



# Training of Technicians on Solar Water Pumping Systems – Nepal

TRAINING COMPLETION REPORT

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## Background

In order to improve the technical knowledge and capacity of local technicians and engineers on solar water pumping systems, Pathibhara Himalayan Polytechnic Institute (PHPI) organized the training of technicians on solar water pumping systems with the support of the International Water Management Institute (IWMI) – Nepal. The training was carried out under the SoLAR (Solar Irrigation for Agricultural Resilience) project to generate knowledge and research to manage water-energy and climate interlinkages by promoting solar irrigation pumps by supporting government efforts in Nepal, India, Bangladesh, and Pakistan.

The training was supported by the Alternative Energy Promotion Center (APEC) and the Swiss Agency for Development and Cooperation (SDC). It was based on a customized manual on solar pumping systems led by PHPI and developed in partnership with IWMI. This innovative and customized training focused on providing knowledge on three aspects: Technical content on renewable energy, general knowledge skills on the same, and installation, sizing, and operation and maintenance of solar water pumps.

## Objective of the training

The main aim of this program was to train relevant technicians on solar pumping systems, who could then provide technical services such as installing solar PV systems, and solar pumping systems, oversee its sustained operation and support maintenance and promotion as and when required.

Specific objectives of the training were as follows:

- To familiarize participants with the basics of solar PV and solar water pumping technology
- To capacitate participants on PV system sizing, including pump sizing, panel sizing, battery sizing, controller sizing, cable sizing, and inverter sizing
- To teach participants how to handle and operate required tools and equipment concerned with solar PV and solar water pumping systems
- To capacitate participants to be able to install, assemble, and test solar PV and solar water pumping systems
- To enable participants to be able to carry out routine/scheduled maintenance of the system
- To impart information on the subsidy delivery mechanism for solar PV and solar water pumping systems

## Date and Venue of the training

The training was conducted as a seven-day residential training from February 28 to March 06, 2021. The training was held on the premises of the training institute of PHPI Nepal at Itahari in Nepal.

### 1. Participants

There were a total of twenty participants who attended the training sessions and hailed from different professional backgrounds. Most of them had an engineering background, while one of them was from the agriculture background and another hailed from the forestry background. [Annex 2]

Five participants were from AEPC, four from rural municipalities as technical officers/sub-engineers, while eleven were from the private sector. The education level varied from Diploma bachelor's level to and T-SLC level. Amongst the twenty participants, seven participants were female. AEPC selected most trainees through private solar companies in Kathmandu, while PHPI selected four female technical officers at the municipal level.

## 2. Training team

Table 1: List of trainers

SN	Members Name	Designation	Organization	Role
1	Er. Khirendra Kumar Yadav	Coordinator And Facilitator	PHPI	<ul style="list-style-type: none"> <li>Overall management, planning, implementation of the training program.</li> <li>Lead coordination with participants and the training team.</li> <li>Monitoring and Evaluation of training, preparing training plan and project completion report.</li> <li>Lead preparation of the solar pumping training manual.</li> </ul>
2	Er. Nipun Regmi	Lead Trainer	Freelance RE Expert	<ul style="list-style-type: none"> <li>Facilitate core training curriculum and deliver lectures</li> <li>Engage participants in site-based teaching as required</li> </ul>
3	Mr Shisher Shrestha	Consultant RE Expert	IWMI	<ul style="list-style-type: none"> <li>On-site monitoring of the training</li> <li>Support training manual development</li> </ul>
4	Ms Labisha Uprety	Research Officer	IWMI	<ul style="list-style-type: none"> <li>On-site monitoring of the training</li> <li>Support training manual development</li> </ul>

## 3. Description of the training

The training method was diverse with lectures, presentations, group discussions, demonstrations at nearby sites, and practical exercises. The participants were provided with a basic background of the significant components of solar PV systems and were introduced to its design aspects which involved detailed system sizing calculations. Other essential elements of the Solar PV systems, such as site survey, system commissioning, M&E, and O&M, were discussed at length. PHPI also provided several useful reference materials and the final training manual to the participants.

The seven-day residential training had a 6-hour session each day. The details of the training are provided in Annex 1.

