



# Solar Irrigation for Agriculture Resilience in South Asia (SoLAR-SA) Project Nepal - Country Project Management Committee (C-PMC) | 8th Meeting

Date: 5 April 2024 | Time: 10:00 – 13:00 hrs. | Venue: IWMI, Nepal Office / Virtual

## C-PMC Members SoLAR-SA Project – Nepal Attendee

SN	Name	Role	Institution	Attendance	Remarks
1	Manohara Khadka, Dr.	Chair	IWMI Country Representative	Yes	In-Person
2	Laxman Prasad Ghimire, Dr.	Member	Representative of AEPC	Yes	In-Person
3	Asha Khanal	Member	Representative of NEA	Yes	In-Person
4	Dinesh Rajouria, Dr.	Member	Representative of WECS	No	-
5	Sangita Shrestha	Member	Representative of DoA	Yes	In-Person
6	Pratigya Neupane	Member	Representative of NARMIN	Yes	In-Person
7	Kumar Raj Shahi	Member	Representative of NiFUAN	Yes	In-Person
8	Prashant Bajracharya	Member	Representative of Private Sector	Yes	In-Person
9	Dipesh Gurung	Member	Representative SDC-Nepal	Yes	In-Person
10	Darshini Ravindranath, Dr.	Member	IWMI - Regional PL, SoLAR	Yes	Virtual
11	Shisher Shrestha	Member Secretary	IWMI – Researcher, SoLAR-NP Country Lead	Yes	In-Person
12	Amrita Rauniyar	Invitee	IWMI Nepal – Consultant	Yes	In-Person
13	Darshan Karki, Dr.	Invitee	IWMI Nepal, Researcher	Yes	In-Person
14	Sumitra KC	Invitee	IWMI Nepal, Researcher	Yes	In-Person
15	Divya Sharma	Invitee	SDC India	Yes	Virtual
16	Tripti Agrawal	Invitee	IWMI New-Delhi	Yes	Virtual
17	Sibani Chattopadhyay	Invitee	IWMI New-Delhi	Yes	Virtual
18	Aariz Raza	Invitee	IWMI New-Delhi	Yes	Virtual

*Abbreviations: AEPC is Alternative Energy Promotion Center; NEA is Nepal Electricity Authority; DWRI is Department of Water Resources and Irrigation; DOA is Department of Agriculture; SDC is Swiss Agency for Development and Cooperation; NFIWAN is National Federation of Irrigation User’s Association, Nepal; NARMIN is National Association of Rural Municipalities in Nepal; IWMI is International Water Management Institute*



## Agenda and Discussions

The session program and agenda of the C-PMC meeting are in [Annex I](#).

### Welcome Remark and Purpose of the meeting.

Dr. Manohara Khadka (Chair of C-PMC and Country Representative of Nepal) welcomed and thanked everyone for participating in the meeting. She then explained the objective of the meeting, which was to discuss the project's main purpose and gain insights from a four-year project review. She added that the meeting also aimed to develop an understanding of the research results of development projects for the last six months by addressing key challenges and achievements. She requested everyone to provide their views, ideas, constructive comments, and suggestions as project feedback. The IWMI team will use the insights received to improve the program further in collaboration with partner organization AEPC. She finally thanked everyone.

Darshani Ravindranath (SoLAR-SA Project Leader) discussed the regional project updates from four project countries (Bangladesh, India, Nepal, and Pakistan) and welcomed everyone to the C-PMC meeting.

The welcome remark was followed by a brief self-introduction session moderated by Shisher Shrestha.

### SoLAR-SA Nepal Y4 updates and Y5 plans

Shisher Shrestha initiated the presentation by highlighting the three outcomes of the project, which are based on (i) Empirical evidence, (ii) Innovative actions and approaches, and (iii) National and Global knowledge and Capacity building.

He presented the key project activity updates from Year 4 (2023) and the activities planned for Nepal in Year 5 (2024).

#### Activity 1.1.2 Impact evaluation and GESI case study of existing and new SIP programs in Nepal

- Two journals were published, one led by Manohara Khadka and the other by Gita Shrestha.
  - Shrestha et al. (2023) studied three solar projects led by AEPC, ICIMOD, and the private sector. The findings show that solar is a women-friendly technology, but gender stereotypes have not changed.
  - Khadka et al. (2023) reviewed water, energy, and food policies in Nepal and Bangladesh. The study highlights that Agricultural policies are relatively progressive compared to water and energy policies.



- Three articles were drafted based on quantitative studies and planned to be published in 2024.
- An Issue brief based on a synthesis of findings from Impact Evaluation and GESI case studies is in the pipeline. The project's findings are disseminated through different participatory workshops, conferences, and events.
- A journal article on greenhouse gas emissions based on the 2023 desk assessment report is also being planned.

#### Activity 2.2.3 Demonstration pilots on grid-connected SIPs in Nepal

- Shisher highlighted that the previous inverter installed had heating issues; we have replaced it with another inverter with a modular setup.
- He highlighted that the biggest achievement for the project was signing a net-metering agreement between NEA and Saurya Krishak Urja Samuha from the pilot project. After many challenges, the IWMI team facilitated signing the agreement on February 26, 2024. This example will pave the way for other similar projects in the country.
- The system is connected to the national grid. He also showcased the power mix of the system, showing PV generation on consecutive 3 days from March 11 to 13, when PV generation was ideal, compared to March 11 and 13, which showed disturbance resulting in discontinued generation.
- The figure was shown to understand energy generation and consumption patterns. It shows less to almost no demand in February (showing a good amount of generation), whereas January showed less generation.
- Farmers use diesel pumps at the rate of NPR. 300/hour, which is far more expensive than NPR. 100/hour, the rate Saurya Krishak Urja Samuha fixed to sell water to other farmers. So, the rate of NPR. 100/hour is cheaper for farmers.
- Community engagement was a crucial aspect of 2023 activities, and the IWMI team conducted six field visits, including need assessment, capacity building training, etc. Farmers were provided Capacity-building training, and 27 female and 19 male farmers participated, along with 2 JTAs.
- Research communication and outreach specialist from IWMI-Nepal, Shivani Chemjong, visited the site and published a blog post addressing gender issues after the field visit.

#### Activity 3.1.1 Training of Local Technicians in Nepal

- Solar technician training was provided in Mahottari and Banke to enhance knowledge and capacity at the local level. These trainings incorporated 50 participants, 50% female participation, and 4 AEPC engineers. Field visits were carried out to gain practical knowledge.
- Feedback received from the trainee states that solar technology is not rocket science, so the trainee would be able to carry out operation and maintenance services.



- A map was created highlighting districts receiving capacity-building training (solar technician's training and capacity-building training for farmers).
- Training is also planned for two different districts in 2024.

#### Activity 3.1.2 National Forum in Nepal

- Shisher updated that the IWMI team plans to organize a national, regional, and global forum combining four thematic areas from 22 to 26 April 2024.
- National and global forums are IWMI-led events, while ICIMOD will lead regional forums.

#### Discussion / Feedback

The following are the key points discussed in the Discussion/Feedback Session. The detailed script of the discussion is in [Annex II](#). The discussion could be summarized in the following four thematic areas.

