FACTORS INFLUENCING ADOPTION OF IMPROVED AGRICULTURAL TECHNOLOGIES

Savita Singhal* and LalitaVatta**
*** Research Scholar, Jai Narain Vyas University, Jodhpur**
****Assistant Professor, Department of Home Science, University of Rajasthan, Jaipur**

ABSTRACT

Introduction: The present investigation was undertaken on beneficiary farmers of Krishi Vigyan Kendra, Jodhpur, Rajasthan. Krishi Vigyan Kendra adopts few villages and continues working for the farm families for three years.

Objective: The present study was an attempt to explore the factors which affect the adoption of technologies transferred through Krishi Vigyan Kendra, Jodhpur.

Methodology: A multi-stage sampling design was used to finalize the sample farmers as respondents. A total of 180 farmers (120 beneficiaries and 60 non beneficiaries) were selected as respondents for the study purpose.

Results and conclusions: The results of the study indicated that education, social participation, extension participation, knowledge, annual income, mass media exposure, agricultural progressiveness and economic motivation were found positively and significantly associated with extent of adoption of technologies by the farmers.

Key words: Krishi Vigyan Kandra, Transfer of technology, Adoption, Improved technology, Level of adoption, Extension participation.

INTRODUCTION

To contribute economy via increased agriculture production, technology transfer and its adoption plays a very important and crucial role. It not only fastens the change process but also triggers to sustainability. To address the issues related to technology dissemination in agriculture, a grass root level scheme has been designed and nurtured by India Council of Agriculture Research, New Delhi and implemented by the Krishi Vigyan Kendra, known as Agriculture Science Center. The mandate of Krishi Vigyan Kendra is technology assessment and demonstration for its wider application and to enhance capacity development (Ministry of Agriculture, 2016). To implement the mandate successfully, on-farm tested technologies are demonstrated to farmers to update their knowledge and skills. Adoption of any technology moves through various stages (awareness to trail and then acceptance and rejection) struggling with various factors which directly or indirectly affect diffusion. Among these factors, the socio-economic characteristics of farmers play a key role in response to adopt new technologies and their participation in development activities. The interactions of personnel, psychological and situational factors always influence strategies and adoption of the improved agricultural production practices. The objective of the present study was to find out the factors influencing adoption of recommended cultivation practices by beneficiary farmers of Krishi Vigyan Kendra, Jodhpur.

METHODOLOGY

The present investigation was undertaken in Jodhpur district of Rajasthan. A multi-stage sampling design was used to select the sample farmers as respondents. In the first stage, Jodhpur district was selected purposively. In the second stage, two Panchayat Samities from Jodhpur district were selected. In the third stage, three villages adopted by Krishi Vigyan Kendra, Jodhpur were selected from each selected Panchayat Samiti. Finally, at the last stage a comprehensive list of all the beneficiary farmers from each selected village was prepared with the help of records of Krishi Vigyan Kendra. From each sample village, 20 beneficiary farmers and 10 non beneficiary farmers were selected through random sampling method as respondents. Thus, a total of 180 farmers

(120 beneficiaries + 60 non beneficiaries were selected as respondents for the study purpose.

The primary data required for the study were collected from selected sample respondents through specially prepared schedules. The schedule included questions relating to the profile of respondents, their agriculture progressiveness (scale developed by Singh, 1989), extension contacts (scale developed by Kansama et al., 1996), mass media exposure and adoption of various improved agricultural practices. Mass media exposure has been operationalized as the degree to which a respondent was exposed to mass media (radio, television, exhibition/ kisan melas, farm magazines and newspapers) for obtaining information concerning agricultural technology. It was measured in terms of listening to farm broadcasts (radio and television), reading of farm literature, and visits to kisan melas etc. during the last one year. Exposure of respondents to farm broadcasts through radio, television and farm literature was given the scores of 4, 3, 2, 1 and 0 for daily, weekly, fortnightly, rarely and never, respectively. Besides, the score of one each to correct name of farm magazine, name of radio and television farm programme and their timings of broadcast indicated by the respondents were assigned. The respondent's visits to kisan melas during past three continuous years were taken into account. The respondents' visits to kisan melas during the last three years were assigned the scores of 3, 2 and 1, respectively. The educational or agricultural video films that were seen by the respondents were also given weightage of 0, 1, 2, 3, 4 and 5 was given to films. The scores so obtained by the respondents for all questions were calculated in order to arrive at their final mass media exposure scores.