## Methodology Used

### 1. Classroom Lecture:

This method was used to introduce theoretical concepts of the Solar PV system and its main components to the trainees.

The classroom lecture included theoretical introductions of off-grid solar PV systems and solar pumping systems. These sessions also focused on the system design and sizing. Various components of Solar PV systems such as panels, inverter, battery, controller, etc., were introduced to the participants. The methods of component selection and wire sizing were taught to the participants. Frequent classroom discussions and problem-solving exercises supported the lectures.



*Figure 1: Classroom lecture conducted by Mr Nipun Regmi*



*Figure 2: Participants in the classroom session*

## **2. Field visit and on-site expert lectures:**

Participants were taken to various sites as part of on-site teaching and exposure visits. Areas included farms equipped with solar pumps and solar grid sites. One of these visits was facilitated by Mr Babu Raja Shrestha, a veteran of solar pumping technology in the country.

The exposure visits were organized to give a hands-on experience to trainees in terms of real-life contexts and challenges of the solar PV pumping sector. During such events, participants observed scenarios, asked questions and re-validated their learning. Trainees interacted with enterprise owners, farmers, and other community members.



*Figure 3: Participants interacting with Mr Babu Raja Shrestha, a freelance RE Expert, at his farm*



*Figure 4: Mr Babu Raja Shrestha showing various RE technologies deployed on his farm*



The exposure visits were organized at the following places:

**a. Jahada - (wada no. 01), Morang, Nepal**

A 2kWp solar irrigation pump was installed at a farm in Jahada, RM. The size of the pump was 2HP, and the system was installed by the local rural municipality and the irrigation water was used by multiple farms. The site had eight 250 Wp solar panels, a controller, and a surface pump. The pump was operational during the visit, and the pumped water was diverted to the adjacent farm as irrigation was not required at that particular moment.

The participants observed several issues with the solar irrigation pumps based on the training classes. One of the major issues identified with the system was that different manufacturers installed solar panels as part of the system. The participants verified the status of the pump and inverter and filled in a checklist regarding its O&M details.



*Figure 5: A site visit to Solar Irrigation Pump installation site in Jahada RM*



*Figure 6: Participants filling the checklists at the site with help from the instructor Mr Nipun Regmi*

**b. Jahada-02, Birpur, Morang, Nepal**

A community-run 8kWp solar mini-grid was installed in Jahada rural municipality. The system consists of two 4kWp arrays made of eight 250 Wp Solar panels each. Two 5KVA inverters are stacked together to create a 10KVA system connected to a 76.8kWh battery.

The per-unit cost of electricity from the solar mini-grid is around NPR 25/unit, and this amount was mainly used to fund the O&M of the mini-grid. The mini-grid powers around 50 households, which uses electricity primarily for lighting purposes. A national grid that was installed recently also exists nearby. The local community prefers electricity from the mini-grid as the national grid has frequent power cuts, which sometimes take days to be fixed. Also, the money paid for the electricity tariff for the mini-grid remains in the community. The trainees received on-site lectures from Mr Nipun Regmi, who explained the overall system design, connection, and lack of proper maintenance.



*Figure 7: Participants observing the Solar Minigrid at Jahada Rural Municipality*



*Figure 8: Instructor Nipun Regmi explaining the design and connection of the Solar mini-grid*



*Figure 9: Jahada-02, Birpur, Morang, Nepal Santhal Solar mini-grid 8 KWp*

### **3. Practical sessions and group activities**

As part of practical learning, the participants were divided into four groups. The trainer gave various assignments to each group; these assignments were to form the basis for trainee presentations on the last day. The assignment covered multiple topics such as system design, interconnection of battery wires, the safety aspect of the solar PV system, operation and maintenance, etc.

As part of their group work, the participants were encouraged to reflect and engage in formal and informal sharing of their analysis from the site visit. The overall aim was to have an interactive session.



