoLAR project is well positioned to inform recent huge investments by the Government of Pakistan (newly launched PM solarization of Agriculture scheme) and the World Bank's Agriculture Transformation (PRIAT) projects.

Current achievements : Jan-Jun 2023

CPMC Meeting

- Fourth County Project Management Committee (CPMC) Meeting for SoLAR Project took place at Climate Energy & Water Research Institute (CEWRI) in National Agricultural Research Centre (NARC), Islamabad on 08th June 2023.

Precision and Sustainable Agriculture under Climate Change – KFUEIT

- Presentation titled, *"Perception Vs Reality: Behavioral Survey & In-situ Instrumentation Analysis for Solar & Non-Solar Farmers"* was given by Zain Akbar (Research Officer-Policy & Water Governance) on 17th Feb 2023

Blog: Groundbreaking but not a Universal Solution: Renewable Energy in Irrigation

Nepal

8th PSC meeting: SDC – SoLAR Updates and Results Jan-Jun 2023 and Plans July-Dec 2023

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

CGIAR

ESTD 1985
NEPAL ELECTRICITY AUTHORITY

SoLAR
Solar Irrigation for Agricultural Resilience

Key Achievements in 2023 –

Impact Evaluation

The team conducted comprehensive GESI case studies of the government's solar irrigation program which showed that SIPs have no effect on gender stereotypes. .

- Two journal articles – (i) GESI case studies and (ii) GESI policy reviews were accepted for publication in Frontiers.

Impact evaluation studies showed that the adoption of SIPs in off-grid areas has led to a reduction of diesel pump usage by 73%, a shift in cropping patterns, and 15% higher farm revenues.

Dissemination of findings

- One conference proceedings published in 11th GW Symposium on Challenges and Opportunities for Sustainable GW Resource Management (March 20, 20023)
- Participation in 7 events to disseminate SoLAR IE findings
- Workshop organized for orientation of local and provincial government (March 26 in Janakpur) and (March 30 in Birendranagar)
- OpEd on Building gender-responsive policies published in The Kathmandu Post by Labisha Uprety on Jan 20, 2023

Demonstration Pilots - Interest in Grid-connected SIP

- A project implemented by MinErgy, in collaboration with BMZ, WWF Nepal, and Bagmati Rural Municipality
- Location - Pyutar, Bagmati Rural Municipality, Lalitpur
- Size - **14.4 KW** Solar Irrigation System
- **112,000 Liters per Day** for **300 ropanis** of land area
- **Net-metering agreement with National Association of Community Electricity Users Nepal (NACEUN)**, Not with NEA

First Solar Irrigation System With Net Meeting Installed In Pyutar

First Solar Irrigation System with Net Metering Installed in Pyutar, Bagmati Rural Municipality, Lalitpur

By NEW SPOTLIGHT ONLINE | June 29, 2023, 3:54 p.m.

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NEW SPOTLIGHT ONLINE

1 JAAN's Representatives Called On President Paudel, Appreciated Japan's Development Assistance
Aug 07, 2023

2 Weather Forest: Light To Moderate Rain With Thunder

Grid-connected solar irrigation

Nepal must diversify its energy sources to meet the nationally determined contributions.

Shisher Shrestha

Published at : May 15, 2023 Updated at : May 16, 2023 15:31

Groundwater (GW) irrigation through shallow tube wells (STWs) powered by diesel pumps has been crucial for farmers in the Terai belt since the 1970s (Asian Development Bank, 2013) due t low investment cost, easy repair, and an established supply chain. However, despite being a prevalent method, diesel pumps are one of the main contributors to greenhouse gas emissions i

IWMI DG and CR visited SoLAR Pilot Site

- Field visit in April 2023
- SoLAR Pilot as System's Approach
- Techno-social Impact of Pilot


FIMER


Pokhariya DC Cno:021-17-703
RS237T4-C Solid State Energy Meter 3PH 4 Wire
95
180
CT: 50/5
PT: 400/400
Sourya Urga Krishak Samuha
MADE IN CHINA


REDMI NOTE 12 PRO 5G

Capacity Building Field visit findings

Date –

May 23-25, 2023 - 13 Farmers (9 male and 4 female), 2 JTAs);