- **Policies for Net-metering:**
  - Understanding and improving the policy and regulatory environment for grid-connected solar irrigation, including issues related to net metering, subsidies, etc.
  - Recommendations to NEA for policy changes to the Net-metering mechanism.
  - Emphasize the need for capacity building, such as providing training on net metering to DCS personnel.
- **Technological Solutions:**
  - Focus on technological solutions for solar irrigation, including optimal energy scheduling, using batteries for stabilization, and the need for distributed energy resources.
  - Exploring technological interventions for solar irrigation, such as considering innovative approaches to address operational challenges, especially in the mid-hills and mountains.
- **Inclusivity and Sustainability:**
  - Highlighting the importance of inclusivity in solar irrigation projects, reaching smallholder farmers, and promoting sustainable practices.
- **Monitoring:**
  - Discuss project efficacy, with more than 90% of planned outcomes achieved except for the NEA agreement and the need to make projects more inclusive and reach smallholder farmers.



- Ensuring inclusivity in solar irrigation projects, reaching smallholder farmers, and promoting sustainable practices to enhance such projects' long-term impact and viability.

## Closing Remarks

Dr. Laxman Prasad Ghimire from APEC commended the IWMI team for the SoLAR project achievements. He highlighted that AEPC received policy recommendations from the project. These days, solar energy is getting attention and momentum. Also, we have challenges and lessons learned in the last five years. For example- Operation and maintenance services. However, there is room to make solar systems more sustainable. Subsidy tariff rate for krishi meter of NPR 2.3 and net-metering of NPR. 5.94 is confusing. We can take this discussion to NEA and the Electricity Regulatory Commission. After the Gujarat exposure, we plan grid-connected solar irrigation for larger projects.

Lastly, AEPC is an energy promotion organization. Irrigation takes place at the field level; it needs a value chain, which crops to grow, marketing, and an integrated approach (we need to work on the value chain). Many integrated approaches must be considered for these sorts of projects. Thank you for your active participation.

# Annex I: Session Program

## Nepal - Country Project Management Committee (C-PMC) | 8<sup>th</sup> Meeting

Date: 05<sup>th</sup> April 2024 | Time: 10:00 AM– 01:00 PM.

Venue: IWMI Nepal Office, Manbawan Lalitpur

### Session Program

Time	Activity	Responsible Person
10:00 AM – 10:30 AM	Welcome / Coffee-Tea	Amrita Rauniyar
10:30 AM – 10:35 AM	Welcome remarks & Purpose of the meeting	Dr. Manohara Khadka
10:35 AM – 10:45 AM	Introduction – C-PMC Members and Guests	Self
10:45 AM – 10:55 AM	Year 4 progress and Year 5 updates	Shisher Shrestha
10:55 AM – 11:05 PM	Research/Activity Highlights	Shisher Shrestha
11:05 AM – 11:50 AM	Discuss / Feedback	All C-PMC Members and Guests
11:50 AM – 12:00 PM	Closing Remarks	Dr. Laxman Prasad Ghimire
12:00 PM – 01:00 PM	Lunch	Om Acharya / Ramesh Tamang

# Annex II: Discussion Session – detailed script

Meeting Notes by Amrita Rauniyar

**Laxman Ghimire:** The content is clear to me. I will contact you if I have any questions.

**Divya Sharma:** The recent concern regarding the agreement with NEA is a great achievement. I look forward to a series of three events that will be organized in Nepal. Huge congratulations to the team!

**Sangita Shrestha:** Presentation was very informative. From the DoA side, there are solar projects in Banke, but there is no such utilization; we are unable to conduct it the way IWMI and AEPC are doing. The Ministry proposes solar programs from PMMP (Prime Minister Agricultural Modernization Project) with a 50% subsidy, but there is a lack of manpower. Seeing your strength, I think we must work collaboratively.

The ADB program is in the pipeline as a technological intervention. This can be done together- to scale up the solar lift project.

DoA has different modalities for implementation; a one-window system can be formed so that DoA can collaborate with IWMI and AEPC. Also, we need to think about the Terai, Hill, and Himalayan regions of Nepal. The same modality might not fit the different geographical regions.

For example, there is a grid system in Terai and an individual system for hills, so policy recommendations are necessary to address these problems.

We can focus on the following: How can we use barren land? Engage manpower who travel abroad.

IWMI can research and recommend to the department what good practices should be implemented for different geographical regions in Nepal.

**Shisher Shrestha:** Solar irrigation is reducing diesel use in the Terai region, where there is maximum demand for SIP from AEPC. However, there are operation and maintenance challenges in the Himalayas, and radiation is high.

**Laxman Ghimire:** 23 districts demand from major terai districts, especially Madhesh Province.

**Asha Khanal:** DCS at the local level needs capacity-building training. So, we plan to provide DCS personnel with training on net metering. We always compromise safety while talking about electricity. The tariff is really low, which is why NEA officials hesitate to sign the net-metering agreement.

Nepal needs distributed energy resources; we face transmission constraints at load centers in the Terai. If we have distributed energy, it will be an opportunity for NEA.

Nepal is hydro-generation dependent. As a WEFE-NEXUS Leader, SIP is the best example. Barren land should be focused, and a WEFE Nexus perspective in the project is needed.

I didn't see any battery in the graph.

**Shisher Shrestha:** The Battery is for stabilization when the NEA line fluctuates.

**Asha Khanal:**

**Optimal energy scheduling** should be conducted for optimum benefit; for example- if a battery is used during peak discharge, farmers will have optimal energy use. There is a significant gap in energy consumption and generation, so **regression analysis** can be done to predict and optimize the resources in a good way. I am happy to provide technical support if you need any help. It is good that the pilot project is utilizing the old pumps again.

**Shisher Shrestha:** The net metering policy (renewed till 2082/2060 bs) only considered solar rooftops and did not envision other systems like SIP. If you can add something to solar irrigation pumps (then the tariff will be the same), then it will be easier for DCS to take up.

**Asha Khanal: Recommendation [recommendation, letter, or any sort of report]** from C-PMC meeting to NEA or ERC. India also faces a similar problem,

**Shisher Shrestha:** APEC has already signed two large grid-connected SIP projects and is undertaking two community projects through DKTI.

**Prashant Bajracharya:** What IWMI is doing is commendable to us. The pilot project is an example that we can replicate in our business apart from what we are doing on a subsidy basis. We have Microfinance with EMI scheme, which is not as successful as subsidy. [Promotion subsidy from NREP]

**Pratigya Neupane:** We must have a provincial meeting to discuss the challenges, such as repairing challenges, regular maintenance, and operation challenges. Mid-hills also have huge demand. Does AEPC also support micro-hydro systems? [Up to 1 KW], connecting local people and marginalized people. There are provisions, but the application process is difficult, so to sustain and retain youths, we must focus on these challenges and address issues in those areas.

I have good initiatives the local government took, which I can share.

Voices with line ministry, either projects are running, and provisions are made for **popularity or productivity**.

The sensitization and orientation parts are missing; first of all, leaders should be sensitized to build leadership and expertise.

**Shisher Shrestha:** lack of training and capacity, local government must have an effective plan.

**Dipesh Gurung:** What IWMI has done is great,

Based on Planned vs. achievement, how much percentage can you give to this project, seeing the last six months?

**Shisher Shrestha:** More than 90% of the result except for the NEA agreement that was planned in 2023.

**Dipesh Gurung:** Eight HHs with 348 Katha, which makes two bighas per person; how can it be made more inclusive? How can we reach smallholder farmers?

