International Journal of Research in Commerce and Management Studies

ISSN 2582-2292

Vol. 8, No. 02 March-April; 2026 Page. No. 757-768

To cite this article: Dinesh Kumar R, Gopi Sankar J, Mary Cathrine P, Nivedha V, Shri sidhya S S and Vaishnov T A, (2026). A STUDY ON ADOPTION AND CHALLENGES OF SOLAR PUMPS IN AGRICULTURAL FARMING WITH RESPECT TO COIMBATORE DISTRICT, International Journal of Research in Commerce and Management Studies (IJRCMS) 8 (2): 757-768 Article No. 717 Sub Id 1216

A STUDY ON ADOPTION AND CHALLENGES OF SOLAR PUMPS IN AGRICULTURAL FARMING WITH RESPECT TO COIMBATORE DISTRICT

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DOI: https://doi.org/10.38193/IJRCMS.2026.8255

ABSTRACT

This study focuses on the adoption and challenges of solar pumps in agricultural farming with reference to Coimbatore District. Solar pumps are becoming an important solution for farmers as they reduce dependency on electricity and diesel. The study aims to understand how far farmers have adopted solar pumps, the benefits they receive, and the difficulties they face while using them. Data is collected from farmers to analyse their awareness, usage, and problems. The study also highlights the need for better support from the government and awareness among farmers to increase the usage of solar pumps.

KEYWORDS: Solar Pumps, Agricultural Farming, Government Subsidy, Irrigation, Renewable Energy, Cost efficiency.

INTRODUCTION

Agriculture plays a major role in India's economy, and irrigation is very important for farming. Traditionally, farmers depend on electric or diesel pumps for irrigation. But due to power cuts, high fuel costs, and environmental issues, farmers are now shifting towards solar pumps.

Solar pumps use sunlight to pump water, which makes them eco-friendly and cost-effective in the long run. In a district like Coimbatore, where agriculture is widely practiced, solar pumps can help farmers improve productivity and reduce expenses. However, even though solar pumps have many

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advantages, not all farmers are using them due to various reasons.

OBJECTIVES

- To study the demographic profile of the farmers in Coimbatore District.
- To analyse the adoption of solar pumps in agricultural farming.
- To identify and examine the challenges faced by farmers in adopting solar pumps.

STATEMENT OF THE PROBLEM

Even though solar pumps are beneficial, many farmers in Coimbatore District are not adopting them fully. Some farmers are not aware of the technology, while others face financial problems due to high initial costs. There are also issues like maintenance, technical knowledge, and lack of proper government support.

Because of these challenges, the usage of solar pumps is still limited. So, it is important to study why farmers are not adopting solar pumps and what problems they face in using them.

RESEARCH METHODOLOGY TYPE OF RESEARCH

Research methodology is a systematic way of collecting and analysing data to understand a problem. This study is based on primary data collected from farmers in Coimbatore District.

A structured questionnaire is used to collect information regarding their age, education, farming type, awareness, and usage of solar pumps.

SOURCES OF DATA

This research collects data through the methods of Primary data and Secondary data.

PRIMARY DATA:

Primary data are the data collected by the researcher from the respondents through methods such as surveys, questionnaires for the specific purpose of the research.

SECONDARY DATA:

Secondary data are the date collected from the reports, books, journals, and government sources.

AREA OF STUDY

The Study focuses on the adoption and challenges of solar pumps used in agricultural irrigation among farmers in Coimbatore district. Its mainly examines how solar energy is utilized in farming activities and the factors influencing its usage.

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SAMPLE SIZE

The sample size of the study is to be 122 respondents.

TOOLS USED FOR ANALYSIS

- Percentage analysis
- Frequency Distribution
- Multiple Response Analysis
- Bar and Pie Charts
- Cross Tabulation

FINDINGS

TABLE -1 AGE GROUP OF RESPONDENTS

S.NO	AGE GROUP	NO OF RESPONDENTS	PERCENTAGE
1	Below 30	90	73.8%
2	31 – 45	26	21.3%
3	46 – 60	6	4.9%
	TOTAL	**122**	**100%**

INTERPRETATION:

From the table, it is found that 73.8% (90 respondents) are below 30, while 21.3% (26 respondents) are between 31 – 45 and 4.9% (6 respondents) are between 46 – 60.

TABLE 2 TYPE OF FAMILY

TYPE OF FAMILY	NO. OF. RESPONDENTS	VALID PERCENTAGE

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JOINT FAMILY	52	42.6%
NUCLEAR FAMILY	70	57.4%
TOTAL	122	100%

INTERPRETATION:

The above table states that out of 122 respondents, 52 of the respondents are from joint family and 70 of the respondents are from nuclear family.

