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Knowledge and Association of Solar Pump Users Regarding Vegetable Production Technology in Jaipur Rajasthan

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ABSTRACT

Rajasthan has outstanding solar radiation in India and a solar water pump is a great investment that makes money in the long run. The present study was conducted in Jaipur district with 120 beneficiary and non- beneficiary farmers regarding knowledge about the improved practices of vegetable production possessed by solar pump users during 2020. The practices namely- selection of improved seed variety, time of sowing, seed treatment, organic and chemical manure application of irrigation at the right time, intercultural operations, weed management, insect and disease management etc. were found as popular practices. The results of the study revealed that majority (95%) of beneficiary fall into the category of medium to high level of knowledge against 80 per cent of the non-beneficiary were falling under low to medium knowledge level. It can be summarized that the variables viz., education, occupation, annual family income, size of land holding, farm mechanization, utilization of information, contact with extension agents etc. were found significant with their knowledge of vegetable production technology. The results also depicted that age was found in non-significant relationship with knowledge of vegetable production technology. There was a significant association between knowledge of vegetable production technology of non-beneficiaries with their occupation, size of land holding and contact with extension agents. In case of age no association was found between age and knowledge of vegetable production technology for both the beneficiary and non-beneficiary farmers.

INTRODUCTION

A solar energy-powered water pump is operated on the electricity that is generated by solar photovoltaic modules. It is equivalent to the input and output energy of the solar-pump panels and in addition available voltage security. As per the farmers who set up any of the micro irrigation systems (Drip irrigation, Mini sprinkler or Sprinkler) on their fields are only eligible under the solar-pump subsidy scheme. India's irrigation is mostly groundwater well based and India has the world's largest groundwater well equipped irrigation system (about 39 million hectares, or 67 per cent of its total irrigated). Around 84 per cent of the total available water is consumed for irrigation in the country and it is crucial to provide timely and adequate water supply to ensure improved agricultural productivity (NITI Aayog, 2015; Dhawan, 2017). Since energy is coming from the sun, your utility bill will be drastically reduced. Solar pump systems do not have a large operating cost, since they are powered naturally by the sun. You don't need to pay a ton of money every time you turn your pump on. A solar water pump is a great investment that will make you money in the long run. Solar water pumps are also easier to maintain than other pump power sources. These pump systems can run for years

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without needing any maintenance. There are not many mechanical components, making them less likely to break down and require new parts or repairs. Many of the Advanced Power customers have run their solar pump systems for more than 10 years without needing any maintenance. One of the biggest benefits of solar water pumps is the fact that you can use them anywhere. Even if you have a well on your property, miles from any source of power, you will still be able to pump water from your well by using solar energy. This means that you don't have to spend thousands trying to get a source of power out to your well location or find an alternative source of power. Solar is a reliable way to power your water pumps in remote areas.

In India, irrigation is majorly dependent on diesel and electric pumps with nearly 21 million agricultural electricity connected pumps (70%) and more than 8 million diesel irrigation pump sets (30%) (IEEFA, 2018). At present, only 0.4 per cent (around 2 lakh) of solar water pumps has been installed in the country (MNRE, 2018 and IEEFA, 2018). For agriculture in India grid electricity is given at tremendously short tariffs. In most cases, flat rates are paid depending on the pump classification (Tanwar, 2016). There is a small market for non-subsidized pumps that witnesses demand from Non- Government Organizations and Institutions. Rajasthan has outstanding solar radiation in India and is one of the world's best. A solar pump along with a micro-irrigation system scheme is ongoing in Rajasthan from the year 2010-11. The Government of Rajasthan launched the scheme in the year 2011 with a sum of Rs. 515 crore to provide subsidized solar irrigation system to the state's 10,000 farmers within three years. Presently, this scheme in Rajasthan was initiated to provide financial support to horticulture farmers who utilised drip irrigation and farm ponds

METHODOLOGY

The research was conducted purposively in Jaipur district of Rajasthan, during the year 2020 because this district stands first in number of beneficiaries under solar pump set as well as in the area under vegetable production. In total there are 13 blocks in Jaipur district, out of which, two blocks i.e., Govindgarh with an area of 269.8 acre and Jalsu with an area 210.8 acre, were selected. From each selected block, 30 beneficiary farmers and 30 non- beneficiary farmers (60 farmers from both blocks) of solar pump set were chosen randomly with the help of data gathered from the office of Deputy Director of Horticulture, Govt. of Rajasthan, Jaipur. The information was collected by personal interview method with the help of structured schedule.

The knowledge for the purpose of present study was operationalized as the amount of understood information about improved vegetable production practices possessed by the farmers. The questionnaire for improved vegetable production practices was prepared. As per the responses of respondent regarding knowledge of each component of technology was given 3 for high, 2 for medium and 1 for low or no knowledge of each practice. The total score obtained by the respondents from all the practices was used to calculate the knowledge index of each respondent. The Knowledge Index calculated from the following formula:

$$\text{Knowledge Index} = \frac{\text{Obtained knowledge score}}{\text{Obtainable knowledge score}} \times 100$$

RESULTS AND DISCUSSION

Knowledge about vegetable production technology

Individual aspect-wise extent of knowledge of vegetable growers was worked out. For this mean per cent score were calculated. The results of the same have been presented in Table 1.