**Shisher Shrestha:** The earlier selection process of AEPC has changed. The policy recommends a handover of pump size with respect to land size. However, those without lalpurja can also apply for a subsidy.

**Dipesh Gurung:** What is the structure of solar at the provincial level? SDC supports a federal structure. We need to delve further into the Institutional arrangement at the provincial level.



**Shisher Shrestha:** After the establishment of the federal system in Nepal, AEPC.

**Dipesh Gurung:** There is no work for the province government, but we must respect the federal system and allocate roles to provinces as well.

**Shisher Shrestha:** The province government is involved in Deep well projects.

**Amrita Rauniyar:** The facilities we provide to farmers through a project are one part, while what farmers seek through the project is another part.

**Darshan Karki:** The efficacy of the solar program with the nexus approach. There is a problem with the provincial government since rivers exist, but water from them is not used. So, this must be addressed.

**Sumitra KC:** in line with Darshan ji, there is a gap between local and provincial government.

**Pratigya Neupane:** NPC is a modifying document to address these gaps, including conditional grants and increasing the size of the equalization grant.

**Divya Sharma:** The Vibrant C-PMC meeting is happening in Nepal. The involvement of stakeholders and actively providing input to this meeting is great. Your participation and active engagement are what make a meeting successful.

**Darshini:** Co-authoring policy briefs with stakeholders will be fruitful in showcasing four years of data.

## Annex III: Presentation




## Annex IV: Photographs from the Meeting





Annex V: Attendance Sheet

Solar Irrigation for Agriculture Resilience in South Asia (SoLAR-SA) Project			
Nepal - Country Project Management Committee (C-PMC)   8 <sup>th</sup> Meeting   April 5, 2024			
S.N.	Name	Institution	Signature
1	Dr. Laxman Prasad Ghimire	AEPC	
2	Asha Khanal	NEA	
3	Dr. Dinesh Rajouria	WECS	Absent
4	Sangita Shrestha	DoA	
5	Pratigya Neupane	NARMIN	
6	Kumar Raj Shahi	NFIWUAN	
7	Prashant Bajracharya	Sun Farmer	
8	Dipesh Gurung	SDC-Nepal	
9	Dr. Manohara Khadka	IWMI-Nepal	
10	Shisher Shrestha	IWMI-Nepal	
11	Dr. Alok Sikka	IWMI - Regional PL, SoLAR	Absent
12	Dr. Marlene Buchy	IWMI	Absent

13	Divya Sharma	SDC	Joined-virtually
14	Amrita Rauniyar	IWMI-Nepal	
15	Dr. Darshini Rabindranath	IWMI-New Delhi	Joined-virtually
16	Dr. Darshan Karki	IWMI-Nepal	
17	Sumitra KC	IWMI-Nepal	
18	Anuj Mishra	IWMI-Nepal	Absent
19	Tripti Agrawal	IWMI-New Delhi	Joined virtually
20	Shivani Chattopadhyaya	IWMI-New Delhi	Joined virtually
21	Aviz Raza	IWMI-New Delhi	Joined-virtually
22			
23			
24			

# 8th Country – Project Management Committee (C-PMC) Meeting

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

April 05, 2024



**SoLAR**  
Solar Irrigation for Agricultural Resilience

# C-PMC Meeting - Agenda

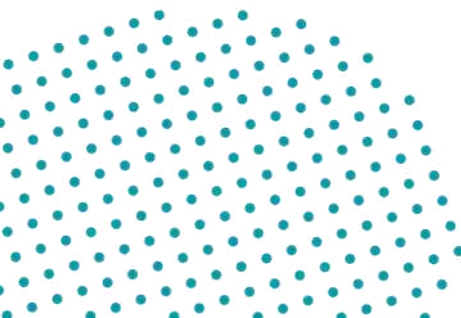
Time	Activity	Responsible Person
10:30 – 10:35	Welcome remarks & Purpose of the meeting	Dr. Manohara Khadka Dr. Darshini Ravindranath
10:35 – 10:45	Introduction – C-PMC Members and Guests	Self
10:45 – 11:05	Year 4 Progress and Year 5 updates Research/ Activity Highlight	Shisher Shrestha
11:05 – 11:50	Discussion / Feedback	All C-PMC Members and Guests
11:50 – 12:00	Closing Remarks	Dr. Laxman Prasad Ghimire Ms. Divya Sharma
12:00 – 13:00	Lunch	

# C-PMC Meetings

SN	Name	Designation / Institution
1	Laxman Prasad Ghimire, Dr.	Assistant Director / AEPC
2	Asha Khanal	Engineer / NEA
3	Dinesh Rajouria, Dr.	DDG / DWRI
4	Sangeeta Shrestha	Sr. Agriculture Engineer /DoA
5	Pratigya Neupane	Program Coordinator / NARMIN
6	Kumar Raj Shahi	Representative / NFIWUAN
7	Prashant Bajracharya	SunFarmer
8	Dipesh Gurung	National Program Officer/ SDC Nepal
9	Darshini Ravindranath, Dr.	PL / SoLAR-SA and RGL - CFPF
10	Manohara Khadka, Dr.	CR/ IWMI Nepal and C-PMC Chair
11	Shisher Shrestha	Researcher IWMI Nepal and C-PMC Secretary