TABLE-3 EDUCATIONAL QUALIFICATION

EDUCATIONAL QUALIFICATION	NO. OF. RESPONDENTS	VALID PERCENTAGE
Primary	10	8.2%
Secondary	16	13.1%
Higher Secondary	24	19.7%
Graduate & above	64	52.5%
Total	122	100

INTERPRETATION

The data shows that the majority of respondents are **graduation & above (52.5%)**, and the lowest is no formal education (6.6%)

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TABLE-4 SIZE OF AGRICULTHURAL LAND HOLDING

SNO	SIZE OF LAND	NO OF RESPONDENTS	VALID PERCENTAGE
01	Below 2 acres	80	55.7%
02	2 – 5 acres	25	26.2%
03	5 – 10 acres	8	9.8%
04	Above 10 acres	1	8.2%
	TOTAL	122	100%

INTERPRETATION

The majority of respondents are from the size of land holding **(55.7%),** and the small size land holding within 2 acres.

TABLE-5 MAIN CROP CULTIVATED

CROPS	NO. OF. RESPONDENTS	VALID PERCENTAGE
Paddy	24	19.7%
Coconut	66	54.1%
Sugarcane	18	14.8%
Vegetables	30	24.6%
Banana	24	19.7%
Others	22	18%
Total	122	100%

INTERPRETATION

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The majority of respondents 54.1% are cultivating coconut.

TABLE-6 SOURCE OF IRRIGATION

S NO	SOURCES	NO. OF RESPONDENTS	VALID PERCENTAGE
01	Bore well	58	47.5%
02	Open well	30	24.5%
03	Cannel	16	13.1%
04	Rain-fed	4	3.3%
05	Others	14	11.5%
	TOTAL	**122**	**100%**

INTERPRETATION

The majority of respondents use bore well **(47.5%),** for the source of irrigation.

TABLE-7 METHODS USED FOR PUMPING WATER

S NO	METHOD	NO. OF RESPONDENTS	VALID PERCENTAGE
01	EB Connection	72	59%
02	Diesel	14	11.5%
03	Solar pump	22	18%
04	Combination of above	14	11.5%
TOTAL		**122**	**100%**

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INTERPRETATION

A majority of respondents accept (59%) are using EB Connection as a method for pumping.

TABLE-8 AVERAGE MONTHLY EXPENDITURE

S NO	AMOUNT	NO OF RESPONDENTS	VALID PERCENTAGE
01	Below 1000	40	32.8%
02	1000 – 3000	44	36.1%
03	3000 – 5000	28	23%
04	Above 5000	10	8.2%
	TOTAL	114	100%

INTERPRETATION

A Majority respondents (36.1%) have an average monthly expense of ₹1000 – 3000 for irrigation purpose.

TABLE-9 AVAILABILITY OF EB SUPPLY FOR AGRICULTURE

S NO	DURATION	NO. OF RESPONDENTS	VALID PERCENTAGE
01	Less than 4 hours per day	50	41%
02	4 – 8 hours per day	52	42.6%
03	8 – 12 hours per day	16	13.1%

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04	More than 12 hours per day	4	3.3%
	TOTAL	**122**	**100%**

INTERPRETATION

A large proportion of respondents (42.6%) have availability of EB supply for 4 – 8 hours per day.

TABLE-10 ADOPTION OF EB SUPPLY

S NO	ADOPTION	NO. OF RESPONDENTS	VALID PERCENTAGE
01	Yes	36	29.5%
02	No	86	70.5%
	TOTAL	**122**	**100%**

INTERPRETATION

A Majority of respondents (42.6%) have availability of EB supply for 4 – 8 hours per day.

TABLE 11 YEAR ODF INSTALLATION OF PUMPS

YEARS	PERCENTAGE
Before 2018	11.8%
2018 – 2021	29.4%
2022 – 2024	29.4%
2025	29.4%

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TABLE 12 GOVERNMENT SUBSIDY

GOVERNMENT SUBSIDY	NO. OF RESPONSE	VALID PERCENTAGE
Yes	73	60%
No	49	40%
Total	122	100%

INTERPRETATION

Many installments are evenly distributed across three period: before 2018, 2022 - 2024 and 2025.

RECOMMENDATIONS

1. Financial Support

The government should provide more subsidies and financial assistance to farmers. This will help reduce the high initial cost of solar pumps and encourage more farmers to adopt them.

2. Awareness and Training

Proper awareness programs and training sessions should be conducted to educate farmers about the benefits, usage, and maintenance of solar pumps.

3. Easy Loan Facilities

Banks and financial institutions should provide loans at low interest rates so that farmers can easily invest in solar pump systems.

4. Technical Support

Regular technical support and maintenance services should be made available to farmers to avoid difficulties in operating solar pumps.

5. Group Adoption

Farmers can form groups or cooperatives to share the cost and usage of solar pumps, which will make it more affordable and efficient.

6. Promotion of Benefits

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The long-term benefits like cost saving, reduced electricity dependency, and environmental protection should be clearly explained to farmers.

7. Demonstration Projects

The government should set up demonstration units in villages to show the working of solar pumps, which will build confidence among farmers.

CONCLUSION

The study concludes that solar pumps are a good alternative for irrigation and can help farmers save money and protect the environment. However, adoption is still low due to high cost, lack of awareness, and technical difficulties. To improve adoption, the government should provide more subsidies, training, and support to farmers. Creating awareness about the benefits of solar pumps will also encourage more farmers to use them.

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