Towards Viksit Bharat@2047
Technological Innovations and Policy Options for Eastern Region

भाकृअनुप
ICAR

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Towards Viksit Bharat@2047: Technological Innovations and Policy Options for Eastern Region

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Solar Irrigation Pump Sizing Tool

Period of development: 2021 - 2022

Developers:

SS Mali, PB Shirsath, S Verma and AK Sikka

Background:

In most regions in the 'Global South' solar photovoltaic pumps can offer 1,400-2,200 peak-hours of reliable and affordable green energy for Irrigation with unit costs declining by the day, and significant promotion by state and union government, it is not surprising that solar pumps are rapidly expanding in India. Over the next few years, PM-KUSUM, the Government of India's ambitious campaign is expected to invest 34,035 crores (US$ 4.6 billion) to support the installation of 3.5 million solar irrigation pumps. This can help significantly expand irrigated area; make irrigation more affordable and accessible for smallholders, reduce pressure an electricity utility to supply electricity to farmers, eliminate pump irrigation's carbon footprint, and improve the overall returns from agriculture. Selection of optimally sized solar pumping systems is a challenging task, not least because farmers' demand for energy for irrigation is a complex, derived demand.

Description of the technology:

The solar pumping system sizing involves a set of complex algorithms, each addressing the specific module in the design procedure. Several technical, biophysical and social factors govern the pump set size, which needs to be properly taken care while designing a matching solar pumping system. The Solar Irrigation Pump Sizing (SIPS) tool is aimed at assisting farmers, researchers and technical persons involved in adoption and promotion of solar pumping systems across India. The tool has universal applicability in the sense that it uses nationwide datasets on climate, soils and crops. Wherein users can fetch the required data for the location of interest. It is comprised of four modules viz. crop water requirement module. Discharge estimation module, head loss estimation module and the pump selection module which works on the principles laid down by the Ministry of New and Renewable Energy (MNRE).

Solar Irrigation Pump Sizing Tool

Commercial potential:

The technology can be offered through licensed, or outsourced to the State Agricultural Department, development agencies, FPOs, NGOs, and other beneficiaries.

Impact:

The SIPS tool optimizes solar pump selection by accurately assessing crop water needs, discharge, and head loss, ensuring efficient irrigation and cost savings.

Agro-ecoregions suitability:

All over India

References:

Mali SS, Shirsath PB, Verma S, Sikka AK. 2021. Solar Irrigation Pump Sizing Tool. Version 1.0 User Manual, ICAR, CCAFS-CIMMYT, IWMI and GIZ collaborative project. New Delhi.