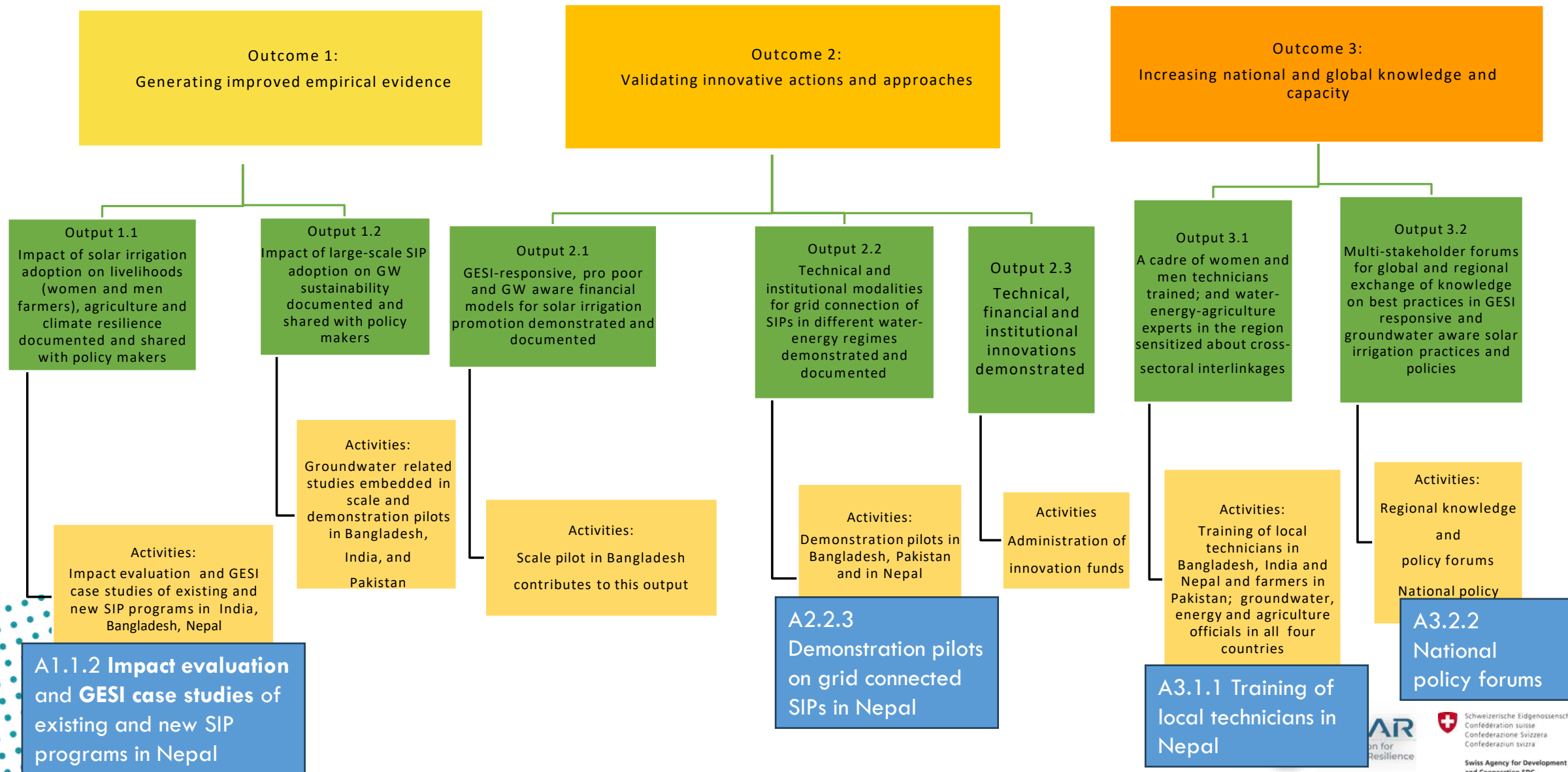


C-PMC Meetings	Date
<b>1<sup>st</sup> CPMC Meeting</b>	14.01.2020
<b>2<sup>nd</sup> CPMC Meeting</b>	05.08.2020
<b>3<sup>rd</sup> CPMC Meeting</b>	28.05.2021
<b>4<sup>th</sup> CPMC Meeting</b>	20.12.2021
<b>5<sup>th</sup> CPMC Meeting</b>	01.07.2022
<b>6<sup>th</sup> CPMC Meeting</b>	13.03.2023
<b>7<sup>th</sup> CPMC Meeting</b>	08.08.2023





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



# Y4 Achievements and Y5 Progress

## 1.1.2 Impact evaluation and GESI case studies of existing and new SIP programs in Nepal

## 1.1.2 Impact evaluation and GESI case studies of existing and new SIP programs in Nepal

Details of sub-activities	Status
<b>Journal Articles</b>	<ul style="list-style-type: none"> <li>• <b>Two articles</b> published</li> <li>• <b>One Conference proceeding</b> published</li> <li>• <b>Three articles</b> drafted (publication planned in 2024)</li> </ul>
<b>Research Reports</b>	<p><b>Two Research Reports</b> were drafted</p> <ul style="list-style-type: none"> <li>• Desk Assessment on Emission Factors of Fossil Fuel Pump (Journal Article Planned in 2024)</li> <li>• Synthesis Research Report (Issue Brief planned in 2024)</li> </ul>
<b>Dissemination of Findings</b>	Presented/participated/ organized in <b>16 events</b> (workshops/conferences/consultative meetings)
<b>Local / Provincial Government Orientation</b>	<p>Orientation Workshops</p> <ul style="list-style-type: none"> <li>• March 26 in <b>Janakpur, Madesh Province</b></li> <li>• March 30 in <b>Birendranagar, Karnali</b></li> </ul>

# Summary of GESI work in Nepal

(*Shrestha et al., 2023*) summarizes the following impact of SIP

- Women Friendly – **YES**
- Change in Gender Stereotypes – **NO**
- Change in Gender Relations – **NO**

(*Khadka et al., 2024*) conducted GESI Policy review shows sectoral policies show variability in the understanding and embeddedness of gender and inclusion

- **Agriculture policies** show greater GESI responsiveness
- **Energy policies** show much lower GESI awareness, seeing energy as gender-neutral



## OPEN ACCESS

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CITATION  
Shrestha G, Uprety L, Khadka M and  
Mukherji A (2023) Technology for whom? Solar

## Technology for whom? Solar irrigation pumps, women, and smallholders in Nepal

Gitta Shrestha<sup>1,2\*</sup>, Labisha Uprety<sup>2</sup>, Manohara Khadka<sup>2</sup> and Aditi Mukherji<sup>3</sup>

<sup>1</sup>Independent Researcher, Kathmandu, Nepal, <sup>2</sup>International Water Management Institute, Kathmandu, Nepal, <sup>3</sup>International Water Management Institute, New Delhi, India

Agricultural technologies are often promoted as a medium for women's economic empowerment, which can transform unequal gender relations in rural agrarian societies. This paper investigates three solar irrigation pump (SIP) schemes implemented by state and non-state actors and examines their impacts on women and marginal farmers. We utilize a theory of change framework intended to evaluate the effectiveness of livelihood interventions and guide



## OPEN ACCESS

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Khadka M, Uprety L, Shrestha G, Shakya S,  
Mitra A and Mukherji A (2024) Can water,  
energy, and food policies in support of solar  
irrigation enable gender transformative  
changes? Evidence from policy analysis in  
Bangladesh and Nepal.  
*Front. Sustain. Food Syst.* 7:1159867.  
10.3389/fsufs.2023.1159867

## Can water, energy, and food policies in support of solar irrigation enable gender transformative changes? Evidence from policy analysis in Bangladesh and Nepal

Manohara Khadka<sup>1</sup>, Labisha Uprety<sup>1</sup>, Gitta Shrestha<sup>1</sup>, Shristi Shakya<sup>1\*</sup>, Archisman Mitra<sup>2</sup> and Aditi Mukherji<sup>2</sup>

<sup>1</sup>International Water Management Institute, Lalitpur, Nepal, <sup>2</sup>International Water Management Institute, Delhi, India

Solar irrigation pumps (SIPs) are emerging as a popular technology to address water, energy, and climate change challenges in South Asia while enhancing livelihoods and food security. SIPs are deemed to be a women-friendly renewable energy technology (RET) due to their design, operating system, and safety. While the gender dimensions of natural resources are well documented, the extent to which the water, energy, and food (WEF) policies—including policies to promote SIP technologies in

## Year 5 Work Plan - Activity 1.1.2 IE & GESI studies in Nepal

Deliverable	Due Date	Output	Impact
Final Manuscript submitted to Journal for Quantitative Surveys	30-04-2024	Journal article submitted	Feedback to Policymakers
Journal Article based on GHG emission from diesel-powered irrigation in Agriculture sector of Nepal	30-09-2024	Journal article submitted	Empirical Evidence
Efficacy of targeted financial instruments for women and small/marginal farmers	31-12-2024	Journal Article, White paper, or research paper with Issue brief	Empirical Evidence
Issue Briefs - Synthesizing 1.1.2 IE and GESI activities - Comprehensive review of existing business models in practice	30-09-2024	Issue Briefs	Knowledge Products