*Figure 10: Participants demonstrating their practical assignments*



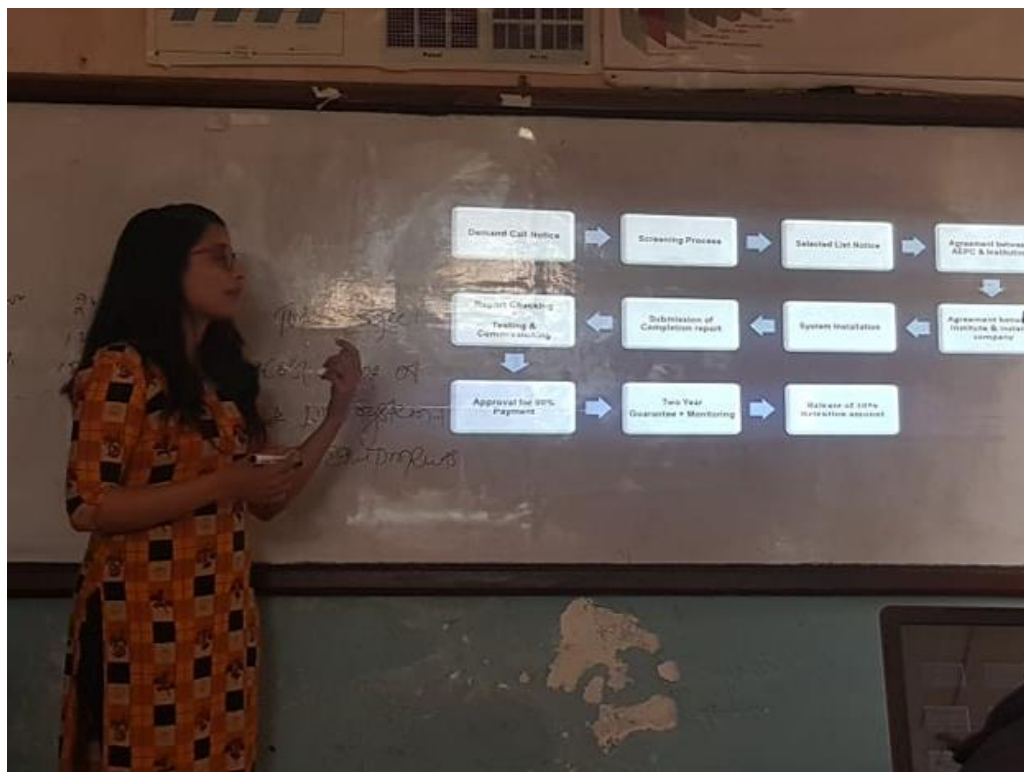
*Figure 11: Participants sharing their experience from the field visit*

#### 4. Final presentations by participants

The main objective of this session was to summarize the learnings of the entire seven-day residential training. On the last day of the training, the final presentation sessions saw participants solve and explain solutions to various theoretical and application-based problems. The theoretical presentations covered feasibility calculations and the design of solar PV home systems and solar water pump systems. The participants also presented multiple concepts and calculations related to the load analysis, panel sizing, battery sizing, inverter sizing, charge controller sizing, etc.

The participants also showcased their understanding of system selection (from the one that is available in the market) from the theoretical design of the PV system. Appropriate cable sizing and selection of cables from commercially available cable sizes in the market were also demonstrated.

One of the groups demonstrated how parallel and series connections of batteries were made and what safety procedures needed to be followed.



*Figure 12: A participant from AEPC explains the institutional subsidy delivery mechanism for solar pumps*

One of the sessions was carried out by participants from the AEPC who gave an interesting and detailed presentation on the solar pump subsidy delivery mechanism. They covered procedures for individual and

community acquirement of the subsidy for the pumps. All presentations resulted in exciting discussions and active participation.

### Reflection of participants:

The IWMI-team had created a short participant feedback form where participants could anonymously state what they thought of the training. On how effective they found the training; all participants had ticked either 'very effective' or 'highly effective'. This was also evident from the participants formal and informal knowledge sharing to the larger group and the IWMI team.

Most participants noted that they had learned something new, be it about the PV system design or grid-connected solar systems. They also pointed out that the knowledge gained would be helpful for them in their professional careers. Several participants noted interest in more such pieces of training. Almost all of them appreciated the training team, especially the lead trainer, who was deemed a passionate educator.

