Factors Affecting Adoption of Organic Farming Technology in Arid Zone

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Abstract: A study was conducted in arid region (Dantiwara village, Jodhpur district) of Rajasthan to identify major factors affecting the adoption of organic farming technology. A package of organic farming technologies was transferred to the farmers' field through various extension methods viz., result demonstration, training, group discussion and distribution of literature. Eighty farmers were selected for the study from Dantiwara village of Jodhpur district. Study revealed that majority (55%) of the farmers belonged to medium adoption category followed by high (25%) and low adoption category (20%). Out of sixteen variables, ten variables i.e. education, caste, occupation, social participation, herd size, source of information, mass media exposure, knowledge, attitude and training received, were found to be positively and significantly correlated with the adoption of organic farming technology. Collectively the sixteen independent variables explained 59.8% of the variation in the adoption of organic farming technology.

Key words: Organic farming technology, adoption, multiple regression analysis.

Eighty eight percent of crop production in north western India is rainfed and multi-component farming system have been followed as tradition to mitigate the effect of frequently occurring drought. This system support use of local resources as purchased inputs increase the risk of production in erratic rainfall conditions.

Therefore, in this region the use of chemicals is very low and that shows potential (Sharma, 2011) to switch over this region into complete organic. Further, some other favorable factors make this region suitable for organic farming e.g. existing traditional farming systems, low residues of synthetic chemicals in soil and environment, enough availability of organic inputs (e.g. crop and animal waste), bio-pesticides like neem and minerals like rock phosphates and gypsum etc. Improved organic system has been developed by CAZRI (Sharma, 2013) with the integration of modern eco-technologies in traditional system e.g. enriched compost for nutrition and use of *Trichoderma virdae*, neem oil, pheromone traps for protection of crop.

However this set of organic production technologies was adopted by a small segment on farmers only. Therefore, keeping this in view a study was planned to assess the factors affecting the adoption of organic farming technology.

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Material and Methods

The study was conducted in Dantiwada village of Mandore Panchayat Samiti of Jodhpur district during 2015 to 2018. All the organic farming technologies mentioned above for mung bean and sesame crop were transferred to the farmers field through various extension methods viz., result demonstration, training, group discussion and distribution of extension literature. Eighty farmers were taken randomly from the village. Data was collected through personal interview of selected respondents with a pre-structured schedule prepared for the purpose. The data collected were tabulated and analyzed by suitable statistical tools in accordance to the objectives of the study.

The extent of adoption of organic farmers was measured with the help of a schedule developed for the study. The schedule comprised of 12 items on organic farming technology.

An Interview schedule comprising of the adoption schedule and profile characteristics was used to collect the data from the respondent farmers. Scores 0 and 1 were assigned to non-adoption and adoption respectively. On this basis total score of each respondent they were classified by cumulative square root frequency technique into low, medium and high adoption level.

Sixteen independent variables namely age, education, caste, occupation, type of family, size

of family, land holding, farming experience, annual income, herd size, social participation, sources of information, mass media exposure, knowledge, attitude and training received were computed for correlation co-efficient in order to find out their relationship with the dependent variable; adoption.

The extent of adoption was calculated by the adoption index developed by Karthikeyan (1994) using the following formulae;

$$AI = \frac{\text{Respondents total score}}{\text{Total possible score}} \times 100$$

where, AI represents adoption index; Respondents total score = Total number of practices adopted by farmers multiplied by respective practices weightage and summated; Total possible score = Total number of practices recommended multiplied by the respective weightage and summated.

The responses received from the respondents were categorized as low (up to 33.33%), medium (33.34 to 66.66%) and high adoption (above 66.66%).

Results and Discussion

Profile of farmers

Majority of the farmers belonged to the age group of 31 to 50 years, other backward caste with primary to middle level education and preferred to live in joint family system of 6-10 members in their family. Majority of the farmers had below 3.5 ha land, 11-20 years of experience of farming and had main occupation as agriculture including livestock. Annual income of majority of farmers was between Rs. 50,000 to 1 lac, had no membership in any organization and had medium mass media exposure, source of information, knowledge and favorable to most favorable attitude towards organic farming (Table 1).