# Y4 Achievements and Y5 Progress

## 2.2.3 Demonstration pilots on grid-connected SIPs in Nepal

## 2.2.3 Demonstration pilots on grid-connected SIPs in Nepal

Details of sub-activities	Status
<b>Publications</b>	<ul style="list-style-type: none"> <li>• <b>One Issue Brief</b> documenting opportunities and challenges in implementing the Grid-connected Pilot project in Nepal</li> <li>• <b>One OpEd</b> published</li> </ul>
<b>Net-metering agreement between NEA and User Community</b>	<ul style="list-style-type: none"> <li>• NM Agreement Signed in <b>Feb 2024</b></li> </ul>
<b>Engagement with community and Capacity-building Workshops</b>	<ul style="list-style-type: none"> <li>• <b>Six field visits</b> in 2023</li> <li>• <b>Two-day Capacity building</b> workshop for <b>46 Farmers</b> on November 2023 (19 M; 27 F)</li> </ul>
<b>Monthly Monitoring Reports</b>	<ul style="list-style-type: none"> <li>• <b>Nine monthly reports</b> generated from (April to December 2023)</li> </ul>

# The SoLAR Pilot in news...



Grid-connected solar irrigation in Nepal – Exploring opportunities and identifying hurdles

ISSUE BRIEF SERIES  
No. 06

Shishir Shrestha, Sagar Mani Gnaawali and Aditi Mukherjee

The Alternative Energy Promotion Centre (APEC) offers subsidies for off-grid solar irrigation pumps (SIPs) to promote sustainable irrigation practices. The collection of these off-grid SIPs is low due to irrigation demand patterns. The potential for grid-connected solar irrigation is increasing as Nepal's national ability grid network grows. Nevertheless, despite not requiring irrigation, off-grid SIPs are not integrated into the national grid. The Swiss Agency for Development and Cooperation (SDC) is implementing a pilot project called Solar Irrigation for Agricultural Resilience in South Asia (SOLAR-SIA). The project aims to explore grid-connected solar irrigation and answer policy questions on the best techno-economical model for grid irrigation in Nepal. Collaboration among these stakeholders during the implementation of pilot projects will contribute to developing guiding policies for grid-connected solar irrigation. Establishing specific policies for not meeting irrigation at agriculture moment is crucial for the sustainability of grid-connected solar irrigation.

## वार्षिक सवा दुई अर्बको डिजल खपत गरिरहेका सिंचाइ पम्पको विकल्पमा उदाउँदै सौर्य ऊर्जा प्रविधि

नेपालको कृषि क्षेत्रमा सिंचाइ प्रयोजनका 'पम्प' चलान अहिलेको मुख्यअनुसार वार्षिक इन्धे सवा दुई अर्बको डिजल खपत भइरहेको छ। यसलाई विस्थापित गर्न सौर्यको 'सोलार पम्प' भने पर्याय हुन सकेको छैन।

मुकेश पोखरेल  
१०/०८/२०२३, आइतबार



सौर्यपम्प: मुकेश पोखरेल/सौर्य

+ -

**पर्सो-** छिपहरमाई गाउँपालिका-२, पर्साका किसान अमिन मियाँले आफ्नो डेढ बिघा खेतमा वर्षको एक पटक मात्र धानबाली लगाउँथे। दुई वर्षदेखि उनले दुई पटक धान भित्र्याउन थालेका छन्। यसबाट उनको वार्षिक धान उत्पादनमा दोब्बरले वृद्धि भएको छ। "सहज र निःशुल्क सिंचाइ सुविधा भएपछि दुई पटक धानबाली सम्भव भयो," उनी भन्छन्।

फुलोको सिंचाइ सुविधा नहुँदा आकाशो पानीको भरमा खेती गर्दै आएका उनले पानी नपर्दा डिजल पम्प चलाएर धान लगाउँथे। त्यसरी दुई बाली धान लगाउन सम्भव थिएन। अनुदानमा प्राप्त सोलार पम्पबाट सिंचाइ गर्न थालेपछि वर्षमा दुई पटक धान लगाउन सम्भव

Cover Story

## Transforming Nepali women's farming—one drop at a time

Shivani Chemjong Dec. 21, 2023, 7:26 a.m.



Mahaludin Khatoon, 64, strolls alongside a lush green rice field on a bright and sunny day. A solar panel sits right in the middle of the field. Once there, she extends her hand behind the panel and presses a green switch to activate her pump. There is a distant gurgling sound for a moment and soon after water gushes past her hand and into the adjacent irrigation channel.

With a satisfied smile, Mahaludin remarks, "Every day, this solar-powered system brings life to these fields ensuring a bountiful harvest for our community."

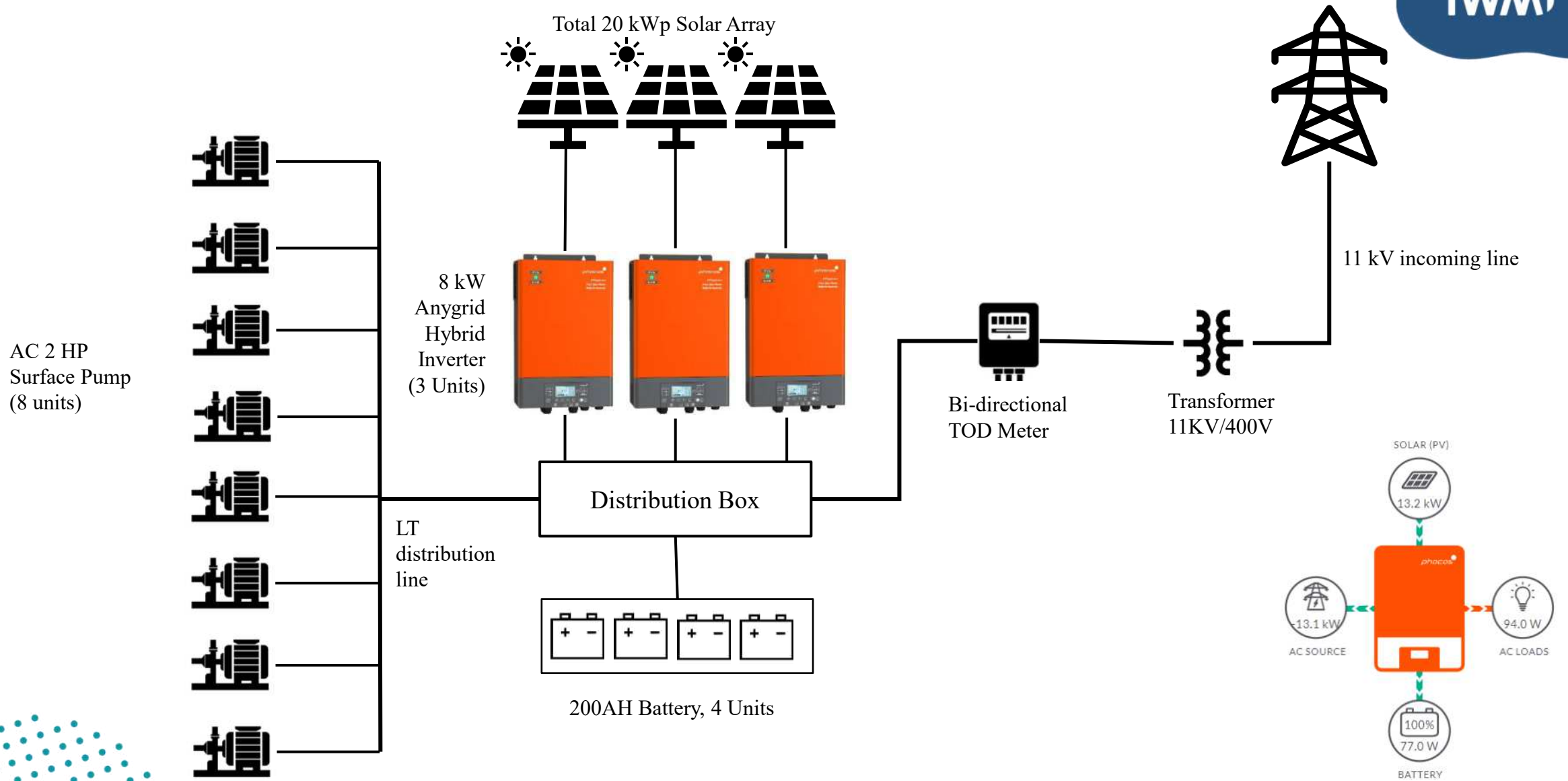
THE KATHMANDU POST  
Without End as Ever