Several participants expressed some concerns about the accommodation arrangements on things that could have been improved, especially regarding the hotel being unhelpful upon requesting the required amenities. There was room for improvement on the hospitality aspect of the entire training program, including providing basics such as more comfortable chairs and lecture spaces.

### Conclusion:

Despite participant qualification levels varying substantially, the majority were very enthralled by the training. The training was proven to be effective. Even participants with very little knowledge about solar systems could comprehensively identify issues with the installed system and successfully complete the O&M checklist provided. Some of the participants were quite experienced in the field and engaged in knowledge-sharing activities with their fellow participants. Participants reflections shared with the group demonstrated that most of them had learned and enjoyed the training and were interested in more such learning opportunities.

The sites selected in nearby municipalities were appropriate to provide a practical demonstration for the participants to summarize the theoretical classes. However, the field visit could have been arranged more effectively with more detailed planning. A demo setup at the training venue could have provided more opportunities for the participants to learn about the solar PV system.





## Annex 1: Training Plan

Program: Solar Irrigation Pump (SIP) Training

Session: Training to Local Resource Person on SIP Technology

Objective: To develop customized SIP Technician.

Date: 28/02/2021 (Day 1)

Time: 6 hours

Steps	Content	Method	Tools	T/P	Time	Responsibilities
Opening	Introduction of the Training and About PHPI and IWMI	One to One	Welcome speech Speech		10:00 To 11:00	PHPI Moderator And IWMI Moderator
Introduction	Solar PV General and SIP System	-Facilitating about Solar PV and SIP System	Slides, Discussion	Theory	11:00 To 1:00	Mr Nipun Regmi
Identifications and Applications	Components of Solar PV and SIP System <ul style="list-style-type: none"> <li>Pictorial Brief</li> <li>PV applications</li> </ul>	-Demonstration -Group Discussion	Slides	Theory And Practical		
<b>Break</b>					<b>15 min</b>	
Site Survey	<ul style="list-style-type: none"> <li>Site Survey Checklist</li> <li>Design Consideration etc.</li> </ul>	Group Discussion demonstration	Slides	Theory	1:15 To 2:00	Mr Nipun Regmi
<b>Snacks</b>					<b>30 min</b>	
Advantages and Limitations	<ul style="list-style-type: none"> <li>Electrical demand load analysis</li> <li>Efficient Energy Utilization</li> </ul>	Group discussion, Demonstration	Slides	Theory	2:30 To 3:15	Mr Khirendra Yadav
Recap and closing	Recap for Day 1	Group discussion, Asking question	Whiteboard, Marker, and slides	Theory	3:15 To 4:00	Mr Nipun Regmi

Program: Solar Irrigation Pump (SIP) Training  
 Session: Training to Local Resource Person on SIP Technology  
 Objective: To develop customized SIP Technician.

Date: 01/03/2021 (Day 2)  
 Time: 6 hours

Steps	Content	Method	Tools	T/P	Time	Responsibilities
Opening	Feedback of the previous session	Verbal, using meta cards	meta cards, board, Slides	Presentation	10:00 To 10:30	Trainee
Introduction	Design of PV System	Calculation, Formula, demonstration	Slides, Calculations, Discussion	Theory And Practical	12:00 To 1:30	Mr Khirendra Yadav Mr Nipun Regmi
Identifications and calculation	<ul style="list-style-type: none"> <li>Solar PV module</li> <li>Battery</li> </ul>					
<b>Break</b>					<b>15 min</b>	
Introduction and Connections	<ul style="list-style-type: none"> <li>General Battery</li> <li>Battery Cable Connection</li> <li>Series Connection</li> <li>Parallel Connection</li> <li>Series/Parallel Connection</li> </ul>	Group Discussion demonstration	Slides, Discussion Battery, Cables, Multimeter	Theory And Practical	1:45 To 2:30	Mr Khirendra Yadav
<b>Snacks</b>					<b>30 min</b>	
Calculation	<ul style="list-style-type: none"> <li>Charge Controller type, size</li> <li>Inverter Sizing</li> <li>Wire Sizing</li> </ul>	Exercise	Slides, Discussion, Board, copies	Theory And Practical	3:00 To 3:45	Mr Nipun Regmi
Recap and closing	Recap for Day 2	Group discussion, Asking question	Whiteboard, Marker	Theory And Practical	3:45 To 4:00	Mr Khirendra Yadav Mr Nipun Regmi

Program: Solar Irrigation Pump (SIP) Training  
 Session: Training to Local Resource Person on SIP Technology  
 Objective: To develop customized SIP Technician.