To measure the extent of adoption of improved agriculture production technologies an index was developed by following the recommended procedures. The respondents were asked to respond to each item of adoption of these practices with respect to their extent of adoption on a five point continuum, namely, full adoption (5), partial adoption (4), less adoption (3), symbolic adoption (2) and non-adoption (1) with respective weightages accorded. Here, full adoption was operationalised as the adoption of stated practice completely and regularly in each season of a year continuously for a three year period. Partial adoption was operationalised as the adoption of only a part or

whole of recommended practice once in a year continuously for a three year period. Less adoption was operationalised as the adoption of only a part of recommended practice once in a three year period. Symbolic adoption was operationalised as the practices over which he had taken mental decision but not taken up physical action over them. Non adoption was operationalised as that recommended practices were not at all adopted by the farmer.

Based on the response of each item, total score of individual farmers was computed by summing up the scores. Thus, total score secured by an individual was the obtained adoption score. The adoption quotient was worked out for each respondent by the following quotient and it was taken as the adoption score for individual respondent.

$$\text{Adoption quotient (AQ)} = \frac{\text{Adoption score obtained by the respondent}}{\text{Maximum possible adoption score}} \times 100$$

Overall adoption level in the area was also worked out by calculating the arithmetic mean of the adoption quotient of all the respondents as below:

$$\text{Overall adoption level} = \frac{\sum AQ}{N}$$

Where, **AQ** = Adoption quotient for the respondents

N = Total number of respondents

The adoption scores assigned to each respondent was totaled and mean scores of adoption (x) and standard deviation (SD) were computed. Adoption behavior was categorized into three levels i.e. (I) low extent of adoption, if the total score of an individual respondent was below Mean - SD (ii) medium extent of adoption, if the score varied from Mean- SD to Mean + SD and (iii) high extent of adoption, if individual score was above Mean + SD.

The entire schedule was subjected to pre-testing before administering it to the actual respondents. The schedule was improved and revised according to the suggestions received from the respondents. The final set of schedules was used after being translated into Hindi language and was personally introduced to the respondents. The responses

were recorded on the schedule itself. The purpose of the study was explained to the respondents before recording the responses.

The data so collected were transferred to the work tables and tally sheets. They were processed, tabulated, classified, analyzed, and given statistical treatment. The cross tables were also prepared and the data were interpreted. The hypotheses formulated were tested and salient interpretations were drawn from the data in light of the objectives of the study.

To study the relationship between profile of respondents and adoption of various improved agricultural practices, correlation technique was used in this study. Correlations between dependent variables and selected independent variables were calculated using SPSS 16.

RESULTS AND DISCUSSION

Socio-economic profile of the respondents

Characteristics representing the personal and socio-economic attributes like family size and caste, social participation, educational status, experience in aquaculture and income are presented in Table 1.

It was clearly evident from the table that the majority of the beneficiary respondents belonged to middle age group (47.2%) followed by younger age group (34.7%) and older age group (18.1%). Majority of the respondents (71.7%) belonged to other backward caste category. More than half of the respondents were from nuclear families having family size of 5-10 members. A majority of the respondents (70.0%) involved in agricultural production were literate having high level of education. But, social participation level of nearly 65.0% of the respondents was low.