Grid-connected solar irrigation  
Nepal must diversify its energy sources to meet the nationally determined contributions.

Shishir Shrestha

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 to low investment cost, easy repair, and an established supply chain.

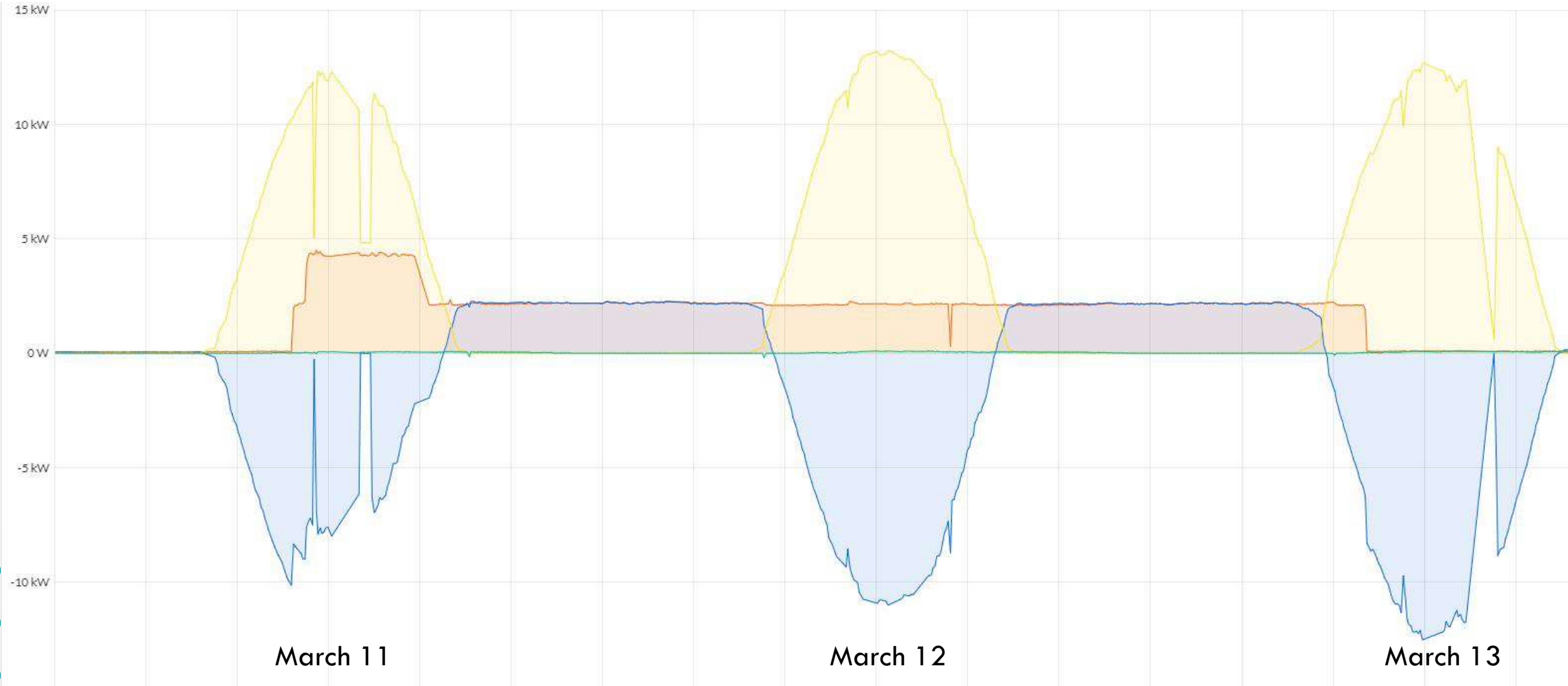




Schematic diagram of Grid-connected Solar Irrigation Pilot

# Power-mix of the System

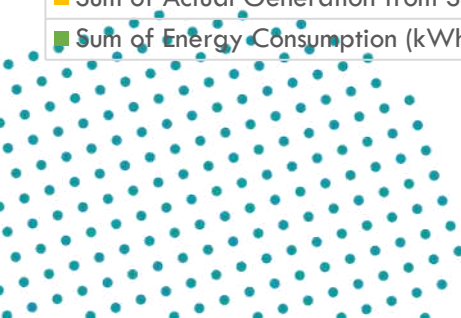
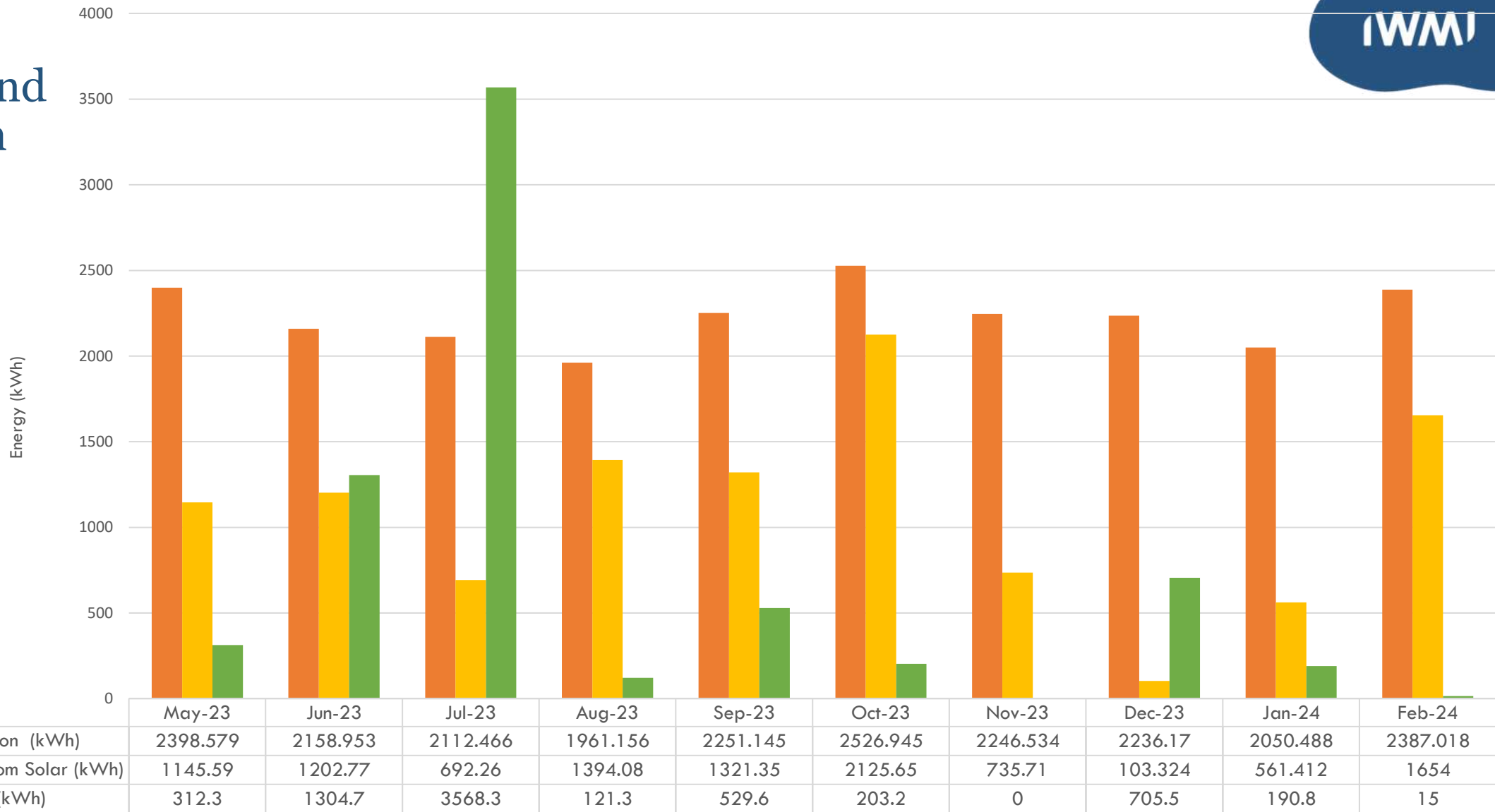
- Load Power
- AC Source Power
- PV Power
- Battery Power



