

RESEARCH ARTICLE

Attitude of Clusterbean Growers Toward Use of Information and Communication Technologies (ICTs)

Rakesh Kumar¹, A.K. Jhajharia² and Rajnish Kumar³

1. Assistant Agriculture Officer,
Office of Assistant Director
Agriculture (Extension),
Bikaner, Rajasthan, India

2. Assistant Professor,
Agril. Ext. and Communication,
COA, SKRAU, Bikaner,
Rajasthan, India

3. PG.Scholar,
(Ext. Edu.), COA, CCSHAU,
Hisar, Haryana, India

Corresponding author e-mail:
rakeshskrau@gmail.com

ABSTRACT

ICTs can be broadly interpreted as technologies that facilitate communication and transmission of information by electronic means. In this study ICTs is operationalised as the use of communication devices or applications by the farmers encompassing mobile phone, Internet, Kisan Call Centres for obtaining information. ICTs can make agriculture more remunerative and a fruitful occupation by providing latest information. It saves money, time and efforts and reduces dependency on so many factors in the chain of extension. The present study was conducted in Bikaner district of Rajasthan in year 2018 on 80 registered farmers (Users) on one of the ICT portal "mkisan.com" through Agriculture Research Station, Bikaner and 80 non-users. The sample was selected from three tehsils of Bikaner district namely Bikaner, Nokha and Kolayat out of total eight tehsils because these three tehsils having highest number of registered farmers under ICT portal "mkisan.com" and having good area under Clusterbean crop. Further two villages from each tehsil were selected and made a total sample size of 160. The study revealed that 93.75 percent users were found in moderately favourable to more favourable attitude. While 92.50 percent of non-users had moderately favourable to less favourable attitude towards use of ICTs.

Key words: Attitude; ICT; Information; Internet; mkisan.com; Users.

Information and Communication Technology (ICT) is a global term that includes all technologies for the manipulation and communication of information encompassing: radio, television, computers, internet, cell phones, and network hardware, satellite systems and so on, as well as various services and application associated with them. Information and Communication Technology (ICT) provides vital access to information, markets by connecting the rural poor and marginalized to the world's information resources and opportunities. The ICTs also have the flexibility in providing information related to the various modes of farming practices including all crops, specific commodities and enterprises, price information and all other information regarding technological advances and tracking global competitiveness (Rumman, 2016). In India around, 70 per cent population live in rural area and their main occupation is agriculture. The main base is agriculture which continues to be the occupation and way of life for more than half of Indian population even today making single largest contribution to

the GDP of our nation. Sustainable prosperity of the farmers and the agricultural labour holds the key for improving the overall human resource development scenario in the country. There is a need to increase production and productivity in agriculture. Hence, the Indian farmers need to be updated with the latest knowledge about new techniques of farming, new cultivars, farm machinery, market and trade situation etc. The extension personnel of the department of agriculture disseminating the technology and message to the farming community through various extension methods. But these approaches have not been able to reach majority of the farmers, spread across the country as the ratio between farmers and extension worker is 1000:1. This gap remains a challenge for extension system even today (Jain, 2011).

Thus, the ICT plays an increasingly important role in linking the research- extension-market continuum towards developing professional competencies and entrepreneurial capabilities among specialists and farming communities respectively.

METHODOLOGY

The present study was conducted in Bikaner district of Rajasthan in the year 2018. The information and communication technologies namely mobile phone, internet, kisan call center were being used by the government and non-government organizations for transfer of agriculture technology in the district and total 1965 farmers were registered through Agriculture Research Station, Bikaner on one of the ICTs portal “mkisan.com” from the Bikaner district. The sample was selected from three tehsils of Bikaner district namely Bikaner, Nokha and Kolayat out of total eight tehsils because these three tehsils having highest number of registered farmers under ICT portal “mkisan.com” and having good area under clusterbean crop. From these tehsils, two villages from each tehsil were selected on the basis of these having highest number of registered farmers on one of the ICT portal “mkisan.com” through Agriculture Research Station, Bikaner. Next, from selected villages 80 users and 80 non-users were selected on the basis of proportionate random sampling technique.

Users: Users were the respondents who were registered on Information and Communication Technology (ICT) portal “m-kisan.com” through Agriculture Research Station, Bikaner.

Non-users: Non-users were those respondents who were not registered under any Information and Communication Technology (ICT) portal or not member of mkisan.com portal.