Date: 02/03/2021 (Day 3)  
 Time: 6 hours

Steps	Content	Method	Tools	T/P	Time(hrs)	Responsibilities
Opening	Feedback of previous session	Verbal, using meta cards	meta cards, board	Theory	10:00 To 10:30	Trainee
Introduction	<ul style="list-style-type: none"> <li>Exercise with an Example for Off-grid PV system</li> </ul>	Calculation, Formula, demonstration	Group Discussion components of Charge controller, Slides	Theory	10:00 To 11:30	Mr Nipun Regmi
Exercise				Theory And Practical		
<b>Break</b>					<b>15 min</b>	
Exercise	<ul style="list-style-type: none"> <li>Exercise with an Example for Off-grid PV system CONTD...</li> </ul>	Group Discussion demonstration	Group Discussion components of Inverter, Slides	Theory	11:45 To 1:30	Mr Nipun Regmi
<b>Snacks</b>					<b>30 min</b>	
Introduction	<ul style="list-style-type: none"> <li>Operation and Maintenance of an Off-Grid Solar System</li> </ul>	Group Discussion demonstration	Slides, Whiteboard, Marker, Chart paper.	Theory	2:00 To 3:30	Mr Nipun Regmi
Recap and closing	Do's and Don'ts in an Off-grid System and Recap for Day 3	Group discussion, Asking question	Whiteboard, Marker	Theory And Practical	3:30 To 4:00	Mr Khirendra Yadav

Program: Solar Irrigation Pump (SIP) Training  
 Session: Training to Local Resource Person on SIP Technology  
 Objective: To develop customized SIP Technician.

Date: 03/03/2021 (Day 4)  
 Time: 6 hours

Steps	Content	Method	Tools	T/P	Time	Responsibilities
Opening	Feedback of previous session	Verbal, using meta cards	meta cards, board	Theory	10:00 To 10:30	Trainee
Introduction	<ul style="list-style-type: none"> <li>SIP Design, type of pumps</li> <li>Basic Steps in System Design</li> <li>General approach for designing (Site Survey etc.)</li> <li>Theoretical Pump Design</li> </ul>	Calculation, Formula, demonstration	Slides, Group Discussion Chart paper	Theory And Practical	12:00 To 1:30	Mr Nipun Regmi
Identifications						
<b>Break</b>					<b>15 min</b>	
Choice of Pump	<ul style="list-style-type: none"> <li>Practical Pump design and market trends</li> </ul>	Exercise, Discussion Demonstration	Slides, Group Discussion Chart paper	Theory	1:45 To 2:30	Mr Nipun Regmi
<b>Snacks</b>					<b>30 min</b>	
Calculation	<ul style="list-style-type: none"> <li>Lifespan of the pump</li> <li>Choosing the right pump</li> </ul>	Group Discussion demonstration	Slides, Group Discussion Chart paper	Theory	3:00 To 3:30	Mr Khirendra Yadav
Recap and closing	Recap	Group discussion, Asking question	Whiteboard, Marker	Theory And Practical	3:30 To 4:00	Mr Khirendra Yadav

Program: Solar Irrigation Pump (SIP) Training  
 Session: Training to Local Resource Person on SIP Technology  
 Objective: To develop customized SIP Technician.