# Energy Generation and Consumption pattern

Total Cumulated Energy generated  
**10,936 kWh**

Value of Energy @ NPR 5.94 tariff  
**NPR 64,960**



# नेपाल विद्युत प्राधिकरण

वितरण तथा ग्राहक सेवा निर्देशनालय  
मधेश प्रदेश, प्रादेशिक कार्यालय, जनकपुर  
पोखरिया वितरण केन्द्र

नेपाल विद्युत प्राधिकरण  
र  
सौर्य ऊर्जा कृषक समूह बीच भएको  
सम्मौता

कार्य विवरण :

५०० वाट बा सोभन्दा बढी क्षमताका फोटोभोल्टेक सौर्य प्रणाली जडान गरी ने.वि.प्रा.को  
वितरण प्रणालीमा Net Metering माफत कनेक्सन गर्न ।

गरी सम्मौता गर्दछौ ।

द्वितीय पक्षको तर्फबाट

प्रथम पक्ष वा कार्यालयको तर्फबाट

सेवा प्रदायक संघ/संस्थाको अधिकार

ने.वि.प्रा.को अधिकार प्राप्त व्यक्तिको

प्राप्त व्यक्तिको नाम : महेन्द्र सा कलवार

नाम : बुद्धिनाथ भन्ना

दर्जा: अध्यक्ष

दर्जा: सहायक प्रबन्धक

दस्ताखत: 

दस्ताखत: 

मिति: २०८०/११/१४

मिति: २०८०/११/१४  


संघ/संस्थाको छाप




कार्यालयको छाप



साक्षी: 

१. भुलन कुमार साह तैली (कृषि प्राविधिक)

साक्षी: 

१ कुलदिप सहा (इ. सुपरभाइजर)

# Net-metering agreement on Feb 26, 2024



# Key Lessons from the pilot

## Hurdles

- Grid-connected Solar Irrigation is a very new
  - **Implementation Process** is not clear
  - Guiding policy for grid-integrated Solar Irrigation is lacking
  - Local NEA officials need capacity building
- NM Policy not clear for Solar Irrigation
  - Krishi meter tariff of **NPR 2.3**
  - NM tariff of **NPR 5.94**

## Early Findings

- Direct beneficiaries **8 HHs (~348 Katha)**
  - No diesel use and very low Electricity bills
  - Additional income through sales of water
- An additional **8-16 HH** indirect beneficiaries (**~1120 Katha**)
  - Previously buying diesel water at **NPR 300/hour**
  - Now getting cheaper water at **NPR 100/hour**
- Reduction in Diesel Use;
- Increase in Irrigation Area

# Capacity building of Farmers



**Total Farmers Trained 46**  
(19 Male; 27 Female)



# Year 5 Work Plan - Activity 2.2.3 Grid Connected SIP Pilot in Nepal

Deliverable	Due Date	Output	Impact
Net-metering Agreement	30-06-2024	NM Agreement Signed	Policy Feedback
Endline Survey to assess the impact of the SoLAR pilot project	30-09-2024	End-line Survey Report	Feedback to Policymakers
Journal Article for Techno-social analysis of Grid-connected SIP pilot	31-12-2024	Journal Article	Empirical Evidence
Issue Briefs - Impact of Net-metering - Lessons learned from the pilot	30-09-2024	Issue Briefs	Policy Feedback
OpEd / Blogpost in Nepali language	30-06-2024	OpEd / Blogpost	Knowledge Sharing



# Y4 Achievements and Y5 Progress

## 3.1.1 Training of local technicians in Nepal



## 3.1.1 Training of local technicians in Nepal

Details of sub-activities	Status
<p><b>Finalize the dual language version of Training module and handover to AEPC</b></p>	<ul style="list-style-type: none"> <li>Published on AEPC's website as a knowledge product</li> </ul>
<p><b>Training / Workshop</b></p>	<p>Two capacity-building workshops</p> <ul style="list-style-type: none"> <li><b>Mahottari - 26-27 September 2023</b> <ul style="list-style-type: none"> <li>31 Participants (M- 16; F-15)</li> <li>2 Participants from AEPC (M- 1; F-1)</li> </ul> </li> <li><b>Banke - 9-10 December 2023</b> <ul style="list-style-type: none"> <li>19 Participants (M- 9; F-10)</li> <li>2 Participants from AEPC (M- 1; F-1)</li> </ul> </li> </ul>



