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Relationship between Socio-Economic Characteristics of Farmers and Adoption of Polyhouse Cultivation Technology

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ABSTRACT

Polyhouse or greenhouse is a structure made-up of translucent materials like polyethylene or shade nets, where the plants are grown under controlled climatic conditions, both considered identical, but the greenhouse is used more commonly in India. The knowledge for the present study was operationalized as the level of adoption about polyhouse technology in the Jaipur division of Rajasthan. Jaipur and Alwar districts were selected because they have a maximum number of polyhouse farmers. Out of both districts, the first three tehsils having a maximum number of polyhouse farmers was selected purposively. In this way, 160 respondents from the Jaipur district and 60 respondents from the Alwar district was selected. Thus, the total sample size was comprised of 220 farmers. The present study showed that education, annual income, sources of farm information, extension contacts and economic motivation had significant correlation with the adoption of farmers at 1 per cent level of significance ($P \leq 0.01$), followed by age had significant correlation with the adoption of farmers at 5 per cent level of significance ($P \leq 0.05$), and remaining independent variables like caste, occupation, land holding and farm mechanization had non- significant correlation with the adoption of farmers.

Key Words: Adoption, Cultivation, Farmers, Independent variables, Polyhouse, Technology.

INTRODUCTION

India is the predominantly an agriculture-based country where majority of the people are engaged in agriculture. It plays a pivotal role in respect of socio-economic transformation of people in general and rural people in particular. Protected cultivation is a promising technology and becoming popular all over the world. There are 115 countries in the world which have undertaken greenhouse vegetable cultivation commercially. India is the second largest producer of vegetables in the world i.e., next to China. Total vegetable production of India is 191.769 million tons of its total area 10.353 million ha (as per NHB database, 2019-20). Polyhouse or greenhouse is a structure made-up of translucent materials like polyethylene or shade nets, where the plants are grown under controlled climatic conditions, both considered identical, but the greenhouse is used more commonly in India. The size of the structure can differ from small shacks to big-size buildings as per the need. Polyhouse is a type of greenhouse, or a smaller version of the greenhouse, where polyethylene is used as cover. In India, farming and nursery are highly dependent on open field seed production because of many reasons like; low economic status of farmers, lack of technical know-how, etc. Seedlings grown under natural conditions are susceptible to the sudden changes in climatic conditions, affecting both their quality and yield. Protected cultivation involves protection from adverse environmental conditions and offers distinct advantages of quality, productivity and favourable market prices to the growers . Problems of crop pests and diseases can also be minimized through polyhouse cultivation.

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Table1. Relationship between selected independent variables of farmers with adoption about PCT.

Sr.No	Independent variable	Correlation Coefficient (r)		
		Jaipur District n_1=160	Alwar District n_2=60	Overall (n=220)
1.	Age	0.057	0.111	0.134*
2.	Caste	0.059	0.071	0.068
3.	Education	0.165*	0.326*	0.242**
4.	Occupation	0.151	0.082	0.128
5.	Annual family income	0.155*	0.292*	0.192**
6.	Land holding	0.103	0.041	0.048
7.	Farm mechanization	0.089	0.013	0.115
8.	Sources of farm information	0.162*	0.275*	0.257**
9.	Extension contacts	0.168*	0.262*	0.263**
10.	Economic motivation	0.196*	0.321*	0.244**

** Significant at 1 per cent level of significance ($P \leq 0.01$)
* Significant at 5 per cent level of significance ($P \leq 0.05$)

Though India is the second-largest producer of vegetable crops globally, its vegetable production is slightly less than the required quantity if a balanced diet is to be provided to every individual. The per capita recommendation of vegetables is 400g/d, but the availability of vegetables per capita is 393.76g/ per person per day (Horticulture Statistics, 2018, Government of Rajasthan, Jaipur). Protected cultivation can be defined as a cropping technique where in the micro climate surrounding the plant body is controlled partially/fully as per the requirement of the plant species grown during their period of growth (Chandra 2001). Polyhouse technology is the unique technique of providing favourable conditions to the plants. In spite of many challenges, man has learnt how to grow plants under natural environment. Even in extreme adverse climatic conditions where no crops can grow, man has developed a method of growing high value crops which is called as Polyhouse Technology. Protected Cultivation technology is a relatively new technology for our country. The total area covered under protected cultivation in our country is approx, 70,000 ha (Choudhary and Verma, 2018). the objective was to study relationship between socio-economic characteristics of farmers and adoption of polyhouse cultivation technology.

