



# WORLD SUSTAINABLE DEVELOPMENT SUMMIT 2022

**TOWARDS A RESILIENT PLANET:  
ENSURING A SUSTAINABLE AND EQUITABLE FUTURE**

February 16-18, 2022 (Virtual)



## Climate Resilience through Solar Irrigation

### THEMATIC TRACK SUMMARY

Venue: Kanha

Date: February 18, 2022

Time: 02:45 PM - 04:15 PM (IST)

#### Suggested Citation

World Sustainable Development Summit (2022), Climate Resilience through Solar Irrigation, Thematic Track Summary (Rapporteurs: Rashmi Murali and Dennis Roy), New Delhi: The Energy and Resources Institute.

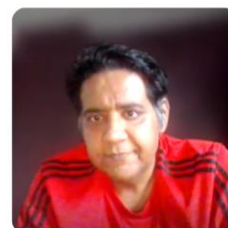
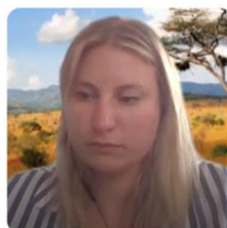
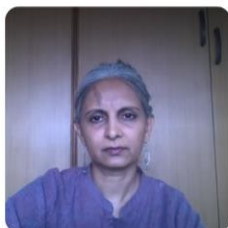
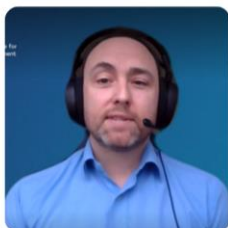
## Actionable Messages

**Message 1:** Decentralized solar irrigation technologies have a great potential to reach vulnerable communities especially in the face of climate change. Solar irrigation can strengthen vulnerable farmers by expanding irrigation access to small and marginal farmers.

**Message 2:** There is a need to incentivize farmers to use solar energy that they will be producing on their farms judiciously, solar power itself will be remanent of crop for the farmers as by doing that, it also provides additional climate resilience.

**Message 3:** All the data that has been collected especially in the solar energy sector sulked be available in the public domain so that researchers and institutions can do something with it.

**Message 4:** Research and academia should be involved in the ongoing discussions and evaluations of solar led technologies as the spirit engineering rests on such discussions.



## Narrative

Climate resilience through solar irrigation, was hosted by the research consortium of International Institute of Sustainable Development (IISD), The Energy and Resource Institute (TERI), and CUTS International. The consortium, with the support of Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and the endorsement of the Ministry of New and Renewable Energy (MNRE), has undertaken research on sustainable implementation of solar irrigation in India, in the backdrop of the water-energy-food nexus, where interventions in one area can cause unexpected impacts on another, as well as on ecosystems. This is particularly concerning since climate change induced rainfall variability is likely to adversely affect agriculture and the impact will be disproportionately felt by poor farmers in developing countries, who may face food insecurity.

In order to achieve the socio-economic objectives of solar irrigation schemes, while minimizing their negative externalities, a guidebook has been developed, with an aim to support state-level policymakers and agencies in implementing solar irrigation schemes sustainably, by maximizing economic benefits while addressing critical questions on social and environmental sustainability.

The thematic track entailed presentation of the guidebook findings and invited experts from South Asia and East Africa to deliberate and discuss ways in which climate resilience in the agriculture sector can be advanced through solar irrigation, with a focus on preventing groundwater depletion in water-stressed regions and supporting marginalized farmers.

**Mr Christopher Beaton, Lead, Sustainable Energy Consumption with IISD** welcomed the participants and speakers, and invited **Mr Nilanjan Ghosh, Senior Advisor, GIZ India**, to deliver the welcome address. **Mr Ghosh** emphasised on exploring pathways for expanding solar irrigation in a way that trade-offs and challenges arising out of the several contributing aspects are managed and the impacts are environmentally sustainable and socially equitable. Decisions regarding deploying a particular technology, such as solar irrigation would require assessments of demand for the technology, market mechanisms, awareness of consumers, regulatory aspects, among others. Targeting of the beneficiaries is also an important factor that could affect the outcome of a programme, such as being inclusive towards small and marginal farmers who are usually impacted by lack of access to resources. The state has an important role to play in ensuring the pathway selected for technology deployment is environmentally and socially just. **Mr Ghosh** concluded his remarks by introducing the guidebook for sustainable implementation of PM-KUSUM scheme developed by the IISD-led consortium.

**Mr Siddharth Goel, Senior Policy Advisor with IISD** presented the findings from the guidebook in detail. It was then followed by a panel discussion on climate resilience through solar irrigation, moderated by **Dr Priya Jadhav, Professor, Indian Institute of Technology Bombay (IITB)**. **Dr Jadhav**, in her introductory remarks emphasised the need for optimising solar pump distribution keeping in mind sustainable development, farmers' income, vulnerable sections of farmers and energy security. A localised approach is needed, where the farmers' needs and external factors such as agro-climatic conditions and cropping patterns are evaluated. Academia could be involved in this, to help achieve the outcomes of the programme, as well as to promote education and training in this field.

**Dr Jadhav** then introduced the panelists, and invited **Ms Lucie Pluschke, East Africa hub manager for Water and Energy for Food, GIZ Kenya** to share her views. According to **Ms Pluschke**, the climate crisis is essentially a water crisis in the context of, and in this regard, resilience is hindered by lack of access to basic services. She drew examples from East Africa where off-grid solar has helped remote and vulnerable communities. Farmers were making use of solar systems for multiple uses in the household and farms, making the most of their investment. She also mentioned how solar irrigation pump providers are moving to holistic services including soil testing, advise on cropping, weather prediction, Internet of Things (IoT), in-house financing to farmers or partnership with Microfinance institutions (MFIs), among others, allowing farmers to access a range of services. However, access to finance remains the biggest barrier to solar irrigation adoption in East Africa, so linking financing with essential services is key to reach poorer communities. Role of women in the electrification of pumps is another important dimension to be explored. Engaging and training women to operate, monitor, and provide maintenance services for solar pumps has been taken up in East African communities successfully.

