ENHANCING CAPACITIES ON

# SOLAR POWERED IRRIGATION SYSTEMS

## THE RATIONALE

The current water scenario in India is now fast changing as a result of increasing population and rising demand for irrigation to raise high-yielding varieties of crops for improved food security. Additionally, rapid urbanization and industrialization, electricity generation, and climate change induced erratic rainfall are putting serious stress to water resources. While India has a 15% share of the world's population, it holds only about 4% of the world's freshwater resources and much of these are unevenly distributed. As the agriculture sector consumes 80% of the freshwater in India, micro-irrigation is often promoted by central and state governments as a way to tackle the growing water crisis. Water efficient technologies such as drip and sprinkler irrigation deliver water to farms in far lesser quantities than conventional gravity flow irrigation. To use the existing water resources efficiently without increasing the emission intensity per unit area Solar Power Irrigation Systems (SPISs) could be a solution. In the past, solar pumps were limited to experimental setups because of a higher cost of installation, but now, there are almost 0.23 million in India. With active support from the government by means of subsidy and loan, a mix of improved technical efficiency and falling unit prices, the use of SPIS is an increasing trend.


## KEEPING RELEVANT WITH SUSTAINABLE DEVELOPMENT GOALS

By committing to Sustainable Development Goals (SDGs), India is aiming at a significant progress in the area of clean energy. India's Nationally Determined Contribution (NDC) is promoting clean energy with its largest program of renewable energy capacity expansion. Instead of fossil fuel and other non-renewable energy resources, solar power could be an efficient and abundant source of energy for irrigation. In addition to reducing the emission footprint per unit production, SPISs would reduce the dependency on fossil fuels and provide a positive response to the national economy.

## WATER EFFICIENCY IN INDIA

To increase the irrigation efficiency (more crop per drop), the initiative by the Govt. of India named *Pradhan Mantri Krishi Sinchayee Yojana* (PMKSY – Prime Minister Agriculture Irrigation Scheme) is pushing forward the agenda of improving overall water efficiency. *Kisan Urja Suraksha evam Uthaan Mahabhiyan* (KUSUM), announced by the Government of India in early 2018 focused on moving towards harvesting solar energy.

With a budget of US$ 20 billion KUSUM proposes to add 35-40 GWp of solar generation capacity over the next 10 years. The scheme proposes (a) 10 GWp through decentralized, ground-mounted, MW-scale solar power plants at the tail-end of agriculture feeders, (b) About two million off-grid solar irrigation pumps (SIPs) for individual farmers, and (c) solarization of 1 million grid-connected farmers through grid-connected SIPs.

## BUILDING CAPACITIES TO PROMOTE SPISs

SPISs has become a very important technology in the agricultural space. Solar-powered irrigation can potentially increase the incomes dramatically, particularly for the farmers living in the most rural segments. Therefore, with the promotion of SPISs, a well-planned strategy is required to reach farmers and Agricultural Extension Workers (AEWs) throughout India particularly where large irrigation scheme is absent, primarily rainfed and off-grid.

In addition to subsidizing SPISs, a better outreach is needed to reach the last-mile. By training AEWs and progressive farmers and encouraging the adoption of SPISs by farmers, through information on subsidy, access and benefits of SPISs; the rate of technology adoption will be increased. By realizing the benefits, the farmers in the vicinity will be encouraged and with the technical support and information on access to SPISs, this has opportunity to increase in many ways. Considering this opportunity, capacity building of farmers and AEWs is required in - maintenance, cropping system management and sustainable agricultural practices. This will also reduce dependency for routine technical support on the SPISs providers and make farmers/AEWs more self-reliant.

## OUR PROGRAMMATIC APPROACH

Under this project, we are targeting the farmers of eastern Bihar, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Uttar Pradesh, and West Bengal. From each region/state, approximately 200 farmers/ Agricultural Extension Workers (AEW) will be trained.

| Outline of the Capacity Development Program | | |
|---|---|---|
| Day 1 | Day 2 | Day 3 |
| **Session 1.1:** Registration, training overview, and learning goals and Introduction to solar technology | **Session 2.1:** Schemes and Programs for acquiring SPIS | **Session 3.1:** Efficient use of SPIS and Scaling/Promotion of Solar Irrigation Systems |
| **Session 1.2:** Solar irrigation technologies and application | **Session 2.2:** Selection and Installation of SPIS | **Session 3.2:** Interactive Session with Experts |
| **Session 1.3:** Different models of solar powered irrigation systems | **Session 2.3:** Visit to farmers' field, group discussion with farmers | **Session 3.3:** Open Discussion, Training Feedback, Closing |

# ABOUT BISA

The Borlaug Institute for South Asia (BISA) is a non-profit international research institute dedicated to food, nutrition and livelihood security as well as environmental rehabilitation in South Asia, which is home to more than 300 million undernourished people. The objective of BISA is to harness the latest technology in agriculture to improve farm productivity and sustainably meet the demands of the future. BISA is more than an institute. It is a commitment to the people of South Asia, particularly to the farmers, and a concerted effort to catalyze a second Green Revolution. Established on October 5, 2011 with R&D centers in the districts of Ludhiana (Punjab), Jabalpur (Madhya Pradesh) and Samastipur (Bihar), BISA is an institute built on the legacy of Dr Norman E Borlaug, the father of the Green Revolution, the winner of Nobel Peace Prize (1970) and the recipient of the Government of India's Padma Vibhushan (2006).

Intending to translate the agrarian challenges into opportunities, India collaborated with the International Maize and Wheat Improvement Center (Spanish acronym CIMMYT) and the Indian Council of Agricultural Research (ICAR). An important step was taken towards the path of sustainable food and nutrition security, with the Borlaug Institute of South Asia (BISA) being established as an independent, non-profit research organization with strong international backing. BISA's focus is to develop and provide improved technologies and know-how to farmers faster, more efficiently, and at a larger scale, in collaboration with local and international partner organizations.

BISA was established through an agreement between the Government of India (GoI) and CIMMYT and was bolstered by the globally credible name of Norman Ernest Borlaug. The institution draws on the decades of experience and success by CIMMYT, the Consultative Group on International Agricultural Research (CGIAR) and a global network of partners, in using research to generate tangible benefits for farmers internationally. BISA is supported by a growing number of national stakeholders in South Asia committed to stronger collaborations for accelerated impact, most prominently ICAR. The Government of India provides some special privileges to BISA. Furthermore, state governments provide access to land, facilities, services, and are important stakeholders in defining the impact challenges.

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