For the purpose of study three ICT tools namely Mobile phone, Internet, and Kisan Call Centre were taken. The reason for selection of clusterbean crop was that clusterbean had highest area (822840 ha.) in the district among all crops (at the time of selection of sample and crop under study) and the Bikaner district also had first position in area under clusterbean crop among all the districts of the Rajasthan. Information and Communication Technologies (ICTs) were also being used for transfer of technologies related to various aspects of crop production in the district.

Attitude was operationalized as the degree of positive or negative feeling of farmers towards ICTs. It was measured with the help of scale developed by Samatha J. and Vijayabhinandana B. (2011) with suitable modifications. The twenty-seven attitude statements were administered on five-point continuum to the sampled farmers. Out of twenty-

seven statements ten were negative and the rest were positive. The possible maximum and minimum scores of each respondent were 135 and 27 respectively. The data were collected through well-developed interview schedule; thereafter these data were analysed, tabulated and interpreted. The Mean Percent Score, Rank and Spearman's rank correlation, correlation analysis and multiple linear regression analysis were used to present the data in tables and draw inferences.

RESULTS AND DISCUSSION

Personal profile of respondents : An overview of the findings revealed that most of the farmers were almost medium in their profile characteristics. Table 1 indicated that majority of the farmers were middle aged and have education up to high school. The farming experience of the respondent was found medium level. Most of the farmers had land holding in between 2 to 4 hectares and not a member of any organization. A little less than two third of the respondents had medium (64.37%) level of information seeking behavior, 61.25 per cent of the respondents belonged to medium level of extension agency contact, a little more than two third of the respondents belonged to medium (68.13%) level of economic status, 64.38 per cent of respondents belonged to medium level of achievement motivation. It also revealed that majority of farmers also had medium level of scientific orientation (65.62%), followed by high (19.38%) and low (15.00%) levels of scientific orientation and more than half of the respondents had medium (53.75%) category of innovativeness, followed by high (23.75%) and low (22.50%) categories of innovativeness. The results are in support with Agarwal *et al.* (2014), Patel (2015), Patidar (2015) and Kailash *et al.* (2017). Agarwal *et al.* (2014), Patel (2015) and Patidar (2015) reported that most of the online communication services users were found to have medium innovativeness and extension contacts. Whereas Kailash *et al.* (2017) showed that majority of farmers had large size of land holding followed by farmers having small size of land holding and marginal size of land holding.

Attitude of respondents towards use of ICTs : Attitude is an organized predisposition to think, feel and perceive and behave towards a cognitive object. It was operationalized as the degree of positive or negative feeling of farmers towards ICTs. The scores on each statement in attitude scale were summed up and the respondents were categorized into three groups viz.,

Table 1. Profile characteristics of respondents

Variables/Category	Users (n=80)	Non-users (n=80)	Overall (N=160)
<i>Age</i>			
Young (<35 yrs)	10 (12.50)	13 (16.25)	23 (14.37)
Middle (35-50 yrs)	61 (76.25)	54 (67.50)	115 (71.88)
Old (>50 yrs)	09 (11.25)	13 (16.25)	22(13.75)
<i>Education</i>			
Illiterate	09 (11.25)	16 (20.00)	25 (15.63)
Primary	31 (38.75)	09 (11.25)	40 (25.00)
High School	13 (16.25)	28 (35.00)	41 (25.62)
Intermediate	11 (13.75)	15 (18.75)	26 (16.25)
Graduation	13 (16.25)	09 (11.25)	22 (13.75)
Post-graduation	03 (03.75)	03 (03.75)	06 (03.75)
<i>Farming experience</i>			
Low	06 (07.50)	07 (08.75)	13 (08.12)
Medium	43 (53.75)	48 (60.00)	91 (56.88)
High	21 (26.25)	25 (31.25)	46 (28.75)
<i>Land holding</i>			
Marginal (<1 ha.)	05 (06.25)	03 (03.75)	08 (05.00)
Small (1-2 ha.)	18 (22.50)	26 (32.50)	44 (27.50)
Medium (2-4 ha.)	46 (57.50)	45 (56.25)	91 (56.87)
Large (>4 ha.)	11 (13.75)	06 (07.50)	17 (10.63)
<i>Social participation</i>			
Not a member	63 (78.75)	65 (81.25)	128 (80.00)
One organization	14 (17.50)	10 (12.50)	24 (15.00)
Office bearer	03 (03.75)	05 (06.25)	08 (05.00)
<i>Extension contacts</i>			
Low	08 (10.00)	23 (28.75)	31 (19.37)
Medium	54 (67.50)	44 (55.00)	98 (61.25)
High	18 (22.50)	13 (16.25)	31 (19.38)
<i>Economic status</i>			
Low	03 (03.75)	06 (07.50)	09 (05.62)
Medium	51 (63.75)	58 (72.50)	109 (68.13)
High	26 (32.50)	16 (20.00)	42 (26.25)
<i>Innovativeness</i>			
Low	18 (22.50)	18 (22.50)	36 (22.50)
Medium	31 (38.75)	55 (68.75)	86 (53.75)
High	31 (38.75)	07 (08.75)	38 (23.75)