As observed regarding selection of improved seed variety, maximum number of the respondents had medium knowledge. In relation to time of sowing, 65.00 per cent of the respondents had high knowledge. Regarding rate of seed treatment, medium knowledge of 43.34 per cent, while high knowledge (46.66%) and low knowledge (10.00%) was found. Regarding recommended dose of organic and chemical manures, maximum number of the respondents (46.66%) was in medium knowledge. Medium knowledge of application of irrigation of 38.34 per cent of the respondents was observed whereas for intercultural operations, medium knowledge of 51.66 per cent of the respondents, for weed management medium knowledge of 60.00 per cent, for insect and disease management medium knowledge of 55.00 per cent and for harvesting, medium knowledge of 53.33 per cent was observed. Similar findings were obtained by Harishankar et al., (2014); Ghintala & Singh (2013); Jethi et al., (2019); Kaur & Singh (2019).

Table 2 shows that medium knowledge level of 41.66 per cent respondents, followed by high knowledge level (33.34%) and low knowledge level of 25.00 per cent respondents. In case of beneficiaries of scheme, maximum number of the respondents, i.e., 48.34 per cent belonged to the medium level of knowledge, followed by 46.66 per cent of the respondents had high level of knowledge and 5.00 per cent had low level of knowledge. On the other hand, in case of non-beneficiaries, maximum number of the respondents,

Table 1. Practices wise knowledge of vegetables production technology under solar pump set scheme

Improved agricultural practices	Beneficiaries Knowledge			Non-beneficiaries Knowledge		
	High	Medium	Low	High	Medium	Low
Selection of improved seed variety	24 (40.00)	31 (51.66)	05 (08.34)	11 (18.34)	21 (35.00)	28 (46.66)
Time of sowing	39 (65.00)	21 (35.00)	00 (00.00)	15 (25.00)	14 (23.34)	31 (51.66)
Seed treatment	28 (46.66)	26 (43.34)	06 (10.00)	13 (21.66)	17 (28.34)	30 (50.00)
Organic and chemical manures	27 (45.00)	28 (46.66)	05 (08.34)	12 (20.00)	20 (33.34)	28 (46.66)
Application of irrigation	34 (56.66)	23 (38.34)	03 (05.00)	14 (23.34)	14 (23.33)	32 (53.33)
Intercultural operations	27(45.00)	31 (51.66)	02(03.34)	10 (16.66)	26 (43.34)	24 (40.00)
Weed management	23 (38.34)	36 (60.00)	01 (01.66)	10 (16.66)	27 (45.00)	23 (38.34)
Insect and disease management	24 (40.00)	33 (55.00)	03 (05.00)	11 (18.34)	25 (41.66)	24 (40.00)
Harvesting	26 (43.30)	32 (53.33)	02(03.34)	12 (20.00)	25 (41.66)	23 (38.34)

Table 2. Categorization of respondents according to their level of knowledge

Category	Beneficiary (n=60)	Non-beneficiary (n=60)	Total (n=120)
Low (Upto 14)	03 (05.00)	27 (45.00)	30 (25.00)
Medium (Between 15-22)	29 (48.34)	21 (35.00)	50 (41.66)
High (Above 22)	28 (46.66)	12 (20.00)	40 (33.34)

i.e., 45 per cent belonged to the low level of knowledge category, followed by 35.00 per cent of the respondents with medium level of knowledge and 20.00 per cent of the respondents fell into high level of knowledge category.

Association between profile and knowledge of vegetable production technology

Association of beneficiaries and non-beneficiaries' vegetable growers of solar pump set scheme with their knowledge of vegetable production technology were worked out and presented in Table 3. In case of non-beneficiaries profile *viz*., education, annual family income, farm mechanization, utilization of information, economic motivation and scientific orientation were found significant at 0.01 level of probability while occupation, size of land holding and contact with extension agent were found significant at 0.05 level of probability with their knowledge of vegetable production technology, whereas age was found in non-significant association.

In case of beneficiaries also the profile *viz*., education, annual family income, farm mechanization, utilization of information, economic motivation and scientific orientation were found significant at 0.01 level of probability while occupation, size of land holding and contact with extension agent were found significant at 0.05 level of probability with their knowledge of vegetable production technology, whereas age were found not significant association. In case of age the calculated chi-square value was less than its corresponding tabulated value at 4 degree of freedom. Thus, the null hypothesis "there is no association between age of beneficiaries & non-beneficiaries and knowledge of vegetable production technology" was accepted and hence, it was calculated that the knowledge of vegetable production technology did not depend upon the age of the beneficiaries & non-beneficiaries farmers. The results are in accordance with the results obtained by Nasrin et al., (2017); Ojha et al., (2020); Suman (2013); Gupta et al., (2020).

