

Solar Water Pumps critical to sustainable agriculture in India

Besides being a reliable energy source, solar pumps offer a cost-effective and environment-friendly alternative for irrigation

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India submitted its Long-Term Low Emission Development Strategy to United Nations Framework Convention on Climate Change (UNFCCC), during the 27th Conference of Parties (COP27) held in Sharm-el-Sheikh, Egypt in November last year. The strategy focuses on energy efficiency, reducing carbon footprints and climate resilient approaches toward growth. Besides the trajectory of growth, the current government also thrusts upon the importance of sustainable development and the need to implement renewable energy in key sectors with agriculture being a pivotal one.

According to the Economic Survey 2020-2021, the share of agriculture in India's GDP reached almost 20% for the first time in 17 years. In addition to agriculture's contribution towards GDP, it is also one of the largest sectors providing employment in the country.

India has almost 17.5 lakh/sq km of arable land which is the highest in the world. Majority of the land in India is irrigated using 30 million groundwater pumps out of which, 20 million pumps are connected to the grid, 10 million are run on diesel and a nominal number of 3.9 million pumps are run using solar energy. These pumps have been deployed in the last 5 years and only a handful of states including Chhattisgarh, Rajasthan, Andhra Pradesh, Uttar Pradesh, Haryana and Bihar have implemented these solar powered pumps for irrigation.

At present the solar pumps are deployed either through the central government led PM-KUSUM (Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan) scheme or under some state schemes. The adoption of solar powered irrigation will not only help reduce the burden of over Rs. One Lakh Crore towards electricity subsidy for agriculture but also reduce oil import bill by reducing diesel consumption by 1.38 billion liters per annum as per MNRE. Secondly, the total consumption of diesel pumps in a year comes out to 5.52 billion liter per annum with an equivalent Co2 emissions of 15.4 million tonnes. The government, overall, through solarised irrigation aims to reduce the carbon emissions by 32 million tonnes. Furthermore, it is estimated that off grid solarisation of pumps can help reduce Transmission & Distribution losses by upto 20%, according to a report of World Irrigation Forum.

There are many advantages of using solar powered pumps also to the farmers. Besides offering a reliable energy source to the farmers, solar pumps offer a cost-effective and environment friendly alternative for irrigation. Moreover, it is beneficial for the remote areas in the country where electricity is still a privilege to the farmers.

A recent study conducted by ICA (International Copper Association-India) and IIEC (International Institute of Energy Conservation) in Haryana and Chhattisgarh, revealed that

solar pumps reduce the daily workload of farmers, improves productivity of their farming and increases average income. The study showcased that 36% of the farmers in Chhattisgarh and 14% in Haryana reported an increase of 50% in their annual incomes and 82% of the farmers have confirmed that their earnings have increased by 25% after the installation of solar water pumps.

Currently, one major threat to the agriculture sector in India is the over exploitation of the groundwater. Despite the advancement of technologies, majority of the farmers in India rely on rainfall for the cultivation of their lands. However, due to the uncertainty of rainfall in many parts of the country, the farmers need a robust and reliable system for irrigation. Additionally, on the other hand, electric pumps do not have a fixed time, therefore, electric supply and pumps are switched on throughout the day to compensate for the erratic power supply. As a result, there is an overuse and exploitation of groundwater. Other factors such as lack of storage facilities, growing demand vis-à-vis population, water contamination, etc. have led to the need of a better and optimal use of groundwater. At this juncture, India needs a sustainable solution to ensure a clean and green mechanism for water supply.

While exploitation of groundwater is as much an issue with solar water pumps as it is with grid run or diesel run pumps. This is where the convergence of solar pumps and micro irrigation will help productivity, in line with PM's 'per drop more crop' vision. To promote the use of solar pumps and to curb the exploitation of ground water, the government of India is thrusting upon the use of micro irrigation techniques such as drip irrigation with the introduction of PM Krishi Sinchayee Yojna (PM-KSY) and National Mission on Micro-irrigation. Under the PM-KSY scheme, the government aims to incentivize and provide financial support to the farmers for the proper use of solar water pumps. Moreover, with the use of micro irrigation, farmers will be able to save 20-48% irrigation water, fertilizers by 28.5% and energy by 30.5%, thereby, improving the overall efficiency of agricultural practices.

However, despite the policy push, the government needs to offer creative subsidies and special financing to help the marginal farmers transition to solar water pumps effectively and immediately. The lack of awareness and resistance towards this transition can also be solved through a robust after-sales service mechanism which require regular cleaning of panels with the right materials, checking wires, cleaning pipes, and replacing inverters, etc. While the government is promoting micro-irrigation schemes, the coordination between the Ministry of New and Renewable Energy and Ministry of Agriculture & Farmers Welfare will help India achieve the goal of sustainable farming. Lastly, a nation-wide awareness campaign that includes reiterating benefits of solar water pumps and an end-to-end training to the farmers must be taken up to educate and inform the farmers about the plethora of benefits of using solar water pumps.

The country is on the right path towards achieving its Net Zero mission by 2070 and with the right approach, the agriculture sector will be a major contributor in meeting this objective and benefit all the stakeholders.

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