MATERIALS AND METHODS

The present study was conducted in the Jaipur division of Rajasthan in 2023. Jaipur division was purposively selected, as it stands first among several beneficiaries under polyhouse cultivation technology. The second stage of the sampling process involved the selection of districts from the divisions. Jaipur (355) and Alwar (147) districts were selected purposively based onthe maximum number of farmers using polyhouse technology as compared to other districts of the Jaipur division. Jaipur and Alwar districts comprised of 21 and 14 tehsils, respectively. Out of both districts, the first three tehsils with a maximum number of farmers with polyhouses were selected purposively. Thus, the total sample size was comprised of 220 farmers.The information was collected through a personal interview with the help of a pre-tested structured schedule. The knowledge for the present study was operationalized as the level of adoption about polyhouse cultivation technology.The programme included all the major aspects about polyhouse vegetable cultivation. This was measured by scale developed by Singh

(2001), which was used with slight modifications) as suggested by the experts. The farmers' adoption of polyhouse cultivation was measured by asking various questions related to PCT (Polyhouse Cultivation Technology). The collected data were analyzed by using Coefficient of correlation (r).

Correlation coefficient

The Correlation Coefficient ('r' value) was used to measure the relationship between the knowledge of farmers about Polyhouse Cultivation Technology and selected independent variables *viz.,* age, caste, education Occupation, annual income, land holding, farm mechanization, sources of farm information,extension contacts and economic motivation dependent and independent variables.The Correlation Coefficient between two groups was calculated by using the following formula: -

$$r = \frac{\sum (XY) - \frac{\sum X \sum Y}{n}}{\sqrt{\left[\sum X^2 - \frac{(\sum X)^2}{n}\right]\left[\sum Y^2 - \frac{(\sum Y)^2}{n}\right]}}$$

Where r = Correlation Coefficient

X = Independent variable

Y = Dependent variable

n = Total number of respondents

RESULTS AND DISCUSSION

The relationship between the adoption of the farmers about polyhouse cultivation technology and independent variables viz., age, caste, education, occupation, annual family income, land holding, farm mechanization, sources of farm information, extension contacts, economic motivation and adoption index was worked out in terms of correlation coefficient ("r"). On the basis of operational measures used for the variables, research hypotheses in null form were derived for testing the relationship and significance on zero order correlation. The zero order correlation (r values) has been given in Table1 and its characteristics wise relationship is being described in subsequent pages.

Age

The data (Table1) revealed that age had positive and non-significant correlation with adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence the null hypothesis (NH05.3.1) was accepted, which showed that there was no relationship between age of farmers and their adoption about PCT and research hypothesis was rejected. This indicated that, adoption of farmers was not influenced by their age. It may be due to the fact that the farmers from the different age groups were similar in taking benefits under PCT. These results were similar with the findings obtained by (Singh *et al,* 2011) who observed that age had non-significant relationship with the adoption.**Caste**

The data (Table1) showed that caste had positive and non-significant correlation with adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence the null hypothesis (NH05.3.2) was accepted, which showed that there was no relationship between caste of farmers and their adoption about PCT and research hypothesis was rejected. This indicated that, adoption of farmers was not influenced by their caste. These findings were in congruence with the findings obtained by (Prakash *et al,* 2021) who observed that caste had non-significant relationship with the adoption.

Education

The data (Table1) expressed that education had positive and significant correlation ($P \leq 0.05$) with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence, the null hypothesis (H04.3) was rejected, which showed that there was no relationship between education of farmers and their adoption about PCT and research hypothesis was accepted. This indicated that, adoption of farmers was influenced by their education level. It might be due to the fact that education has changed the outlook of farmer which helped in changing the in adoption behaviour. These findings were similar with the results reported by (Singh *et al,* 2016 and Nayak *et al,* 2020) who observed that education had significant relationship with the adoption.

Occupation

The data (Table1) explained that occupation had positive and non-significant correlation with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence, the null hypothesis (NH05.3.4) was accepted, which showed that there was no relationship between occupation of farmers and their adoption about PCT and research hypothesis was rejected. This indicated that, adoption of farmers was not influenced by their occupation. It may be due to the fact that there was no biasedness in the distribution of PCT benefits, whatever might be like occupation of farmers. These results were similar with the findings of (Sharnagat, 2008) who observed that occupation status had non-significant relationship with the adoption.