# Nepal – Capacity Building





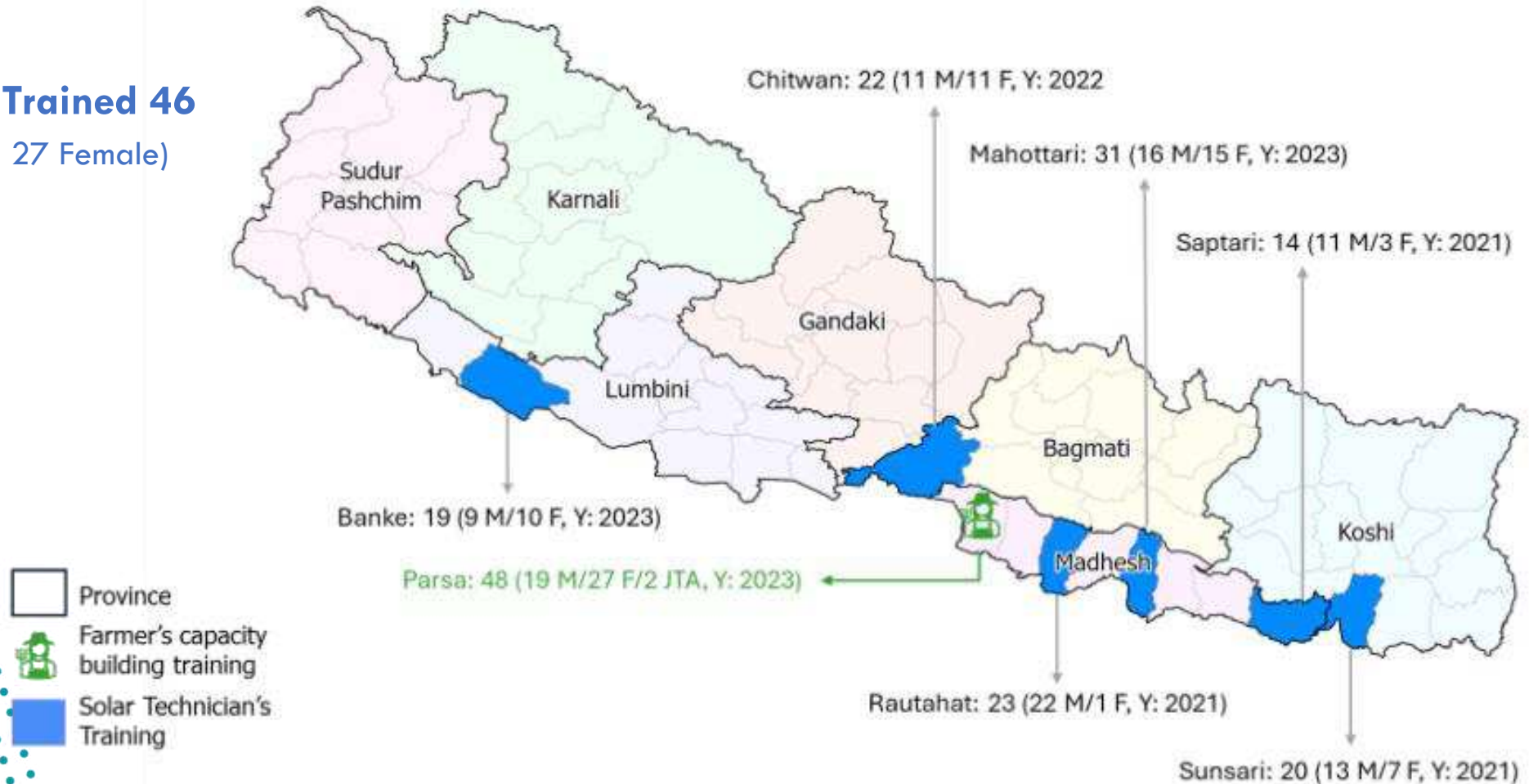
## Total Persons Trained – 132

- (Male 83; Female 49)
- **2023 – 54 Participants** (50% female)

## Total Farmers Trained 46

- (19 Male; 27 Female)

### Capacity Building Training



- Province
- Farmer's capacity building training
- Solar Technician's Training

# Year 5 Work Plan - Activity 3.1.1 Training of Local Technicians in Nepal

Deliverable	Due Date	Output	Impact
Training / Workshop/school	30-06-2024	Training report including details of persons attended	Capacity Building
Synthesizing all Capacity Building activity under 3.1.1 Training of technician.	30-04-2024	Issue Brief	Knowledge Product

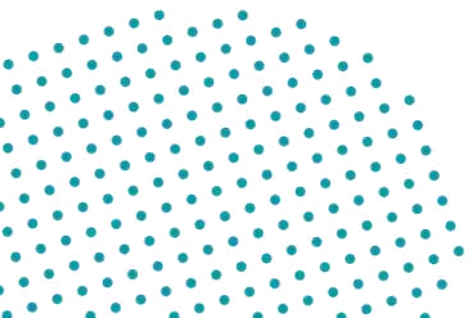


# Y4 Achievements and Y5 Progress

## 3.1.2 National and Global Knowledge Forum

## 3.1.2 National Forum in Nepal

Details of sub-activities	Status
<b>National forum</b>	<ul style="list-style-type: none"><li>• March 17, 2023, on the Occasions of Nepal National Water and Weather Week</li><li>• Co-organized by AEPC, IWMI in partnership with GIZ POSTED and NREP</li><li>• Venue – Everest Hotel</li><li>• Participants - ~80</li></ul>



# Knowledge Forum on Accelerating Change in a Federal Nepal through Transformative Actions for Inclusive Water Management

March 17, 2023 | Hotel Everest, Kathmandu

- Technical Session on **Water technologies and innovation: Solar Irrigation as tool for responding to food and water insecurities, and inclusive development.**
- Organized in partnership with **AEPC, IWMI, NREP and GIZ POSTED**
- **3 Presentations / 1 Panel Discussion**



## Year 5 Work Plan - Activity 3.2.2: National Forum in Nepal

Deliverable	Due Date	Output	Impact
National forum (with 100 participants, mostly policymakers)	31-12-2024	1 policy brief	Initiate dialogue amongst policy makers and stakeholders
Global Forum (with 120-180 participants, mostly policy makers) IWMI	31-12-2024	1 policy brief	Initiate dialogue amongst policy makers and stakeholders





# National Forum

## Objectives

1. Provide a platform to **exchange knowledge** on solar irrigation in Nepal.
2. Facilitate **policy dialogues** with policymakers, development partners, and stakeholders to improve the government's solar irrigation initiatives and make them more socially inclusive, scalable, and sustainable.
3. Identify key **gaps in research and opportunities for future work** in Nepal's solar irrigation sector.

## Three Themes

Theme 1 - Scaling Solar Irrigation in Nepal

Theme 2 - Social Inclusion in Designing Solar Irrigation Programs

Theme 3 - Making Solar Irrigation programs more sustainable.



Nepal Science-Policy Dialogue on Solar Irrigation

## Empowering Agriculture with Renewable Energy for Sustainable Irrigation and Inclusive Policies

Venue: Kailash Conference Hall, ICIMOD  
Date: Monday, April 22, 2024, | Time: 09:00-17:00

### Expected Outcomes

1. Increased understanding and knowledge exchange among participants about solar irrigation practices in Nepal.
2. Enhanced policy dialogues may improve the government's solar irrigation initiatives.
3. Identify critical research gaps and opportunities for future work in Nepal's solar irrigation sector.



# Global Science-Policy Forum: Socially Inclusive Solar Irrigation Systems

## April 2024

Monday	Tuesday	Wednesday	Thursday	Friday
22	23	24	25	26

National Knowledge Forum  
~100 participants

Regional Knowledge Forum  
~100 participants

Global Knowledge Forum  
~150 participants

### Global Forum Themes

1. **Groundwater sustainability, adaptation, and mitigation**
2. **Business models** of SIPs **and scaling** up of solar irrigation
3. The role of communities: **Capacity building** and **Gender, Equity and Social Inclusion**
4. Designing **effective and inclusive policies** for solar energy transitions

# Discussion Session

Q&A Session



# Thank you