Distribution of respondents according to overall adoption of organic farming technology

The data in Table 2 revealed that majority (55%) of farmers had medium level of adoption followed by high (25%) and low level of adoption (20%). Similar findings were reported by Singh and Chauhan (2006), Singh and Chauhan (2010), and Singh (2015).

Relationship between socio-economic characteristics of the farmers and adoption of organic farming technology

It is evident from the Table 3 that there is highly significant and positive correlation between training received, knowledge, mass media exposure, education, source of information, herd size, social participation, attitude, caste and occupation and adoption of organic farming technology. Analysis showed that the farmers with high level of training received, knowledge, mass media exposure, education, source of information, herd size, social participation, attitude, caste and occupation were found to be adopting more organic farming technology in comparison to those with lower level of above stated variables.

Singh (2002) had also earlier reported that education, mass media exposure and contact with extension agencies had positive and significant relationship with adoption of pulse crops. Chaudhary et al. (2001) too found positive and significant relationship between education, annual income and sources of information utilization pattern with adoption of rice production technology.

However, in cumin Singh (2005) reported that education, occupation, irrigation facilities, source of information and knowledge were found positive and significant correlated with adoption. Singh and Chauhan (2006) in a detailed study found that caste, education, occupation, social participation, mass media exposure, contact with extension agencies, attitude and knowledge were positively and significantly correlated with adoption of moth bean production technology.

Singh (2011) reported that occupation and knowledge were found positive and significant correlated with adoption. Kafle (2011) found that three factors, farmers' participation in organic farming related trainings and visits, farm size and compatibility of organic farming to their situations are the main determinants of adoption of organic farming among farmers. Rezvanfar et al. (2011) confirmed earlier research which showed that farmer' perception and motivation about organic farming and participation in extension activities are the main determinants of organic farming among small. Prashanth and Reddy (2012), revealed that the characteristics viz., education, herd

Table 1. Profile of the respondents

Socio-economic characteristics	Category	Number	% age	Mean	Range
Age	Below 31 years	19	23.8	41.90	22-63
	31 to 50 years	44	55.0		
	Above 50 years	17	21.2		
Education	Illiterate	6	7.5	6.30	0-14
	Primary	35	43.8		
	Middle	18	22.5		
	Secondary	14	17.5		
	Sr. Secondary	6	7.5		
	Graduate	1	1.2		
Caste	Scheduled caste and Scheduled tribe	11	13.8	1.98	1-3
	Other back ward caste	60	75.0		
	General	9	11.2		
Occupation	Agriculture alone	15	18.7	1.80	1-2
	Agriculture including livestock	65	81.3		
Land holding	Marginal (below 3.5 ha)	40	50.0	4.06	0.66-26.6
	Small (3.51 to 7 ha)	34	42.5		
	Large (above 7 ha)	6	7.5		
Family type	Joint family	47	58.8	1.55	1-2
	Single family	33	41.2		
Family size	Below 5 members	22	27.5	6.30	4-12
	6 to 10 members	56	70.0		
	Above 10 members	2	2.5		
Farming experiences	Below 10 years	8	10.0	22.00	3-45
	11 to 20 years	37	46.3		
	Above 20 years	35	43.7		
Annual income	Blow Rs. 50000	7	8.7	1.06	Rs. 0.4-6 lac
	Rs. 50000 to 110,000	59	73.8		
	Above Rs. 100,000	14	17.5		
Social participation	No participation in any organization	69	86.3	0.15	0-1
	Participation in one organization	11	13.7		
Mass media	Low (upto 3 score)	13	16.2	5.40	2-9
	Medium (4 to 6 score)	42	52.5		
	High (Above 6 score)	25	31.3		
Source of information	Low (upto 9 score)	2	2.5	15.40	5-24
	Medium (10 to 18 score)	64	80.0		
	High (above 18 score)	14	17.5		
Knowledge	Low (upto 6 score)	9	11.2	10.30	4-16
	Medium (7 to 12 Score)	52	65.0		
	High (above 12 Score)	19	23.8		
Attitude	Least favorable (12 to 36 score)	24	30.0	41.45	33-54
	Favorable (37 to 42 score)	19	234.8		
	Most favorable (above 42 score)	37	46.2		
Training received	No training received	27	33.8	1.30	0-3
	1 training received	20	25.0		
	More than 1 training received	33	41.2		

