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Factors influencing the adoption of solar pumps by the farmers in Jodhpur district of Rajasthan

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Abstract

The research study was conducted in Jodhpur district of Rajasthan. There are total seven tehsils in Jodhpur district of Rajasthan, out of which, two tehsils namely Osian and Balesar were selected on the basis of maximum number of installed solar pumps. Ten villages from each selected tehsils were selected on the basis of maximum number of solar pumps beneficiaries. One hundred twenty five (125) respondents were selected from twenty selected villages these were having maximum number of solar pumps selected for study. In the research investigated the social economic status of the respondents, was measured for selected 10 independent variables were selected namely age, caste, education level, size of land holding, family type, social participation, annual income of family, occupation, extension contact and mass utilization were identified as the important variables which might have influence the knowledge and adoption of solar pumps of the respondents. This study shown that although, adoption of solar pumps were positively and significantly related with size of land holding, social participation, annual income of family, occupation, extension contact and mass media utilization.

Keywords: solar pumps, adoption, independent variables, mass media, social contact, panels and land holding

Introduction

Agriculture need as energy important input production. Solar energy is the origin for all forms of energy which can be used either through the thermal route and photovoltaic route. Solar energy can be used directly for heating, lighting homes for generating electricity, hot water heating for diary operations, solar cooking, industrial and commercial uses. Solar pumping robust fusion in rural development, available technology and ecological conservation available technology for increasing living standards, farmers income and improving the living conditions of women by reducing labour intensity and reducing poverty.

The Jawaharlal Nehru National Solar Mission was launched on the 11th January, 2010 by the Prime Minister Govt of India. Rajasthan provides one of the most attractive destinations for harnessing solar energy for various purposes, especially for irrigation on account of largest number of sunny days (325) in a year and one of the best solar insolation (6-7 kWh / m² / day). To harness the huge amount of solar energy, the Government of Rajasthan had installed 14 solar pumps on experimental basis in 2008-2009. The state had formulated an integrated solar water pump scheme in 2011-12 by combining various schemes of central and state governments (Singh *et al.* 2017) [7].

According to Ministry of New and Renewable Energy (MNRE) Rajasthan has potential of 142 GW of electricity from solar energy. Solar plant of 4,637 MW has been commissioned in state up to December 2019. Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (PM-KUSUM) Yojana was launch by the Government of India to increase the income of farmers and provide sources of irrigation for agricultural sector. Any farmers, group of farmers, panchayats and cooperatives can apply under KUSUM Yojana to get benefits of solar pumps. Govt provides 60 % subsidy to farmers and 30 percent of total cost by govt as loan and remaining 10% contributes by the beneficiary.

Methodology

The study was conducted in Jodhpur district of Rajasthan. There are total seven tehsils in Jodhpur district of Rajasthan, out of which, two tehsils namely Osian and Balesar were selected on the basis of maximum number of installed solar pump. Ten villages from each selected tehsils were selected on the basis of maximum number of solar pumps beneficiaries.

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125 beneficiaries were selected from twenty selected village by these were having maximum number of solar pumps were selected for research study (Sources: 2011-19 Department of Agriculture and horticulture, Paota, Jodhpur, Rajasthan). Data and information were collected by investigator through personal interview technique with the help of interview schedule. Thereafter, data were tabulated and various statistical measures viz. per cent, mean, mean per cent scores, standard deviation, ranking and correlation were used to arrive at specific inference.

Results

Relationship between selected independents variables and adoption of solar pumps by the farmers

The association between adoption of solar pumps and the selected independent variables viz., Age, caste, educational level, size of land holding, family type, social participation, Annual income of farmers, Occupation, extension contact, mass media and their level of adoption of solar pumps of respondents were tested with the help of “correlation coefficient (r)” and the results have been presented in Table 1.

