



Comparative assessment of solar pumps for Irrigation in Palghar district – Maharashtra.

Arun P Mali¹ N. S. Zambare²

¹Dept. of Rural Development, St. Gonsalo Garcia College, Vasai

²Dept. of Environmental Studies, St. Gonsalo Garcia College, Vasai.

Corresponding Author- Arun P Mali

Email: Arunmali1964@gmail.com

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Abstract:

The agricultural sector is becoming a largest industry in all over the world. The increasing demand of agricultural power is now alarming due to the mechanized farming and sharing in industries, innovations in farming practices particularly in the developing nations of the world. Water and electricity are main resources for agricultural production system, which are parallel to the agricultural development. The present research based on the primary and secondary data to determine factors affecting farmers agriculture production because of adoption of solar powered pumps. The study limited to the Palghar District and considered six important factors like government subsidy, beneficiary cost, beneficiaries scheme for product, resource availability, knowledge, Permanence and local environment. The main focus on the reliable source of energy for irrigation water in remote places of Palghar district that are not joined to electricity grid or place with lack of supply of fuel and maintenance service. Use of the solar powered pumps also increases the stability of agriculture in terms of diversified production. It is separate from volatile fuel prices and eco-friendly sustainable source of energy generation. It is easy to install with minimum maintenance cost.

Keywords: Agriculture, adoption of Solar powered pumps, farmers, survey.

1. Introduction:

Energy is a key resource for the overall development of an economy in all over world. India has been endowed with abundant renewable solar energy resource. The country where the use of solar energy has not kept pace because of expanding human population, urban and industrial expansion which have resulted large gap between the demand and supply of electricity. (NBA and RD report, 2022). India is the second largest populated country. As per the consumption of electricity, Maharashtra consumes 12 percent of India's electricity (Rajesh V. Kale & Sanjay D. Pohekar, 2012). Present Indian Irrigation systems are almost entirely dependent on electric and diesel pumps. About 30 million irrigation pumps in use throughout the country, about 70 per cent run on grid electricity, 30 per cent are powered by diesel, and only 0.4 per cent are solar (Agrawal and Jain, 2015;

MNRE, 2014a). Indian agriculture farms are mainly dependent on electricity and traditional pumps that are operated by consuming electricity and diesel. The shortage of power and increase in fuel prices mainly influence the agriculture production and irrigation system. Hence to save the electricity and rapid increase in prices of diesel, Government is implementing schemes and subsidies to farmer for adoption of solar powered pumps in agriculture. (S.S. Chandel, & et.al., 2015). Government subsidies and schemes are positively impact on the use of solar pumps in agriculture (Jain, A. and Shahidi, T., 2018). The main purpose is to provide subsidies and promote the use of solar energy product and create awareness among the people to use non-conventional use of energy resources (Sagar Sanap and et.al., 2019).

2. Study Area:

2.1 Palghar District:

Palghar is the 36th district of the Maharashtra state. Palghar district located between the west coast of the Arabian Sea and the ranges of Sahyadri Mountains. The total Population of Palghar district is around 29,90,116. The district has a total of 8 talukas such as Mokhada, Talasari, Vasai, Vikramgad, Palghar, Dahanu and Wada. The total geographical area in Palghar district is 4,69,699 hectares and the 1008 villages and 3818 sub-villages as well as 477 grampanchayats. In District the literacy rate is 66.65% and Male percentage is 72.23% and female literacy rate is 59.28% (<https://palghar.gov.in/en/about-district/> Accessed on 30/09/2022).

3. Kusum Solar Pump Yojana:

The State Government of Maharashtra launched a scheme to provide a Solar Irrigation Pump to state farmers in order to promote solar energy. Under this scheme, the government provides farmers with a 95 percent subsidy for installing solar pumps in their fields for irrigation purposes.