**Mr J K Jethani, Director Scientist-F, Ministry of New and Renewable Energy (MNRE)** described the solarisation initiatives undertaken by the government for solar pumps. He also explained the pros and cons of different types of solarisation mechanisms such as replacing diesel pumps with solar and feeder solarisation. Challenges mentioned by **Mr Jethani** in terms of solarising irrigation includes utilisation of solar power in lean agricultural seasons,

variability of solar power, issues with solar capacity addition without extra infrastructure for ramping up or down power as per demand, among others. He mentioned how studies were being conducted to address some of these issues. Several innovations were done on the technical side while formulating the PM-KUSUM scheme were also mentioned by him. These include universal solar pump controller, allowing non-agricultural use of solar, and monitoring pump performance through remote monitoring systems. **Mr Jethani** mentioned the scheme progress considerably slowed down due to the COVID-19 pandemic, where the priority of the states shifted to the health sector, resulting in state subsidy contribution to the scheme being affected. There were supply side challenges as well including rise in steel and copper prices, and unavailability of panels due to domestic content requirement being imposed. **Mr Jethani** explained that scheme component-specific challenges were not seen in component B, rather in component A and C. This was mainly due to the fact that farmers receive highly subsidised electricity and it does not make sense for them to go for solar power plants by investing 40% of the cost.

**Mr Shilp Verma, Senior Researcher, Water-Energy-Food-Policies, International Water Management Institute (IWMI)**, talked about the solar pump sizing tool developed by IWMI that takes into account multiple parameters to support the decision of the farmers. The tool will be continuously refined based on updated agriculture data. **Mr Verma** noted that India's water sector problems are strongly interlinked with energy sector issues, which is where solar pumps offer possibilities for solving the water crisis for farmers as well as support climate change mitigation. However, indiscriminate use of solar pumps, that are made available at subsidised rates, could lead to the environmental hazards of over-exploitation of groundwater. This concern is now mainstreamed, and efforts are being made to address this using a nexus approach. **Mr Verma** talked about their pilot in Gujarat where farmers were incentivised to evacuate surplus power produced on their farms to the grid, enabling them to earn a revenue while conserving groundwater. Through their pilot in Bihar, they tried to benefit small and marginal farmers with solar irrigation. There is a need to ensure that the irrigation service markets created through solar pumps, like energy entrepreneurs, are also buyer friendly. **Mr Verma** emphasized on the need for coordination between water and energy departments to solve each other's problems. This may require access to data collected by remote monitoring systems to be analysed and used for formulating solutions.

The final speaker, **Dr Dipal Barua, Chairman, Bright Green Energy Foundation & President, Bangladesh Solar & Renewable Energy Association (BSREA)**, shared experiences from the solar programmes of Bangladesh. He described the challenges of subsidised diesel being made available for diesel pumps in agriculture. He also talked about business models for financing solar pumps not being clear to be replicated successfully. Energy companies involved in deploying solar pumps have not been able to make this venture profitable. However, **Dr Barua** mentioned that farmers have been accepting of solar pumps, even diversifying their crops. He touched upon issues of seasonality of solar and the need for alternatives being explored. **Dr Barua** also talked about appropriate sizing of solar pumps to make it more affordable for small and marginal farmers. Coordination issues were also pertinent in Bangladesh, and talks were on with the government to create a body for coordinating with various departments.

The floor was then opened for discussions moderated by **Dr Jadhav**.

The session concluded with closing remarks by **Dr Debajit Palit, Director, Rural Energy and Livelihoods, TERI**.

## Making Words Count @WSDS 2022

“ The pathways should always be socially equitable and environmentally sustainable. Small and marginal farmers are often left out, due to inequality in terms of access to resources.

**Mr Nilanjan Ghose**  
**Senior Advisor, GIZ India**

“ We want to look at how can we optimize and ensure the role of solar PV pumps in helping the farmer community to become more resilient, in the face of climate change. Academia should also be involved in the ongoing agricultural and solar evaluations as; these are interdisciplinary approaches towards environment and sustainability such that the spirit of engineering rests on it.

**Dr Priya Jadhav**  
**Professor, Indian Institute of Technology Bombay (IITB)**

“ It is very much clear that when we speak of climate crisis, we speak about water crisis. What we are noticing is that the decentralized off-grid solar irrigation systems can really provide services to remote and especially vulnerable communities.

**Ms Lucie Pluschke**  
**East Africa hub manager for Water and Energy, for Food, GIZ Kenya**

“ There is a case for solarization giving clean energy to agriculture that will help in combating the concerns of climate change.

**Mr J K Jethani**  
**Director Scientist-F, Ministry of New and Renewable Energy (MNRE), Government of India**

“ India's energy sector plays a much bigger role in driving solutions to major problems faced by India's water sector. If we can incentivize farmers to use solar energy that they will be producing on their farms judiciously, solar power itself will be remanent of crop for the farmers as by doing that, it also provides additional climate resilience.

**Mr Shilp Verma**  
**Senior Researcher, Water-Energy-Food-Policies, International Water Management Institute**

“ The positive thing is that the farmers are interested to cultivate under the solar irrigation pump and are producing different varieties of crop. Solar irrigation has a lot of positive impact, but we need to have different sizes for different parts of the country, where we also need to create a mechanism how the groundwater can be used efficiently.

**Dr Dipal Barua**  
**Chairman, Bright Green Energy Foundation & President, Bangladesh Solar & Renewable Energy Association (BSREA)**