CONCLUSION

Among the beneficiary respondents knowledge about the improved practices of vegetable production namely selection of improved seed variety, time of sowing, seed treatment, organic and chemical manure, application of irrigation at the right time, intercultural operations, weed management, insect and disease management and harvesting were found to be popular. It can be summarized that the variables *viz.*, education, occupation, annual family income, size of landholding, farm mechanization, utilization of information, contact with extension agent, economic motivation and scientific orientation were found significant with their knowledge of vegetable production technology. The age was having non-significant relationship with their knowledge of vegetable production technology. It could, therefore be suggested that trainings be organized as well as promotion of the ongoing schemes should be conducted on the foregoing aspects coupled with method demonstration, in combination with other extension methods. Good governance activities have to be undertaken to promote the knowledge of the scheme.

REFERENCES

Dhawan, D. V. (2017). Water and Agriculture in India. *OAV – German Asia-Pacific Business Association, German Agribusiness Alliance*.

Ghintala, A., & Singh, K. (2013). Knowledge and Adoption of Sprinkler Irrigation System by the Farmers of Banaskantha District of North Gujrat. *Indian Journal of Extension Education and Rural Development, 21*, 26-29.

Gupta, B. K., Mishra, B. P., Singh, V., Patel, D., & Singh, M. P. (2020). Constraints faced by vegetable growers in adoption of IPM in Bundelkhand Region of Uttar Pradesh. *Indian Journal of Extension Education*, *56*(4), 92-97.

Harishankar, S., Kumar, R., Sathish, Sudharsan, K. P., Vignesh, U., & Viveknath, T. (2014). Solar Powered Smart Irrigation System. *Advance in Electronic and Electric Engineering*, *4*(4), 341-346.

IEEFA. (2018). India: Vast Potential in Solar-Powered Irrigation, USA: Institute for Energy Economics and Financial Analysis.

Jain, A., & Agrawal, S. (2018). Financing Solar for Irrigation in India: Risks, Challenges, and Solution, New Delhi: Council on Energy, Environment and Water (CEEW).

Jethi, R., Roy, M. L., Mukherjee, A., Chandra, N., & Joshi, P. (2019). Knowledge level of vegetable growing farmers in hills of Uttarakhand: A comparative study. *A Journal of Multidisciplinary Advance Research, 8*(2), 1-8.

Table 3. Association of knowledge of beneficiaries and non-beneficiaries with profile

Variables	Beneficiaries		Non beneficiaries	
	χ^2 value	d.f.	χ^2 value	d.f.
Age (X_1)	5.28^{NS}	4	6.37^{NS}	4
Education (X_2)	23.56**	8	24.28**	8
Occupation (X_3)	13.67*	6	14.56*	6
Annual family income (X_4)	15.32**	4	14.78**	4
Size of landholding (X_5)	14.48*	6	15.26*	6
Farm mechanization (X_6)	19.58**	4	18.68**	4
Utilization of information (X_7)	16.72**	4	15.42**	4
Contact with extension agent (X_8)	10.28*	4	11.58*	4
Economic motivation (X_9)	12.56**	4	11.82**	4
Scientific orientation (X_{10})	14.56**	4	13.24**	4

^{NS} Non significant **Significant at 0.01 level of probability *Significant at 0.05 level of probability

Kaur, S., & Singh, G. (2019). An overview of knowledge level of the farmers about recommended cultural practices for vegetable production in north India. *Asian Journal of Agricultural Extension, Economics & Sociology*, *36*(2), 1-5.

Kumar, A., Bareth, L. S., Yadav, J. P., & Ghaswa, R. (2021). Effectiveness of National Mission on Oilseed and Oil Palm on adoption of mustard crop interventions. *Indian Journal of Extension Education*, *57*(3), 109-111.

MNRE. (2018). New scheme for farmers for installation of solar pumps and grid connected solar power plants.

Nasrin, M., Borua, S., Borua, R., & Deka, B. (2017). Knowledge level of farmers on recommended cultivation practices of off-season vegetable crops under low cost polyhouse technology in Assam. *Asian Journal of Agricultural Extension, Economics & Sociology*, *21*(4), 1-6.

NITI Aayog GOI. (2015). Raising agricultural productivity and making farming remunerative for farmers.

Paine, A. K., Saha A., Tiwari, P. K., Singh, D. D., & Gupta, R. K. (2021). Constraints perceived by the vegetable growers towards excessive use of chemicals. *Indian Journal of Extension Education*, *57*(3), 45-47.

Suman, R. S. (2013). Knowledge extent of farmers about vegetable production technologies. *Agriculture Update*, *8*(3), 368-370.

Tanwar, S. K. (2016). Scope of solar pump set for irrigation. MBA Project report, submitted to the SKRAU, Bikaner.

Yadav, K., Yadav, J. P., & Bijarniya, S. (2019). Adoption of drip irrigation system by the farmers in Jhotwara panchyat samiti of district Jaipur, Rajasthan. *Indian Journal of Extension Education*, *55*(1), 142-144.