3.1 Eligibility:

Farmers who want to apply under the Mukhyamantri Solar Pump Scheme must have their own agricultural land & permanent residence in Maharashtra state. Farmers, who have their own agricultural electricity connection, they will not be allowed in this scheme. All the subsidies under the Maharashtra Solar Krishi Pump Yojana will be directly transferred to the beneficiary's accounts. The Solar Water Pumps will be provided only for irrigation purposes under this scheme.

(<https://krishijagran.com/agriculture-world/kusum-solar-pump-yojana-maharashtra-2021-complete-details/>).

4. Water pumping Problem:

Water pumping is one of the easiest and most appropriate by using solar photovoltaic-powered pumping systems. It meets the range of water needs. In Palghar district the remote and hilly locations are more hence, there is no grid

connectivity to provide 3 phase power to run the water pumps for water lifting. Limited areas are having grid connectivity but the voltage is very low to run the water pump. The villagers are running the diesel engine-based water pumps and they spend their whole day to get diesel. Moreover, the distance between the water source and village is also high. Due to improper electricity connectivity, in summer season Palghar district face the issue of water crisis. In this time, women and children in many tribal villages and communities in of Palghar District were required to walk up to 2 km every day to get water for their households. (<http://test.gramoorja.in.s3-website.ap->



south-1.amazonaws.com/solar-pumping.html).

5. Methodology:

The Maharashtra state government under the scheme of KUSUM, the solar water pumps are distributed in 20 districts. It covers major quantities of the drought hit and less grid supply districts. In present study, field visits and surveys are conducted in 8 sub divisions of the Palghar district. Palghar region fall in the “Hot and humid” zone and majority of agriculture is seasonal type of agriculture.



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Field Visit: Beneficiaries of Solar Pump Scheme

The Data is conducted by visiting agriculture farms and interviewing farmers and by observing their fields and irrigation systems. The interviews were conducted with farmers in a semi-structured way, through the questionnaires. We also talked to MSEB

officers and solar pump providers in Palghar district.

5.1 Use of KUSUM Solar Pumps in Palghar District:

Solar energy is a natural source and it can be a revolutionary advancement for the agricultural industry. In addition to conserving the water resources, less dependency on the grid and saving power costs and increase the agricultural production to becoming an additional revenue stream for the farmers.

Sr. No.	Sub Division	3 to 5 HP of beneficiaries	7 HP of beneficiaries
1	Boisar	28	1
2	Dahanu	21	2
3	Jawhar	32	0
4	Mokhada	14	4
5	Palghar	21	0
6	Safala	19	0
7	Talasari	27	1
8	Vikramgad	51	11

Source: mseb office, Palghar

Table No.1 Number Beneficiaries in each Sub division of District

The farmers in Palghar district had the field size of less than 5 acres. Open well and tube well were the primary source of water for irrigation. The major crops include Rice (Paddy), Wheat, Black Gram, and vegetables are cultivated in Palghar district. Most of the farmers used traditional irrigation method to irrigate the agricultural crops and only 10 % used drip irrigation method. In Palghar District there are eight sub divisions of Maharashtra state electricity bord. The major beneficiaries of the Kusum Solar pump yojana are found in Vikram gad sub Division. This Scheme is highly benefited for all sub division of the district. After installation of the solar pumps in Palghar district the large area of land is converted into the agriculture. Apart from the agriculture, this scheme solved the problem of drinking water especially in summer season. The Small land farmers are started their good agriculture practices that supports their household needs.

6. Conclusion:

Since the increase in prices of non-renewable sources of energy, the solar energy is better option in recent days. The main benefit of the solar water pump is that it uses sunlight at no cost. As per geographical region, the Palghar district famers was totally dependent on grid electricity distribution system. The use of solar power pumps for irrigation in a major boost and it solves the issues of drinking water as well as agriculture irrigation. The farmers improved their agricultural production They shifted their seasonal agriculture into regular agriculture because of the use of solar power pumps. It also helps not only to reduce the power consumption from the electricity supply but also saves money for farmers in the long run.

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