It was observed that majority of respondents were possessing medium sized land holding with medium level of socio- economic status. The frequency distribution of respondents on their farm family income appeared to be better. The frequency distribution of respondents appeared to be highly skewed towards higher side of economic motivation. More than one third of the respondents expressed higher levels of

economic motivation. The respondents had moderate level of extension contact having moderate exposure to mass media.

Table 1: Socio economic and personal profile of the respondents

Characteristics	Attribute	Respondents (n=120)
Age	< 35 years	57 (47.5)
	35-50 years	45(37.5)
	> 50 year	18(15.0)
Caste	Schedule caste	15 (12.5)
	Schedule tribe	1 (0.8)
	Other backward caste	86 (71.7)
	General	18 (15.0)
Family type	Nuclear	69 (57.5)
	Joint	51 (42.5)
Size of family	Small (Up to 5 members)	33 (27.5)
	Medium (5-10 members)	63 (52.5)
	Large (more than 10 members)	24 (20.0)
Education	Illiterate	36 (30.0)
	Literate (can read and write)	19 (15.8)
	Educated (up to 10+2 level)	52 (43.3)
	Highly educated (graduate and above)	13 (10.8)
Social participation	Low	81 (67.5)
	Medium	32 (26.7)
	High	7 (5.8)
Socio-economic status	Low	15 (12.5)
	Medium	63 (52.5)
	High	42 (35.0)

Operational land holdings	Marginal	12 (10.0)
	Small	16 (13.3)
	Medium	23 (19.2)
	Large	69 (57.5)
Annual family income	Up to Rs. 60,000/-	1 (0.8)
	Rs. 60000 to Rs.120,000/-	3 (2.50)
	Rs. 120000 to Rs. 180,000/-	30 (25.0)
	Above Rs. 180,000/-	86 (71.7)
Agricultural progressiveness	Low	29 (24.2)
	Medium	53 (44.2)
	High	38 (31.7)
Extension contact	Low	16 (13.3)
	Medium	43 (35.8)
	High	61 (50.8)
Mass media exposure	Low	21 (17.50)
	Medium	53 (44.2)
	High	46 (38.3)

Figures in the parentheses denote percentages.

Level of adoption

The data presented in Table 2 revealed that nearly 84.0% respondents had medium to high level for adoption of improved agricultural production technologies. While, only 15.8% of the respondents had low level of adoption.

Table 2: Distribution of respondents based on level of adoption

Category	Respondents (n=120)
Low	19 (15.8)
Medium	58 (48.3)
High	43 (35.8)

Figures in the parentheses denote percentages.

Relationship between adoption level and independent variables

The characteristics of farmers play an important role in deciding to reject or accept watershed technology. The association between extent of adoption of technologies and selected independent variables namely, age, caste, education, social participation, family size, agricultural progressiveness, size of land holdings was worked out in terms of rank correlation coefficient (Table 3).

On the basis of operational measures used for the variables, research hypotheses in null form were derived for testing the association between dependent and independent variables and significance on zero order correlation (r values) which are given in Table 3.

Table 3: Relationship between increase in adoption level of beneficiaries and their independent variables

S. No.	Independent variables	Correlation coefficient (r)
1.	Age	0.137 NS
2.	Education	0.437**
3.	Size of family	0.217 NS
4.	Social participation	0.429**
5.	Extension participation	0.617**
6.	Knowledge	0.813**
7.	Land holdings	0.235**
8.	Annual income	0.719**
9.	Mass media exposure	0.738**
10.	Innovation proneness	0.674**
11.	Economic motivation	0.631**
12.	Extension contact	0.739**

**Significant at 0.01 level of significance.
NS = Non significant

Age and adoption : It is apparent from the data (Table 3) that age had non-significant correlation with the adoption of agricultural technologies, it might be due to the old age of farmers and their traditional way of thinking which was restricting them to change and to take any risk. This finding is in the line with the results of Prajapati et al. (2015) who reported that age as independent variable of dairy farm women had negative and non-significant correlation with adoption.

