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Correlation between profile of solar water pump users and utility perception

¹Gawande KM, ²Khade AH, ³Koshti NR, ⁴More SD, ⁵Shinde VB and ⁶Nagpure SC

¹M.Sc. Student, Department of Agricultural Extension Education, Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

²Assistant Professor & Head of Agricultural Extension Education Section, COA, Dr. PDKV, Akola, Maharashtra, India

³Professor and Head, Department of Agricultural Extension Education, Post Graduate Institute, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, Maharashtra, India

⁴Assistant Professor, University Press Directorate of Agricultural Extension Education, Dr. PDKV, Akola, Maharashtra, India

⁵Assistant Professor, Department of renewable energy, College of Agricultural Engineering and Technology, Dr. PDKV, Akola, Maharashtra, India

⁶Professor (CAS), and Chief Seed Production Officer, Wani Rambhapur, Akola, Maharashtra, India

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Corresponding Author: Gawande KM

Abstract

The present study was carried out in Akola district of Maharashtra state with the help of exploratory design of social research. The objective of study, to study the profile of solar water pump user farmers and to study the relationship between profile of solar water pump users and their utility perception. The results show that, majority of the respondents (45.00 per cent) belonged to middle age group, 36.00 per cent had higher secondary schooling, 40.00 per cent had semi-medium land holding and 96.00 per cent had annual income above Rs. 1, 50, 000. The correlation results indicate that, education, source of information, innovativeness, economic motivation and cropping pattern had positive and highly significant correlation with utility perception. Land holding, annual income and sources of irrigation had positive and significant correlation with utility perception. Whereas, age, occupation and family size showed non-significant relationship with utility perception, indicating that these demographic variables do not directly influence the overall utility perception of solar water pumps.

Keywords: Solar water pumps, correlation, utility perception, profile, PM-KUSUM scheme, MTSKPY

1. Introduction

Agriculture is an important source of livelihood in the western part of the Vidarbha region of Maharashtra. A large number of farmers depend on seasonal crops for their income and farm livelihood. Crop production in this region depends greatly on the availability of assured irrigation. However, irregular electricity supply can make irrigation difficult for farmers. In this situation, solar water pumps provide an alternative source of energy for irrigation.

The Government of India has promoted solar water pumps under the Pradhan Mantri Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM) to support farmers and encourage the use of renewable energy in agriculture [6, 7]. Under Component-B, the scheme supports standalone solar agricultural pumps. 11, 68, 667 standalone solar pumps had been installed under Component-B [7]. Maharashtra has emerged as a leading state in solar irrigation, with 2, 25, 660 solar agricultural pumps installed under PM-KUSUM and MTSKPY [8].

The growing use of solar water pumps shows their increasing role in farm irrigation. However, the usefulness of the technology may be viewed differently by different farmers. Farmers' personal, social, economic and psychological characteristics may influence their utility perception.

Therefore, it is important to understand how the profile of solar water pump users is related to their perception of the technology.

The present study was therefore undertaken in Akola district to study the profile of solar water pump user farmers. The study also examines the relationship between selected characteristics of these farmers and their overall utility perception. Specifically, it analyses how individual socio-economic factors shape the psychological evaluation of clean energy technologies. This exploration highlights the vital connection between a grower's daily circumstances and their acceptance of technical innovations. The findings may help extension workers and concerned agencies in planning better support for solar water pump users.

The present study was framed with objective

1. To study the profile of solar water pump user farmers
2. To study the relationship between profile Solar water Pump users and Utility Perception

2. Methodology

An exploratory research design of social research was used in the present investigation. The sample was drawn from the Akola, Balapur, and Patur talukas of Akola district of

Maharashtra state, on the basis of having the highest concentration and maximum number of installed solar water pumps. Total 9 villages were selected purposively from these three talukas. From these villages, individual respondents were drawn randomly using the proportionate stratified

random sampling technique, thus in total 100 beneficiary farmers constituted the final sample size for the study. Data were collected by personally interviewing the respondents with the help of a pre-tested and structured interview schedule.

Table 1: Distribution of the respondents according to their selected characteristics. (N=100)

Sr. No.	Profile of the Solar Water Pump Users	Percentage (%)
1	Age	
	Young age (Up to 35 years)	21.00
	Middle age (36 to 50 years)	45.00
	Old age (Above 50 years)	34.00
2	Education	
	Illiterate	00.00
	Primary School	02.00
	Middle School	12.00
	Secondary School	20.00
	Higher Secondary School	36.00
	Graduation	30.00
3	Land Holding	
	Marginal (Up to 1.00 ha)	07.00
	Small (1.01 to 2.00 ha)	32.00
	Semi-Medium (2.01 to 4.00 ha)	40.00
	Medium (4.01 to 10.00 ha)	21.00
	Large (more than 10.00 ha)	00.00
4	Annual income	
	Up to 1, 50, 000	04.00
	1, 50, 001 to 3, 00, 000	29.00
	3, 00, 001 to 4, 50, 000	22.00
	4, 50, 001 and above	45.00
5	Occupation	
	Agriculture + Labour	0.00
	Agriculture	62.00
	Agriculture + Allied (Dairy/Goat farming/Poultry, etc.)	18.00
	Agriculture + Business	08.00
	Agriculture + Services	12.00
6	Family Size	
	Small (up to 3)	21.00
	Medium (4-6)	68.00
	Large (above 7)	11.00
7	Cropping Pattern	
	Kharif	10.00
	Kharif + Rabi	39.00
	Summer	14.00
	Annual	20.00
	Perennial/Orchard	17.00
8	Source of Irrigation	
	Open Well	16
	Tube well / Borewell	82
	Pond	2
	Canal	0
9	Source of Information	
	Low	20.00
	Medium	60.00
	High	21.00
10	Innovativeness	
	Low	7.00
	Medium	79.00
	High	14.00
10	Sources of information	
	Low	07.00
	Medium	79.00
	High	14.00
11	Economic Motivation	
	Low	17.00
	Medium	62.00
	High	21.00

