

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

Pakistan - Country Project Management Committee (C-PMC) | 3rd Meeting

Date: 21 December 2021 | Time: 10:00 AM – 11:30 AM (PST)

Venue: Virtual meeting via MS Teams

### A) List of attendees

*(See annex I)*

### B) Agenda

1. Welcome remarks by Mohsin Hafeez, Country Representative, IWMI Pakistan.
2. Brief introduction by the participants for the C-PMC meeting.
3. Update by Mohsin Hafeez:

He briefly gave updates for the current year about the SoLAR project activities and deliverables around the research related to solar power irrigation in Punjab. Under SoLAR project, IWMI has conducted precision irrigation trials in collaboration with KFUEIT in Rahim Yar Khan and with PARC in Islamabad. In addition to that after telephonic survey, initial rapid enumeration survey has been completed under the SoLAR project. Now main behavioural survey is underway.

Pakistan water week 2021 was conducted from 6-9 December in Islamabad. A national forum was conducted related to potential of solar powered irrigation at the conference. There was excellent participation in the forum and illuminating discussions. IWMI has also won a World bank project in which review of solar pumping practices in Punjab province will be conducted. The results of the existing behavioural study will inform the World Bank's loan program named as the Punjab Resilient and Inclusive Agriculture Transformation (PRIAT) Project.

#### 4. Presentation by Azeem Shah:

Azeem Shah gave a presentation on the activities carried out in year 2021 under SoLAR project. Key highlights of the year 2021 was the Situational Analysis that was finalized, published and is available on SoLAR project website. Under component 1.2.3, two phases of behavioural study have been completed i.e., phone survey and rapid enumeration survey. Under component 3.3.1, successful field trials have been conducted for wheat (rabi crop) through precision surface irrigation coupled with SIP. Increase in water productivity and crop yield has been recorded. Maize trials for kharif season have also been completed. For component 3.3.1, training of 70 students and faculty members was carried out on "Design of Solar Pumping Unit for Precision Surface Irrigation". In addition to this, training of 19

farmers was carried out on “Operation and Maintenance of Solar Pumping Unit and Precision Surface Irrigation”.

With respect to in-situ measurement of farmer’s irrigation behaviour procurement of instruments have been done and will be installed earlier next month. Instrumentation will be carried out in 12 sites for three different categories i.e., groundwater monitoring for solar and diesel pumps, soil moisture analysis and actual energy generated by solar panels. Based on actual energy potential of solar panels, choice experiments will be conducted to inform the policy for selling excess energy back to the grid. Moreover, provincial studies of SIP outlook were conducted in Baluchistan, Sindh and Khyber Pakhtunkhwa. Draft reports for KP and Baluchistan province have been submitted. After going through key highlights, results from phone survey and rapid enumeration survey were presented. To summarize, the findings difference between surveys was presented. SIP farmers in telephonic survey were using other pumps in combination of SIPs, many growing orchards, using drip irrigation and almost all got SIP from government subsidy. SIP famers in rapid enumeration were mostly using SIP only, growing staple crops, using flood irrigation and installed SIP through self-finance.

The results from precision surface irrigation coupled with SIP for Maize crops in Kharif season 2021 with 15 litres per second discharge showed that laser graded bed and furrow field configuration had highest crop water productivity. Now, soil salinity analysis is underway. Soil moisture and salinity data has been gathered with soil tensiometer and electrical conductivity meter, respectively. Modelling for the soil salinity analysis is being conducted by Hydrus.

In the second half of the presentation, details of trainings for professional and farmers, specifications of instrumentation of the diesel and solar pumps and key points of national forum seminar conducted as a part of Pakistan Water Week 2021 were given.

#### 5. Deliberations:

**Khalid Jamil (PARC):** Khalid Jamil asked how the information about the size and type of SIP farmers with the consequences of solar pump pumping on groundwater table will get linked. Observation about reconsidering use of ultra-sonic flow meter is that these meters are only accurate in measuring discharge in pipes full of water; otherwise, they are inaccurate.

**Muhammad Ashraf (KFUEIT):** Md Ashraf asked that for farmers using SIP in conjunction with diesel pump, for how long will the diesel pump get used? He highlighted that in Nov-Jan period, canal water is unavailable, and farmers mostly compensate shortage of water and low discharge of SIP with use of diesel pumps.

As a result of precision surface irrigation results, many farmers have approached him to learn about water saving as it subsequently results in cost saving. He also suggested to study Bahawalpur desert area where many farmers have SIP, they grow one crop a year (wheat) and they use gypsum to counter saline water.

**Azeem Shah (IWMI):** Azeem Shah in his reply to these questions said that current survey was being conducted with 624 farmers (half sample is SIP and half is non-SIP farmers). Extensive information was being collected i.e., cropping pattern, irrigation routine, types and capacities of pumps used and duration of groundwater pumping. Calculations for groundwater abstraction for both SIP and non-SIP farmers will be carried retrospectively. These calculations will be supplemented with in-situ instrumentation. Data from instrumentation will be collected throughout the remaining duration of project and after

regular intervals, IWMI team will try to correlate the data with the survey findings. Subsequent report will include recommendations on how/what/where do we expect groundwater depletion with regards to SIPs.