August 4-5, 2023 - 7 Farmers, 2 JTAs

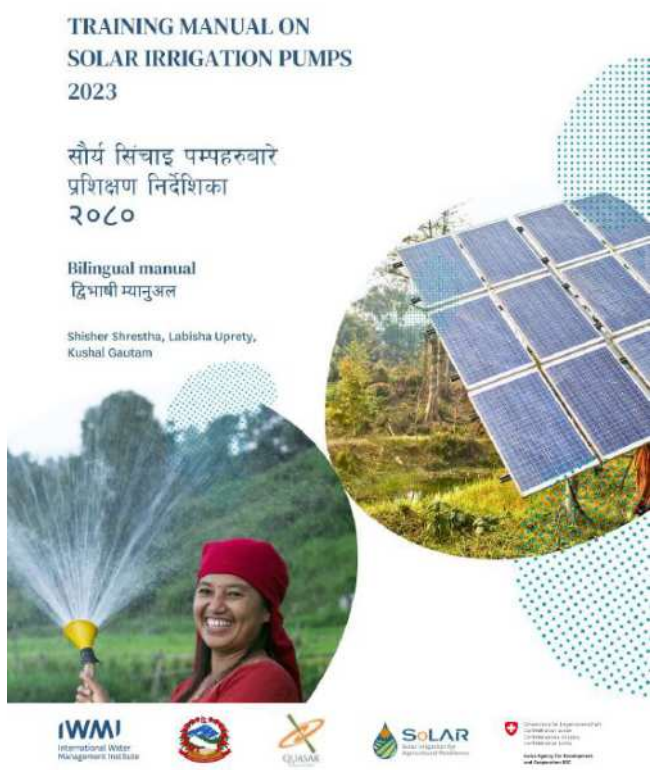
Objective: Need Assessment for Capacity Building Training

Key Observations

- Women farmers were very happy to participate in the meeting
- Seedbed preparation, soil quality test, crop water requirement and irrigation time schedule, and technical training on operation and maintenance were recommended.

Key Achievements in 2023 – Capacity Building

Bilingual Training Manual on Operations and Maintenance of SIP prepared and handed over to AEPC



National Knowledge Forum in Nepal – March 17 2023

- Organized as part of Nepal National Water Week 2023, IWMI hosted a1-day Knowledge Forum on **Accelerating Change in a Federal Nepal through Transformative Actions for Inclusive Water Management**
- In partnership with AEPC, NREP, GIZ and POSTED

SoLAR Regional Forum

- 15-member delegation from Nepal participated in the SoLAR Regional Forum
- Direct Participation in 19 sessions as Session Chair, Presenter, Panel discussion, Custodian, etc.
- Representations from the Local government (1), NEA (2), AEPC (1), DoA (1), DWRI (2), NARMIN (1), Private Sector and Experts (3), IWMI (4)

Wider highlights

Innovation Fund Update

Two SoLAR Innovation Fund Projects (Ghampower from Nepal and Switch ON from India) were completed.

Ghampower

- To train 153 agents in Nepal's western and eastern areas, Ghampower arranged 26 workshops.
- In collaboration with AEPC, 10 Gham Power Krishi Meters were tested at various locations

Switch ON

- 20 solar pumps for micro-irrigation were set up as part of the SwitchON project, and water user groups were established at each location. Through exposure visits (35) and awareness camps, 1614 women farmers were made more aware, and 356 women farmers were trained.

REGIONAL KNOWLEDGE FORUM

Energizing Agriculture and Enabling Just Energy Transitions in South Asia

6th-8th February 2023
Indian Institute of Technology
Gandhinagar, Gujarat

At a Glance

- Hybrid conference hosting regional researchers, policymakers, practitioners in the RE domain.
- Participants: **189** (131 in person + 58 virtual) representing 70 institutions across 16 nations.
- The two-day long conference was followed by a half day field visit:
  - **Keynote Sessions -** 4 plenary sessions, 8 presentations
  - **Technical Sessions -** 14 sessions, 57 presentations + 8 panel discussions
  - **Field Visit -** Visit to solar irrigation pump sites, GERMI Gandhinagar training facility, and interaction with farmers & utility officials
- Focus Areas: Africa, Central and South Asia