Date: 04/03/2021 (Day 5)  
 Time: 6 hours

Steps	Content	Method	Tools	T/P	Time	Responsibilities
Opening	Feedback of previous session	Verbal, using meta cards	meta cards, board	Theory	10:00 To 10:30	Trainee
Commissioning, Repair and Maintenance Overview	<ul style="list-style-type: none"> <li>Commissioning and O &amp;M</li> <li>PV Array</li> <li>Controllers/VFDs</li> <li>Pump</li> <li>Batteries</li> <li>Street Light Maintenance</li> <li>Household electrifications</li> </ul>	Calculation, Formula, demonstration	Slides, Discussion Multimeter, Screw drive, Solar PV panel, required electrical tools.	Theory And Practical	12:00 To 1:30	Mr Nipun Regmi
<b>Break</b>					<b>15 min</b>	
Monitoring and Evaluation	<ul style="list-style-type: none"> <li>Installed water pumps</li> <li>Trouble Shooting</li> <li>Safety and tools</li> </ul>	Group Discussion demonstration	Slides, checklist, Data required electrical tools.	Theory And Practical	1:45 To 2:30	Mr. Nipun Regmi
<b>Snacks</b>					<b>30 min</b>	
Failure & Fault Detection and Remedy	<ul style="list-style-type: none"> <li>Failure type</li> <li>Fault Identification</li> <li>Fault remedy</li> </ul>	Group Discussion demonstration	Slides, checklist, Data, video, required electrical tools.	Theory And Practical	3:00 To 3:30	Mr Nipun Regmi
Troubleshooting	<ul style="list-style-type: none"> <li>Electrical Testing</li> <li>Pump Maintenance</li> <li>Battery Maintenance</li> </ul>	Group discussion, Demonstration	Slides, checklist, Data, video, required electrical tools, Multimeter, Hydrometer.	Theory And Practical	3:30 To 4:00	Mr Khirendra Yadav
Recap and closing	Recap Day 5	Group discussion, Asking question	Whiteboard, Marker	Theory And Practical		

Program: Solar Irrigation Pump (SIP) Training

Session: Training to Local Resource Person on SIP Technology

Objective: To develop a customized SIP Technician.

Date: 05/03/2021 (Day 6)

Time: 6 hours

Steps	Content	Method	Tools	T/P	Time	Responsibilities
Opening	Filed visit Checklist	Verbal, using meta cards	Placards, A4 size paper, etc.	Field Visit	10:00 To 10-30	Mr. Khirendra yadav Mr. Nipun Regmi
Visit	Visit SIPS and PV systems at various location	Group discussion, Asking question	Vehicle, Briefing	Field Visit	10-30 To 4:00	
	Mr Babu Raja (Freelancer expert in renewal Energy, Biratnagar, Rjbanshi chock)	<ul style="list-style-type: none"> <li>Observe the installation.</li> <li>Work on the checklist.</li> <li>See the connection</li> <li>See the Fault and its troubleshooting</li> </ul>			11:15 to 12:00	Mr Babu Raja
	Jahada - (wada no. 01), Morang, Nepa Solar pv water pump 1(2HP) Solar pv water pump 2(2HP)				1:00 to 2:00	Mr Khirendra yadav Mr Nipun Regmi
	<b>Break</b>				<b>30 Min</b>	
	Biratnagar- (wada no.18), Morang, Nepal Solar pv water pump(2HP)				2:30 To 3:00	Mr. Khirendra yadav Mr. Nipun Regmi
	Jahada-02, Birpur, Morang, Nepal Santhal Solar mini-grid 8 KWp		<ul style="list-style-type: none"> <li>Observe the installation.</li> <li>Work on the checklist.</li> <li>See the connection</li> <li>See the Fault and its troubleshooting</li> </ul>			3:00 To 4:00

Program: Solar Irrigation Pump (SIP) Training  
 Session: Training to Local Resource Person on SIP Technology  
 Objective: To develop customized SIP Technician.