Education and adoption: The data in Table 3 revealed that against the assumption, the education was found significantly and positively associated with the adoption of improved agricultural production practices. This may be true because education gives shape and direction to the thinking process of an individual. Hence, significant and positive influence of education on the adoption behavior of farmers may be justified. On the same line Singh et al. (2016), Prajapati et al. (2015), Jakhar et al. (2015) and Hadiya et al. (2014) found a similar trend.

Social participation and adoption: As against the assumption, beneficiaries degree of participation in social activities was found significantly and positively related with the adoption of improved agricultural production practices. It led to the conclusion that social participation was one of the factors which inspired the farmers for adoption of improved agricultural production practices. This might be due to the fact that people's social participation gave an opportunity to the farmers to widen their scope for interaction and to discuss their problems. These findings were in accordance with the findings of Singh et al. (2016), Jakhar et al. (2015), Prajapati et al. (2015), Hadiya et al. (2014) and Sheikh et al. (2013).

Family size and adoption: The data in Table 3 revealed that size of family had non-significant association with the adoption of various cultivation practices. It meant that the size of family had not exerted its influence on the adoption of various cultivation practices. This might be due to the fact that although farming was such a business in which all the family members contributed equally but the decision power was vested in the head of family. These findings were supported by Singh et al. (2016), Singh et al. (2015) and Barman et al. (2015).

Extension participation and extent of adoption: A positive and significant association was found between extension participation and extent of adoption (Table 3). This could be because more participation in different extension activities might have helped the respondents in gaining better knowledge, frequent contact and proper guidance resulting in high adoption of various cultivation practices. This finding was in accordance with the findings of Singh et al. (2016), Singh et al. (2015), Prajapati et al. (2015), Chanu et al. (2014) and Sajeev and Saroj (2014).

Knowledge and adoption: It has been observed that the knowledge index was positively and significantly associated with the extent of adoption. The high knowledge level about technology possessed by respondents might have helped them to adopt newer technology. The findings were in line with the findings of Singh et al. (2016), Patel and Chauhan (2015), Prajapati et al. (2015) and Chouhan et al. (2013).

Land holdings and adoption: The results showed that the association between adoption level of farmers and their size of land holding was not significant. It may be stated that size of land holding had no effect in influencing the adoption behaviour of the farmers. Similar findings were also reported by Singh et al. (2016).

Annual income and adoption: It is apparent from the data (Table 3) that annual income of the farmers had positive and highly significant correlation with level of adoption of improved agricultural technologies. It might be related to better financial condition of farmers which might have helped them to be capable in purchasing the essential inputs for successful farming. This finding was supported by the findings of Singh et al. (2016), Barman et al. (2015), Marak et al. (2015), Patel and Chauhan (2015)and Prajapati et al. (2015).

Mass media exposure and adoption: The data presented in Table 3 clearly indicated that, mass media exposure of the farmers had positive and highly significant correlation with their level of adoption of technologies. This indicated the potential of mass media in disseminating knowledge among the farmers. This finding was in the line with the results of Singh et al. (2016) and Singh et al. (2015).

Innovation proneness and adoption: As against hypothesis, agricultural progressiveness was found to be positively and significantly related to adoption of technologies. This showed that the adoption of improved agricultural technologies increased with increase in level of agricultural progressiveness. The reason might be that the agriculturally progressive farmers were well acquainted with improved agricultural production technologies. Similar relationship was observed by Singh et al. (2016), Prajapati et al. (2015), Hadiya et al. (2014) and Sheikh et al. (2013).

Economic motivation and adoption: It was obvious from the results that level of adoption of technologies had positive and highly significant correlation with economic motivation. This indicated that higher level of economic motivation of respondents had played a vital role in adopting more number of technologies. The finding was in accordance with the findings of Singh et al. (2016), Borthakur et al. (2015) and Singh et al. (2015).