SoLAR Solar Irrigation for Agricultural Resilience

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Forum Themes

- **Solarizing Smallholder Irrigation** – policy landscape and empirical evidence of the impact of solar irrigation pumps (SIPs) on farmers' incomes and livelihoods
- Conserving Groundwater through Solar Irrigation – empirical evidence of the impact of SIPs on groundwater use or model the same, given future climate change scenarios.
- **Connecting Off-Grid to the Grid** – SIPs started as an off-grid enterprise in South Asia but most countries felt the need to shift to on-grid solar irrigation because of its underutilization. Additionally, the on-grid solar pumps help electricity utilities meet their renewable energy mix targets.
- **Renewable Energy (RE) in Agricultural Value Chains**: policies, institutions, and financial models that support the use of RE in agriculture and empirical case studies that look at the impact of RE in agriculture and its effect on farmers' livelihoods and incomes.
- **Making Energy Transitions Inclusive and Equitable** – examine if they are gender transformative or not, and the ways in which these can be made so.

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Key Takeaways

- Conducting hydrological surveys to assess feasibility, addressing issues of farmers purchasing power and land ownership
- Benefits of local production of pumps, subsidies, and market linkages to incentivize adoption
- Financial considerations (innovative models and private sector involvement) highlighted
- Need for proactive & gender-inclusive policy and capacity building at all levels
- Maximizing capacity utilization & grid integration essential for smallholder farmers

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Event Photos

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G20 Workshop on Solar Energy for Universal Energy Access

Held in Goa, on 20th July

Side event for Energy Transition Working Group, supported by ISA

Dr. Alok Sikka participated in session moderated by Dr. Paolo Frankl (IEA)

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COP 28 Activities

- IWMI will be curating a session on solar work at COP 28 at ISA's Pavilion

Allotted Time	Activity	Speaker
5 minutes	Welcome & Introduction	Alok Sikka (IWMI)
3 minutes	Opening Remarks	Ajay Mathur (ISA)/ Mark Smith (IWMI)/Jonathan (SDC)
10 minutes Q&A: 3 minutes	Understanding the adoption and impact of on-grid SIPs	Deepak Varshney (IWMI)
10 minutes Q&A: 3 minutes	Learnings from different business models for scaling off-grid SIPs	Archisman Mitra (IWMI)
10 minutes Q&A: 3 minutes	Groundwater sustainability in SIP irrigated areas	Faiz Alam (IWMI)
10 minutes, Q&A: 3 minutes	Enabling equitable and gender-inclusive SIP access	Shisher Shrestha (IWMI)/Manohara Khadka (IWMI)
25 minutes	Panel discussion: Accelerating clean energy transition through solar irrigation	Moderated by Darshini Ravindranath (IWMI): Panellists: P.C. Sharma (ISA), Divya Sharma (SDC), World Bank Rep (TBC)/ADB Rep (TBC), Shilp Verma (IWMI), Azeem Shah (IWMI)
5 minutes	Concluding Remarks	Ajay Mathur (ISA)/Mark Smith (IWMI)/TBD (SDC)

Way Forward in 2023

Impact Evaluation
- Studies assessing the equity implications
- Factors for success in different models

Groundwater Studies
- Final report and publication on comparing groundwater use of solar and diesel farmers
- Final calibrated and validated numerical groundwater model with future scenarios simulated (updating different combinations of climate model ensembles, crop diversification, and water management scenarios)

Grid-integration
- Collect continuous monitoring data on energy export and other bio-physical factors through new monitoring machines installed
- Identify the source of variation in terms of energy export
- Additional grid integrations where relevant

Case studies on different SIP promotion models

Finalize reports from the studies on groundwater market impact of SIP, tubewell permit system etc

Policy Outreach
- Policy briefs
- Planning and organizing the National Forum for disseminating findings and achievements

Way Forward

- Assessing the climate mitigation benefits and enhancing climate resilience
- Enhancing Gender, Equality and Social Impacts of the programme
- Policy briefs to help engage more meaningfully with government counterparts
- Assessing the overall enabling environment of solar irrigation, including looking at the subsidy regimes, private sector implications
- Harvesting lessons learned from the Innovation Fund projects
- Improving understanding of the water-energy-food nexus
- Enhance south to south learnings (e.g., Africa)

International Water Management Institute

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Thank you

CGIAR