Table 2. Distribution of respondents according to overall adoption of organic farming technology

Adoption level	Frequency	Percentage
Low (upto 33.3%)	16	20.00
Medium (33.3-66.6%)	44	55.00
High (above 66.6%)	20	25.00
Total	80	100.00

Table 3. Correlation between socio- economic characteristics of the respondents and adoption of organic farming technology

Socio- economic characteristics	Correlation co-efficient (r)
Age	0.0333NS
Education	0.4351**
Caste	0.1868*
Occupation	0.1861*
Family type	-0.0702NS
Family members	0.0552 NS
Total land	0.0075 NS
Experience	0.0330 NS
Annual income	-0.1411 NS
Social participation	0.2851**
Herd size	0.3458**
Source of information	0.3930**
Mass media exposure	0.4357**
Knowledge	0.5643**
Attitude	0.2368**
Training received	0.6104**

NS = Non-significant; * = Significant at 5% level; ** = Significant at 1% level.

size, organic inputs utilization pattern, training received, decision making behaviour and extension contact were found positively and significantly related with the extent of adoption of organic cotton practices by the organic cotton farmers.

In a recent report Singh (2015) emphasized that farmers characteristics like education, occupation, extension contact, source of information, economic motivation, scientific motivation and knowledge positively and significantly influenced the adoption of moth bean production technologies in the arid tract of Rajasthan.

The variables namely age, type of family, size of family, land holding size, experience and annual income were found to be non-significantly correlated with adoption in most of the studies.

Multiple regression analysis

The results of regression analysis between the independent variables and adoption of farmers regarding organic farming technology given in Table 4 revealed that all the 16 selected independent variables taken together explained a variation of 59.82% towards dependent variable i.e. the adoption. The 'F' value 5.86265 was found to be significant at 1% level of probability. The results implied that all the 16

Table 4. Regression coefficient between independent variables and adoption of organic farming technology

Socio- economic characteristics	Reg. coefficient ('b' value)	Standard error	't' value
Age	-0.0649	0.0754	-0.8606
Education	-0.0327	0.1406	-0.2322
Caste	0.4811	0.6452	0.7457
Occupation	0.5258	0.3755	1.4005
Family type	-0.2413	0.6424	-0.3755
Family members	0.1718	0.2249	0.7639
Total land	-0.0077	0.0136	-0.5643
Experience	0.0798	0.0833	0.9583
Annual income	-0.0175	0.0347	-0.5060
Social participation	0.7654	0.8946	0.8555
Herd size	-0.0882	0.2523	-0.3494
Source of information	0.2361	0.0823	2.8678**
Mass media exposure	0.0739	0.2105	0.3512
Knowledge	0.3671	0.1765	2.0794**
Attitude	-0.0522	0.0486	-1.0751
Training received	1.3309	0.3795	3.5072**

R^2- 0.5982, R-0.7734, F = 5.862654**.

variables accounted for significant amount of variation for adoption.

Further, it was also observed that 't' test of significance expressed in coefficient of regression 'b' value was positively significant for source of information, training received and knowledge at 1% level of probability. On the contrary, coefficient of regression 'b' value were non- significant for age, education, caste, occupation, type of family, size of family, land holding, farming experience, annual income, social participation, herd size, mass media exposure and attitude (Table 4). This is in line with the reports of earlier workers detailed in preceding paragraph.

The in depth analysis of the relationship between dependent and independent variables proved that sources of information, knowledge and training received of the farmers were most important variables among all the sixteen potential selected variables in the study, which were predictors of adoption.

Conclusion

From the above finding s it can be concluded that majority of the farmers had adopted the organic farming technology to medium extent. Out of sixteen variables, ten variables education, caste, occupation, social participation, herd size, source of information, mass media exposure, knowledge, attitude and training received were found to be positively and significantly correlated with adoption of organic farming technology.

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