Extension contact and adoption: Relationship between extension contact of farmers and their extent of adoption of agricultural production technologies was positive and highly significant. The probable reason might be the interaction between extension personnel and farmers that has led to gain in knowledge and skills. This finding was similar to the findings by Prajapati et al. (2015), Chanu et al. (2014) and Sheikh et al. (2013).

CONCLUSION

It may be concluded that education, social participation, extension participation, knowledge, annual income, mass media exposure, agricultural progressiveness and economic motivation were found positively and significantly associated with extent of adoption of technologies by the farmers.

REFERENCES

Barman S, Sonowal M, Saikia A. Adoption of improved bhutjolokia (capsicum chinense) cultivation practices by farmers of the upper Brahmaputra valley zone of Assam. Indian Research Journal of Extension Education, 2015; 15 (1): 20-24.

Borthakur S, Mishra P, Talukdar RK, Bortamuly D. Scaling the adoption of recommended rice production technologies by the farmers in Assam state. Indian Research Journal of Extension Education, 2015; 15 (2):32-37.

Chanu TM, Baite DJ, Singh M.K, Rao DUM. Adoption of pineapple cultivation practices by the farmers in Manipur state. Indian Research Journal of Extension Education, 2014; 14 (1):17-20.

Chouhan S, Singh SRK, Pande AK, Gautam US. Adoption dynamics of improved sugarcane cultivation in Madhya Pradesh. Indian Research Journal of Extension Education, 2013; 13 (2):27-30.

Hadiya B, Deshmukh G, Bariya M. Adoption of recommended practices of kharif groundnut growers in Saurashtra zone of Gujarat. Indian Research Journal of Extension Education,2014; 14 (3): 47-50.

Jakhar PR, Bangarva GS, Jat, JR, Singh S. Extent of adoption of recommended cultivation practices of mungbean in Nagaur district of Rajasthan. Indian Research Journal of Extension Education, 2015; 15(1): 49-52.

Kansama HS, Sharma, RP, Sharma SK. Knowledge and adoption of wheat technology among contact and non-contact farmers. Agriculture Science Digest, 1996; XVI (3): 154-156.

Marak BR, Bandyopadhyay AK, Lahiri B. Adoption of pineapple production technology in West Garo Hills district of Meghalaya. Indian Research Journal of Extension Education, 2015; 15(3):56-59.

Ministry of Agriculture, Government of India, 2016, http://pib.nic.in/newsite/PrintRelease.aspx?relid=146917 Accessed on July 15, 2016. 2.30 pm.

Patel MC, Chauhan NB. Factors affecting the knowledge and adoption behaviour of urban women regarding solar cooker. Indian Research Journal of Extension Education, 2015; 15 (4):85-89.

Prajapati JV, Patel JB, Bhatt PM. Extent of adoption of low-cost technologies of animal husbandry by tribal dairy farmwomen. Indian Research Journal of Extension Education, 2015; 15 (4):47-50.

Sajeev MV, Saroj PL. Technology utilization and its socio-economic determinants among cashew farmers of Karnataka. Indian Research Journal of Extension Education, 2014; 14 (3): 59-65.

Sheikh FA, Mir SA, Mubarak T, Itoo H, Bhat ZA, Bhat JA, Mir I A, Angchuk P, Shafi S, Arafat Y. Impact assessment of front line demonstrations on brown Sarson: Experience from temperate north-western Himalayan region of India. African Journal of Agricultural Research, 2013; 8(23): 2956-2964.

Singh B, Singh YK, Tripathi S, Binjhade CL. adoption of improved pulse production technology by pulse growers of Chhindwara district of Madhya Pradesh. Indian Research Journal of Extension Education, 2015; 15 (4): 189-190.

Singh DV, Mishra A, Singh SRK. The extent of adoption of the market intelligence among the summer cabbage growers. International Journal of Humanities and Social Science Invention, 2016;5(7): 67-70.

Singh AK. Fertilizer promotion. In: studies in agricultural extension and management. Ray, G.L. (Ed.), Mittal Publications, Delhi, 1989.