As far as use ultra-sonic flow meter is concerned, the team can discuss possibilities around that. Addressing the comment by Md Ashraf about interest shown by farmers in learning water saving techniques, Azeem Shah replied that it will be his goal that at the end of precision surface irrigation trials, his team could come up with simple guideline for specific soil type and land configurations regarding precision surface irrigation parameters. Thus, farmers across Pakistan can make use of those guidelines.

**Tahir Anwar (FWMC):** Tahir Anwar commented that he had recently travelled to Baluchistan (Mastung, Pishin, Kalat and Kila Abdullah area), and mentioned that there was an indiscriminate increase in SIPs across that region. Will your study provide policy guidelines for Baluchistan?

**Azeem Shah (IWMI):** Azeem Shah responded that as part of provincial studies, we have received study on SIP outlook on Baluchistan. Additionally, FAO in 2019-20 did a study on solar suitability mapping. Now we are conducting detailed survey on irrigation behaviour of farmers related to SIPs. Hopefully we can come up with substantial recommendations for SIPs.

**Mohsin Hafeez (IWMI):** Mohsin Hafeez asked PARC that how will we be able to compare SIP coupled with drip irrigation system with other systems? If we have not done it yet, can we do it in future trials?

**Bashir Ahmad (PARC):** Bashir Ahmad responded to the question that they have planned SIP coupled with HEIS for wheat season and trial is underway. They are also collecting data from farmers in the Thal region who are using SIPs with flood irrigation. On the other hand, they are collecting data from farmers growing orchards with drip irrigation system. In the end, they will calculate water efficiency for both types of farmers.

**Mohsin Hafeez (MH):** As OFWM emphasized about SIP coupled with drip irrigation trials. We need to carry out such experiments at either PARC or KFUEIT.

6. Work plan for year 3: AS presented the work plan for year 3 of the Solar project to the CPMC members which was unanimously approved by all stakeholders.

#### 7. Discussion on Workplan:

**Muhammad Ashraf (KFUEIT):** He agreed with the work plan, and he highlighted that focus of farmer is on water saving and from my experience pivotal thing is educating the farmer. Farmers are very receptive as saving water ensures cost saving. Most farmers are using laser levelling. Work needs to be done at policy level as water can be saved through bed and furrow and laser grading. Machinery for these methods and technology need to be made available through appropriate policy formulation.

**Tahir Anwar (FWMC):** He endorsed the work plan, and also suggested to discuss this with DG of FWMC. It is an executive department of Ministry of Food Security and Research.

**Azeem Shah (IWMI):** He replied that DG FWMC is already member of steering committee and most of the project updates are already with him. Moreover, I will go to Islamabad and meet him, brief him about the project updates/ work plan, and seek his feedback. He was invited to CPMC meeting but could not attend due to some other commitments.

**Bashir Ahmad (PARC):** He endorsed the workplan and commented that PARC is already conducting trial on raised beds, but machinery is an issue. We have imported machinery and tried to indigenise through local manufacturers. He also commented about portable SIPs used in Thal region and many benefits of using portable SIPs in terms of efficiency. Portable SIPs solve security issue, and also can be used for domestic electricity consumption and to cut fodder.

**Khalid Jamil (PARC):** He mentioned that his team has already compiled a complete report on adoption pathway of portable SIP and behaviour of farmers with regards to portable SIP in the Thal region. They have also estimated the upscaling of portable SIP based on biophysical and socio-economic factors. He suggested instead of going for low discharge, they can instead adopt portable high discharge SIPs, so farmers can have low irrigation time and use it for other purposes as stated earlier.

**Azeem Shah (IWMI):** He commented that his team can design trainings around portable SIPs under training component of the SoLAR project.

Closing remarks by Azeem Ali Shah.

*Meeting notes prepared by Md Zain Bin Akbar, IWMI Pakistan.*

## Annex I: List of Participants

Sl no	Name	Role	Institution	Attendance
1	Mohsin Hafeez	Chair	IWMI	Yes
2	Arif Anwar	Member	IWMI	Yes
3	Azeem Ali Shah	Member Secretary	IWMI	Yes
4	Md Zain Bin Akbar	Member	IWMI	Yes
5	Divya Kashyap	Member	SDC	Yes
6	Tahir Anwar	Invitee	FWMC	Yes
7	Bashir Ahmad	Member	PARC	Yes
8	Khalid Jamal	Member	PARC	Yes
9	M Ashraf	Member	KFUEIT	Yes

*Abbreviations: FWMC is Federal Water Management Cell; IWMI is International Water Management Institute; KFUEIT is Khwaja Fareed University of Engineering and Information Technology; PARC is Pakistan Agricultural Research Council; SDC is Swiss Agency for Development and Cooperation.*

## Annex II: Photo Section