Table 1: Relationship between selected independents variables and adoption of solar pumps by the farmers

n = 125

S. No.	Independent variables	Correlation coefficient	5%	1%
1.	Age	-0.186	*	-
2.	Caste	0.026	-	-
3.	Educational level	0.219	*	-
4.	Size of land holding	0.279	*	**
5.	Family type	-0.025	-	-
6.	Social participation	0.269	*	**
7.	Annual income of family	0.199	*	-
8.	Occupation	0.261	*	**
9.	Extension contact	0.189	*	-
10.	Mass media utilization	0.213	*	-

**= significant at 1% level, *= significant at 5% level, NS = non-significant

The value of coefficient correlation outfit in table 4.4.1 clearly shows that level of adoption of solar pumps were directly positively and significantly related at 5 % level of significantly with size of land holding, social participation, annual income of family, occupation, extension contact and mass media utilization.

Discussion

The association between adoption of solar pumps and independents variables viz., Age, caste, Education level, Size of land holding, social participation, annual income of farmers, occupation, extension contact, mass media utilization and their level of adoption of solar pumps of respondents were tested with help of “correlations coefficient” and the result.

The value of coefficient correlation outfit in table 1 clearly shows that level of adoption of solar pumps were positively and significantly related at 5 % level of significantly with size of land holding, social participation, annual income of family, occupation, extension contact and mass media utilization It might be concluded that the adoption of solar pumps was affected by the size of land holding. Increase the land size the farmers to take more land under irrigation by using solar

pumps. Social participation of farmers have exerted on influence on adoption of solar pumps (Finding kumar and godara 2017). Income of farmers might have increased their capacity to purchase and install the solar pumps at their farm to increase the agriculture production hence the adoption of solar pumps increased (Finding Zhang *et al.* 2011). Occupation, extension contact and mass media affected the adoption of solar pumps due to the facts that agriculture is the part of life and other occupational activities might have increased more interaction towards new technologies (Finding Naseem and Imran 2016), extension contact provided more and complete information about new technologies and mass media increased exposure of farmers towards technologies which have increased adoption of solar pumps.

There was negative and significantly relationship between age and level of adoption of solar pumps due to the facts that age of respondents not directly affected to adoption of solar pumps because each farmers desire to use solar pumps (Finding Hosseini and Soltani 2011 and Shen *et al.* 2015) [8]

There are positively and non-significant relationship between caste and level of adoption of solar pumps at 5% level of significance (Finding Krishna *et al.* 2019) and family type negative with non-significant relationship with level of adoption of solar pumps (Finding Mills and Schleich 2012).

Hence, the null hypotheses $H_{01.1}$, $H_{01.3}$, $H_{01.4}$, $H_{01.6}$, $H_{01.7}$, $H_{01.8}$, $H_{01.9}$ and $H_{01.10}$ were rejected and alternate hypotheses were accepted. It means that caste and education level did not have a significant effected on the level of solar pumps.

These finding are conformity with the finding of research conducted by Raghuwanshi *et al.* (2020) [6] that level of adoption of solar energy technology were positively and significantly related at 5 % level of significance with education, land holding, social participation, annual income, occupation, extension contact and mass media utilization. There was positively and non-significant relationship between age and size of family and their level of adoption of solar energy technology where as caste posses negative and non significant relationship with the level of adoption of solar energy technology.

Hence, the null hypotheses $H_{01.3}$, $H_{01.4}$, $H_{01.6}$, $H_{01.7}$, $H_{01.8}$, $H_{01.9}$ and $H_{01.10}$ were rejected and alternate hypotheses were accepted.

Conclusion

The study has shown that although, adoption of solar pumps has a direct relation with size of land holding, family type, social participation, annual income of family, occupation, extension contact and mass media utilization.

The study has suggested the need of enhancing financial inducement to ensure faster adoption of solar energy use in water extraction. To change the attitude of the farmers and motivate them to adopt this solar technology, the field functionaries should organize field trips to show the live demo of the technology and remove the doubt of the respondents regarding this solar technology. There is need to develop location – specific strategies, training, demonstration and programmes. It was observed that most of the adopted farmers had medium level of knowledge. So it is suggested that extension functionaries should make efforts to organize demonstration of the technology, provide appropriate literature and training about the new technology and procedure of availing the subsidy provided by Government. The investigator has taken the age, caste, education level, size of land holding, size of family, social participation,

occupation, annual income, extension participation and mass media participation as the independent variables which may be considered by the organization before execution of the solar pumps.

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