less favourable attitude, moderately favourable attitude and more favourable attitude.

A cursory look at Table 2 indicated that, majority (56.25%) of the users had moderately favourable attitude towards use of ICTs, followed by more favourable (37.50%) and less favourable (06.25%) attitude towards use of ICTs.

In case of non-users, more than half of the respondents had moderately (51.25%) favourable attitude towards use of ICTs, followed by less favourable (41.25%) and more favourable (07.50%) attitude towards use of ICTs.

Table 2. Distribution of respondents according to their attitude towards use of ICTs

Category	Users (n=80)		Non-users (n=80)		Overall (N=160)	
	No.	%	No.	%	No.	%
Less (< 86.35)	05	06.25	33	41.25	38	23.75
Moderately (86.35 to 108.51)	45	56.25	41	51.25	86	53.75
More (>108.51)	30	37.50	06	07.50	36	22.50
Total	80	100	80	100	160	100
	Mean=97.43		SD=11.08			

Overall, majority (53.75%) had moderately favourable attitude towards use of ICTs, followed by less favourable (23.75%) and more favourable (22.50%) attitude towards use of ICTs. The findings are in concordance with *Jeeva (2006)*, *Ganeshkumar (2008)*, *Kabir (2015)* and *Shely and Kumar (2016)*. *Jeeva (2006)* found that 59.72 per cent of the researchers had moderately favourable attitude followed by more favourable attitude (26.39%) and less favourable attitude (13.89%). Whereas *Ganeshkumar (2008)* reported that two third of the farmers had moderately (66.70%) favourable attitude towards ICT based extension, followed by less favourable (20.00%) and more favourable (13.30%) attitudes. *Shely and Kumar (2016)* showed that the 55.00 per cent of respondents had moderately favourable attitude towards KCC followed by 23.50 per cent had highly favourable attitude. Whereas *Kabir (2015)* reported that farmers of the study areas have a moderately favourable attitude and the most important finding is that there are no farmers in the study areas who less or slightly favourable attitude towards ICT based farming.

Content analysis of attitude scale developed towards ICTs use : An attempt was made to find out the response of farmers towards a set of statements of attitude towards use of ICTs with varying degrees of positive and negative impression.

The Table 3 describe the distribution of users, non-users and overall respondent as per they obtained mean percent score in respect of their attitude towards various statements of use of ICTs.

The result showed that in users' statement "ICTs can be accessed all the time (24hrs/7days)" had 1st rank as it had highest mean percent score of 89.50, 2nd rank went to statement "ICTs are the best means to collect latest information regarding weather, cultivation practices, market prices etc" had mean percent score of 89.25; whereas, 3rd rank went to statement "ICTs

reach the farmers in a short period of time” with mean percent score of 87.50.

Next, for non-user respondents, statement “ICTs reach the farmers in a short period of time” gained 1st rank with a mean percent score of 79.00, 2nd rank statement was “The information available through ICTs is reliable and adequate” with mean percent score 73.00 and 3rd rank statement “ICTs provide right solution for the problems faced by the farmers” gained mean percent score of 72.75.

For overall respondents, statement “ICTs reach the farmers in a short period of time” attained 1st rank with mean percent score 83.25, statement “ICTs can be

accessed all the time (24hrs/7days)” attained rank 2nd with mean percent score 80.75 and with mean percent score of 80.25, statement “ICTs are the best means to collect latest information regarding weather, cultivation practices, market prices etc.” attained 3rd rank.