Date: 06/03/2021 (Day 7)  
 Time: 6 hours

Steps	Content	Method	Tools	T/P	Time	Responsibilities
Presentation	Topic selected by Trainee	<ul style="list-style-type: none"> <li>• Demonstration</li> <li>• Group Discussion</li> </ul>	Using Multimedia Slides, Group Discussion All the components of solar PV Slides	Theory And Practical	10:00 To 1:30	Trainee
<b>Snacks</b>					<b>30 min</b>	
Feedback	On Presentation	<ul style="list-style-type: none"> <li>• Group Discussion</li> <li>• Demonstration</li> </ul>	Using Multimedia White Board	Theory And Practical	2:00 To 2:30	Mr Nipun Regmi Mr Khirendra Yadav Trainee
Subsidies & Forms (AEPC)	Subsidies, Policies, Forms, etc. on Solar Pumping Provide by AEPC	<ul style="list-style-type: none"> <li>• Group Discussion</li> <li>• Demonstration</li> </ul>	Form and process	Theory	2:30 To 3:15	Participants from AEPC
Recap and closing	Overall training Feedback and Manual Discussion & Distribution	<ul style="list-style-type: none"> <li>• Group discussion</li> <li>• Asking question</li> </ul>	Whiteboard, Marker	Theory And Practical	3:15 To 4:00	Trainees Mr Nipun Regmi Mr Khirendra Yadav

## Annex 2: Name list and details of participants Name list and details of participants

S.No	Name	Company Name	Mobile	Qualification
1	Nabin Phuyal	Sourya Energy	9860000196	BE Electrical
2	Damodar Pandey	Urjha Ghar	9843703340	BE Electrical
3	Ramchandra Marhattha	Nepal Energy Development Company	9841977070	Solar L-II
4	Keshav Bhandari	Center for Resource Conservation	9741123752	Solar L-II
5	Padam Bhattari	Public Solar	9851132802	Solar L-II
6	Anil Basnet	Shunshine Energy	9851117922	Solar L-II
7	Dipesh Niurala	Surya Roshani	9843998152	Prediploma E.E
8	Gaurav Raj Poudel	Cosmic Energy	9867209375	Mech. Engg
9	Shiva Shankar Shrestha	Topsun Energy	9841835920	Diploma in E. E
10	Dil Bahadur Chaudhary	Sun way	9841591226	SLC
11	Prem Raj Pandey	Solar Homes	9844478398	Intermediate
12	Gyan Bdr Rai	Nepal Energy Development Company	9849360609	Solar L-II
13	Krishna Ram Thing	Suryodaya Energy Company	9851168412	Solar L-II
14	Diksha Ghimire	AEPC	9851131391	Solar Engineer
15	Monika Kafle	AEPC	9860070886	Solar Engineer
16	Kalpana Pathak	AEPC	9840058592	Solar Engineer
17	Amrita Rauniyar	Forestry	9861623560	Bachelor
18	Ranjana Karki	Technical Official	9819977389	Agriculture
19	Ashila Sunuwar	Sub-engineer	9849583877	Diploma
20	Milina Rai	Asst. Sub-engineer	9869056365	Sub diploma



### Annex 3: Attendance details

S.N	Name	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1	Nabin Phuyal	X	X	X	X	X	-	-
2	Damodar Pandey	X	X	X	X	X	X	X
3	Ramchandra Marhattha	X	X	X	X	X	X	X
4	Keshav Bhandari	-	X	X	X	X	X	X
5	Padam Bhattari	X	X	X	X	X	X	X
6	Shiva Shankar Shrestha	X	X	X	X	X	X	X
7	Dil Bahadur Chaudhary	X	X	X	X	X	X	X
8	Prem Raj Pandey	X	X	X	X	X	X	X
9	Gyan Bdr Rai	X	X	X	X	X	X	X
10	Krishna Ram Thing	X	X	X	X	X	X	X
11	Dipesh Niraula	X	X	X	X	X	X	X
12	Diksha Ghimire	X	X	X	X	X	X	X
13	Monika Kafle	X	X	X	X	X	X	X
14	Kalpana Pathak	X	X	X	X	X	X	X
15	Anil Basnet	-	X	X	X	X	X	X
16	Gaurav Raj Poudel	-	X	X	X	X	X	X
17	Amrita Rauniyar	X	X	X	X	X	X	X
18	Ranjana Karki	X	X	X	X	X	X	X
19	Ashila Sunuwar	X	X	X	X	X	X	X
20	Milina Rai	X	X	X	X	X	X	X