The data were tabulated and the statistical tools namely percentage, mean, standard deviation, and Karl Pearson's coefficient of correlation were employed for the interpretation of the findings.

3. Results and Discussion

The data presented in Table 1 show that most of the solar water pump users were from the middle age group (45.00%)^[2, 8, 6]. In education, the highest share had higher secondary education (36.00%), followed by graduates (30.00%)^[2, 3]. A semi-medium land holding was reported by 40.00 per cent of the respondents^[2, 6]. Nearly half (45.00%) had an annual income of Rs. 4, 50, 001 and above. Income is linked with the farmer's purchasing power, risk-taking ability and scope to invest in new farm technologies^[2, 3, 6]. Agriculture was the main occupation of 62.00 per cent of the respondents^[3, 11]. Most farmers (68.00%) had a medium family size^[8, 11]. The Kharif + Rabi cropping pattern was followed by 39.00 per cent of the respondents, while 20.00 per cent grew annual crops^[6, 10]. Tube well / borewell was the main source of irrigation for 82.00 per cent of the farmers^[2, 10]. Regarding sources of information, 60.00 per cent had a medium level^[6, 12]. A large majority (79.00%) also had medium innovativeness^[1, 5], while 62.00 per cent had medium economic motivation^[5, 8]. Overall, the profile shows that most solar water pump users had a moderate level of socio-economic and personal characteristics, with agriculture remaining their main occupation.

4. Coefficient of correlation of profile of solar water pump users with their utility perception

The coefficient of correlation was calculated to assess the relationship between the profile characteristics of solar water pump users and their utility perception. The results are presented in Table 2.

Table 2: Coefficient of Correlation of selected characteristics of Solar pump user farmers with their Utility perception of solar water pump

Sr. No.	Variables	'r values'
1.	Age	-0.120 ^{NS}
2.	Education	0.439 ^{**}
3.	Land holding	0.203 [*]
4.	Annual income	0.237 ^{**}
5.	Occupation	0.125 ^{NS}
6.	Family size	0.106 ^{NS}
7.	Cropping Pattern	0.256 ^{**}
8.	Sources of Irrigation	0.237 [*]
9.	Source of information	0.368 ^{**}
10.	Innovativeness	0.277 ^{**}
11.	Economic motivation	0.266 ^{**}
12.	Age	-0.120 ^{NS}

*Significant at 0.05 per cent level of probability.

**Significant at 0.01 per cent level of probability.

NS – non-significant

The findings presented in Table 2 revealed that among the eleven independent variables, age, occupation, and family size showed a non-significant correlation with utility perception^[11, 12]. Education, cropping pattern, source of information, innovativeness, and economic motivation showed a positive and highly significant correlation with utility perception at 0.01 per cent level of probability^[1, 8, 11].

^[12]. Land holding, annual income, and sources of irrigation showed a positive and significant correlation with utility perception at 0.05 per cent level of probability^[8, 12]. A better cropping pattern may increase cropping intensity, crop output and farm income, which may improve the perceived usefulness of solar water pumps. Thus, the findings indicate that higher levels of education, land holding, annual income, cropping pattern, sources of irrigation, source of information, innovativeness, and economic motivation were associated with higher utility perception among solar water pump users.

5. Conclusion

It was concluded that most of the solar water pump users were middle-aged, educated up to higher secondary level and belonged to the semi-medium land holding category. A higher proportion had an annual income of Rs. 4, 50, 001 and above, while agriculture was the main occupation. Most respondents had medium family size, followed a Kharif + Rabi cropping pattern and mainly depended on tube well / borewell for irrigation. The majority also had medium levels of information source use, innovativeness and economic motivation. Education, cropping pattern, source of information, innovativeness and economic motivation showed a positive and highly significant relationship with utility perception, whereas land holding, annual income and sources of irrigation showed a positive and significant relationship. Age, occupation and family size did not show a significant relationship. Overall, the findings suggest that farmers with better education, information access and willingness to try new practices had higher utility perception of solar water pumps. Hence, extension agencies should conduct awareness campaigns to explain the importance and utility of solar water pumps, along with clear information about available subsidies and government schemes, so that farmers can better understand and adopt solar water pumps.^[1]

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