Annual income

The data (Table1) showed that annual income had positive and significant correlation ($P \leq 0.05$) with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence, the null hypothesis (NH05.3.5) was rejected, which showed that there was no relationship between annual family income of farmers and their adoption about PCT and research hypothesis was accepted. This showed that, adoption of farmers was influenced by their annual family income. It also showed that higher the annual family income, more favourable adoption about PCT and vice-versa. It might be due to the fact that high annual income helped the farmers in spending more money for utilizing the latest polyhouse production technologies. These results were in accordance with the results of (Kumar *et al,* 2012 and Harisha *et al,* 2020) who observed that annual family income had significant relationship with the adoption.

Land holding

The data (Table1) indicated that land holding had positive and non-significant correlation with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence, the null hypothesis (NH05.3.6) was accepted, which showed that there was no relationship between size of land holding of farmers and their adoption about PCT and research hypothesis was rejected. It might be due to the reason that most of the farmers had medium to large land holdings, so the attitude of farmers was not influenced by their size of land holding. These findings were similar to the finding obtained by (Barau *et al,* 2020) who observed that land holding had non-significant relationship with the adoption.

Farm mechanization

The data (Table1) revealed that farm mechanization had positive and non-significant correlation with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence the null hypothesis (NH05.3.7) was accepted, which showed that there was no relationship between farm mechanization of farmers and their knowledge about PCT and research hypothesis was rejected. This indicated that, adoption of farmers was not influenced by their farm mechanization. It might be due to the fact that with different farm mechanization techniques, the benefits derived by the farmers were uniform. These findings were similar with the results obtained by (Jaganathan *et al,* 2009 and Pawar *et al,* 2019) who observed that farm mechanization had non-significant relationship with the adoption.

Sources of farm information

The data (Table1) showed that sources of farm information had positive and significant correlation ($P \leq 0.05$) with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence, the null hypothesis (NH05.3.8) was rejected, which showed that there was no relationship between sources of farm information by farmers and their adoption about PCT and research hypothesis was accepted. This pointed out that, adoption of farmers was influenced by their sources of farm information. It might be due to the reason that the high frequency of sources made by the farmers with farm information enabled them to acquire more information, improved their skills and thus increased their knowledge. These results were in congruence to the findings reported by (Kumar *et al,* 2012) who observed that sources of farm information had significant relationship with the adoption.

Extension contacts

The data (Table1) revealed that extension contacts had positive and significant correlation (P≤0.05)with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence, the null hypothesis (NH05.3.9) was rejected, which showed that there was no relationship between extension contact of farmers and their adoption about PCT and research hypothesis was accepted. This indicated that, adoption of farmers was influenced by their extension contacts. It showed that more contact of the farmers with the extension personnel, more favorable adoption towards PCT was found and vice-versa. It might be due to the fact that the high frequency of contacts made by the farmers with extension agency enabled them to acquire more information, improved their skills and increased their knowledge. The findings were in accordance with the results obtained by (Singh, 2001) who observed that extension contacts had significant relationship with the adoption.

Economic motivation

The data (Table1) showed that economic motivation had positive and significant correlation (P≤0.05) with the adoption of farmers about PCT in both districts (Jaipur and Alwar). Hence, the null hypothesis (NH05.3.10) was rejected, which showed that there was no relationship between economic motivation of farmers and their adoption about PCT and research hypothesis was accepted. This pointed out that, adoption of farmers was not influenced by their economic motivation. It might be due to the fact that it was believed that economic motivation was the basic character upon which other drives, motives and attributes were built. It psychologically brought an individual to orient himself to achieve higher income and horticultural crops are remunerative in nature. So, it was natural that horticulturist of this area are moderately economically motivated and having moderate to high adoption towards PCT that was reflected into significant relationship. These findings were similar with the results of (Jaganathan *et al,* 2009 and Patel *et al,* 2015) who observed that economic motivation had significant relationship with the adoption.

CONCLUSION

The present study showed that education, annual income, sources of farm information, extension contacts and economic motivation had significant correlation with the adoption of farmers at 1 per cent level of significance(P≤0.01), followed by age had significant correlation with the adoption of farmers at 5 per cent level of significance (P≤0.05) and remaining independent variables like caste, occupation, land holding and farm mechanization had non- significant correlation with the adoption of farmers. In Jaipur district it was observed that education, annual income, sources of farm information, extension contacts and economic motivation had significant correlation with the adoption of farmers at 5 per cent level of significance(P≤0.05). Other independent variables like; age, caste, occupation, land holding and farm mechanization had non-significant correlation with the adoption of farmers. In Alwar district it was observed that education, annual income, source of farm information, extension contacts and economic motivation had significant correlation with the adoption of farmers at 5 per cent level of significance (P≤0.05). Other independent variables like age, caste, occupation, land holding and farm mechanization had non-significant correlation with the adoption of farmers about PCT.

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