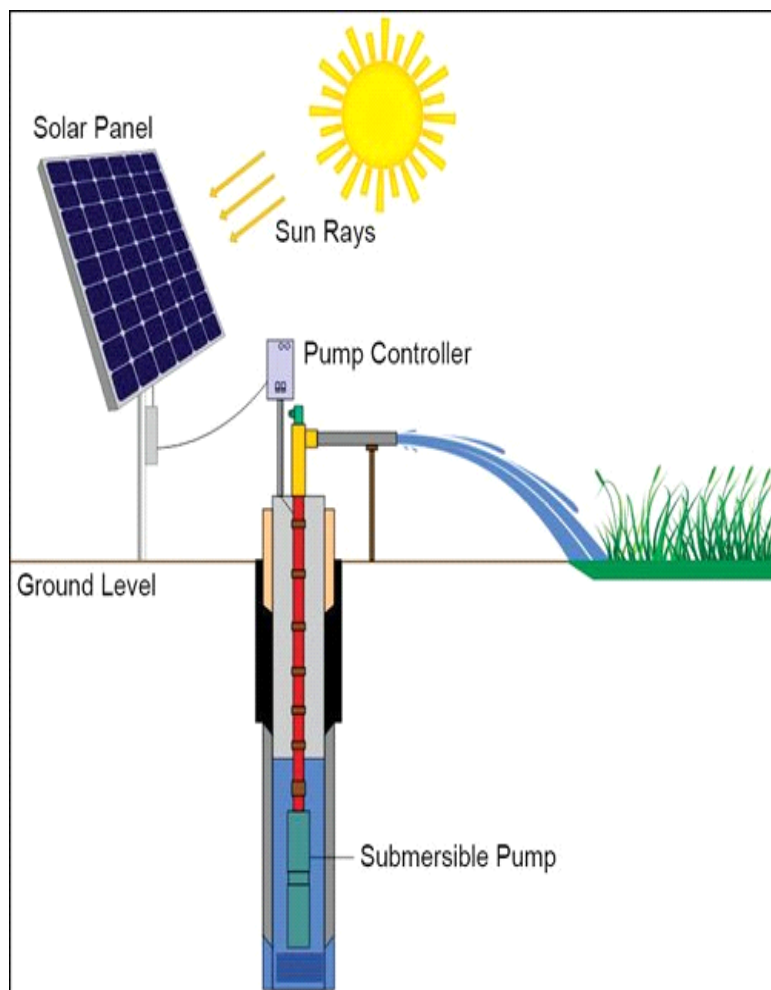
X	Present
-	Absent

## Annex 4: Performance Evaluation

Performance evaluation of each trainee was conducted every day with respective modules

Tasks		Designs and Calculation of energy demand & Pumping System		Solar pumping system, Battery and Maintenance		Social mobilization, Entrepreneurship concept	
SN	Name	Standard Met	Standard Not Met	Standard Met	Standard Not Met	Standard Met	Standard Not Met
1.	Damodar Pandey	✓		✓		✓	
2.	Ramchandra Marhattha	✓		✓		✓	
3.	Keshav Bhandari	✓		✓		✓	
4.	Padam Bhattarai	✓		✓		✓	
5.	Anil Basnet	✓		✓		✓	
6.	Dipesh Niraula	✓		✓		✓	
7.	Gaurav Raj Poudel	✓		✓		✓	
8.	Shiva Shankar Shrestha	✓		✓		✓	
9.	Dil Bahadur Chaudhary	✓		✓		✓	
10.	Prem Raj Pandey	✓		✓		✓	
11.	Nabin Phuyal	✓		✓		✓	
12.	Gyan Bdr Rai	✓		✓		✓	
13.	Krishna Ram Thing	✓		✓		✓	
14.	Diksha Ghimire	✓		✓		✓	
15.	Monika Kafle	✓		✓		✓	
16.	Kalpana Pathak	✓		✓		✓	
17.	Amrita Rauniyar	✓		✓		✓	
18.	Ranjana Karki, Belka	✓		✓		✓	
19.	Ashila Sunuwar	✓		✓		✓	
20.	Milina Rai	✓		✓		✓	

# TRAINING COMPLETION REPORT ON SOLAR WATER PUMPING SYSTEM



**PREPARED BY:**

Er. Khirendra Yadav  
Program Coordinator



**SUBMITTED TO:**



International Water  
Management Institute

