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Research Paper Economics

Economic Viability of solar irrigation pumps for Sustainable Agriculture in Maharashtra: - Adoption Response by farmers

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ABSTRACT

Present paper investigates the Economic Viability of proposed scheme of solar powered irrigation pumps in Maharashtra where farmers could be used to gather solar energy for existing submersible and diesel pump. The Maharashtra agriculture sector is already facing many problems relating to sustainability. Since the solar pumping systems are integrated with micro irrigation, the inherent multifold advantages of micro irrigation which include huge water saving increase in yields, fertilizer savings and other input cost savings are at the door-step of the farmers. Apart from this, increase in productivity would lead to increase in net income of farmers by 3-4 times as compared to rain fed farming. Small and marginal farmers are deprived of both water and power. Most of them hardly have any irrigation facility. Majority of the small farmers have to depend on rain-fed farming for their livelihood. Their income levels are very low. This innovative model of Integrated Solar Powered Micro Irrigation involving different components such as development of on-farm water source, like farm ponds, solar pumping systems, piping and micro irrigation systems would ensure reliability of water supply and power supply to the small farms in Maharashtra.er for watering their farms.

KEYWORDS : Solar pump, Irrigation, Economic Viability, small farmers.

Introduction:

Water is the most important single requirement for the growth of the plant. Crop can be raised successfully only if water available in adequate quantity. Irrigation is required not only in low rainfall areas and during non-rainy season but also during long break in rains in good rainfall areas. Water requirement have to be met from ground or surface water resources. In India, irrigation works are classified into major, medium, and minor irrigation works. Wells have been use in the country for irrigation from time immemorial. Their number increased as the cultivated area increased. Solar pumps have a unique cost structure with very high capital investment and near-zero marginal cost of pumping. This makes it very similar to electric pump owners who face high flat tariffs with a rationed power supply at zero marginal cost.

For the sustain of agriculture by the government of Maharashtra five lakh solar pumps would be installed in the state in the next five year for agricultural purposes for this Pointing out that almost Rs 8,000 crore had been spent in the last 5-6 years on relief measures alone. relief measures weren't a lasting solution to the drought situation and for setting up solar pumps would bring down the demand for power should reduce. All expert committees had pointed out that Maharashtra had low agricultural productivity and should increase its irrigation facilities. Farmers' tariffs depend on the installed horse power (HP) capacity of their in to ensure lower bills is rampant with a poor payment situation. Agricultural consumers pay just Rs3, 014 annually for a 3 HP pump; the state government pitches in with the balance amount in the Rs14, 098 total bill. For a 5 HP pump, the farmer pays Rs7,669 of the Rs23,336 bill. A large number of pumps in the state are 5 HP ones, from the Maharashtra State Electricity Distribution Company Limited *(MahaVitaran*). This is the government's vision for ensuring that farmers, even in areas where transmission lines cannot be laid, can generate power.

These pumps are available in Market multiple configurations starting from 1 HP to 5 HP the following table showing Capacity of pumps.

Capacity of Solar Pump	Type of Pump	Cost of Pump	Water Table Depth
1.8 kW	Surface/Submersible	2.60 Lakh	Upto 10m
2.2 kW	Surface/Submersible	3.50 Lakh	10-20m
3.0 kW	Surface/Submersible	4.40 Lakh	10-20m
5.0 kW	Submersible	7.50 Lakh	20m onwards upto
7.5 kW	Submersible	9.20 Lakh	100m

Source:SHAKTI (2014).

Subsidy support required for farmers:

The subsidy support can be brought down from 95% to around 85%. Farmer pays only a portion of his Electricity bill savings.

In the budget for 2014–2015, the government of India has launching a scheme of "Solar Power Driven Agricultural Pump Sets" and "Water Pumping Stations" for energizing one lakh pumps with an allocation of Rs. 400 crore. The government of Maharashtra has also launched a scheme To promote the nonconventional energy sources for long term energy security. Under the Central Government scheme, the State Government has undertaken a pilot project of installation of 7,540 solar agricultural pump sets. It is expected that farmers will get assured electricity supply under the scheme.

Starting with the pump, the amount of solar power needed depends on the specific water table depth of a farm; the further the water is from the ground, the more power would be needed to pump that water up for irrigation. This in turn depends on the geography of a particular region; taking the as an example, water level depths vary between 2-5 meters below ground level, so for one hectare of land, an estimated 600 watts of solar required for pumping water.

Objectives:

i. To analyze the without subsidies are economically unviable for farmers as compared to conventional electric and diesel pumps.
ii. To Know the policy and institutional interventions for small and marginal farmers Adapt to solar pumps for irrigation.

Methodology and Data:

In this paper, Researchers use the data both secondary sources and a primary source. Survey questionnaire conducted in 20 villages of solapur district in maharashtra.In each village; the goal was to survey all land-owning farmers. In total, Researcher surveyed 100 individual land-owning farmers across the twenty villages.

Results and Discussion:

The specific water pumping costs are the main criterion for an appraisal of different pumping technologies. These are the costs caused by a pumping system, taking investment costs as well as running costs.

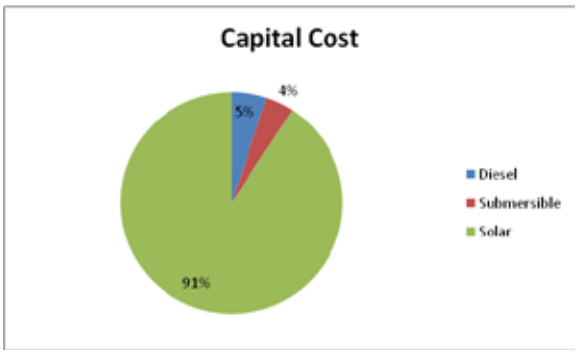
Economics of Solar Water Pumps vs. Diesel-Submersible Irrigation Pumps.

Cost component for installation of solar pump Vs Diesel – Power pump

Type of irrigation Pump	Diesel	Submersible	Solar
Capital Cost	25000	20000	440000

Source: Authors' own analysis.

The government of Maharashtra will be given subsidy after installation system. High cost involved in renewing systems and lack of irrigation water source. Use of this micro-irrigation technology by farmers has been reported 64% very low as com- pared with the potential this technology offers by the Government.



It indicate that without subsidies, solar pumps are economically unviable for small and marginal land holders farmers as compared to conventional electric and diesel pumps. Consequently, most investment decisions tend to favor diesel pumps over Solar pumps systems. That drawback may be compensated, and the farmers' financial risk minimized, by way of appropriate financing and assistance models.

Costs too high:

Few farmers can afford the initial investment. Around 85% of farmers have less than ten hectares of land and they cannot afford agriculture inputs like seed, fertilizers and pesticides, let alone the installation of solar water pumps to irrigate their land.

Conclusion:

The result shows that Small-scale irrigation pumping is one of the more attractive applications for solar power. Solar pumps were unreliable as it depended on weather conditions. That instead, de-centralized solar power plants could be established to provide electricity to farmers. Around 85% of farmers in Maharashtra, whom were marginal and dry-land farmers, would not be able to pay for the pumps. Despite all these challenges and issues that need to be worked out, the notion of meeting electricity to irrigation needs holds immense promise. To date, these initiatives have been pursued separately and have not taken advantage of solar as a common generation source.

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