An effort was also made to determine the relationship between the ranks assigned by users and non-users by applying rank order correlation test. The value of rank order correlation (r_s) was 0.74 which shows positive correlation, the significance of r_s was tested by ‘t’ test and it was observed that calculated ‘t’ value (5.57) was higher than its tabulated value. This leads to conclusion that there was a similarity

Table 3. Statement wise mean percent score and ranks of attitude scale

Statements	Users (n=80)		Non-users (n=80)		Overall (n=160)	
	MPS	Rank	MPS	Rank	MPS	Rank
ICTs reach the farmers in a short period of time.	87.50	III	79.00	I	83.25	I
ICTs provide right solution for the problems faced by the farmers.	78.75	IX	72.75	III	75.75	VI
*It is very difficult to enhance the overall efficiency of agriculture production system with the use of ICTs.	74.25	XVI	63.25	XXII	68.75	XX
ICTs can be accessed all the time (24hrs/7days).	89.50	I	72.00	VII	80.75	II
ICTs can be accessed from any part of the globe/world without any geographical barriers	82.00	V	68.50	XV	75.25	VIII
*Sustainability of agriculture is independent of access to information to the ICTs.	69.50	XXV	61.50	XXV	65.50	XXIV
ICTs are fastest way to exchange information among various client groups	81.00	VI	69.00	XIII	75.00	IX
Use of ICTs is cost effective.	78.00	X	69.00	XIV	73.50	X
Getting information on agriculture and allied fields through ICTs saves time.	82.75	IV	72.00	VIII	77.38	IV
ICTs are the best means to collect latest information regarding weather cultivation practices, market prices etc.	89.25	II	71.25	IX	80.25	III
*Farmers get confused with lot of information obtained from ICTs.	76.75	XII	63.50	XXI	70.13	XVII
Use of ICTs enhances the transfer of technology.	77.75	XI	67.00	XVI	72.38	XV
ICTs empower the farmers in taking decisions on cultivation practices, pest and disease management etc.	79.25	VIII	72.25	VI	75.75	VII
*ICT based extension would not evolve as major means of technology dissemination	67.50	XXVII	62.25	XXIII	64.88	XXVI
ICTs use enlarges the social communications of farmers.	76.25	XIII	69.25	XI	72.75	XIII
*ICTs cannot provide instant solution to a problem faced by a farmer	73.50	XVIII	61.75	XXIV	67.63	XXII
ICTs reach the unreached farmers.	80.75	VII	72.50	V	76.63	V
ICTs can contribute towards the overall development of farmers.	75.75	XIV	71.00	X	73.38	XI
*Farmers could not access market information of different locations using ICTs	72.50	XX	72.75	IV	72.63	XIV
ICTs supplement and complement the present public extension system.	72.50	XXI	67.00	XVII	69.75	XIX
*There is no area in agriculture where IT has a role to play	75.00	XV	69.25	XII	72.13	XVI
The information available through ICTs is reliable and adequate	73.75	XVII	73.00	II	73.38	XII
*ICT usage requires skills	68.25	XXVI	65.25	XIX	66.75	XXIII
ICTs bring rural communities closer to the global economic system.	72.75	XIX	67.00	XVIII	69.88	XVIII
*The ICTs infrastructure is costly and difficult to maintain.	70.75	XXIII	59.75	XXVI	65.25	XXV
ICTs help in improving the Research-Extension-Farmer-Market linkage.	72.50	XXII	64.75	XX	68.63	XXI
*The farmers need assistance from the extension agents for using ICTs.	70.25	XXIV	52.50	XXVII	61.38	XXVII
*Negative Sentences						
rs-Rank order correlation						$r_s=0.74$
Significant at 1% level of significance						$t = 5.57^{}$

in the rank assignment pattern of users and non-users about attitude towards use of ICTs, though there was difference in magnitude of mean percent score of users and non-users.

Relationship between profile characteristics and attitude towards use of ICTs : The association between independent variables and attitude of respondents tested through correlation coefficient (r) values. This measure described the strength and direction of the relation between two variables.

The relationship among that education (0.6298), land holding (0.5867), information seeking behaviour (0.5145), extension contact (0.6938), economic status (0.6655), achievement motivation (0.6972), scientific orientation (0.6345) and innovativeness (0.5937) of users were positively correlated with attitude towards use of ICTs and the association was found significant at 1 per cent level of probability. The r-values of age (0.1932), farming experience (0.4069) and social participation (0.1996) of users showed non-significant relation with attitude towards use of ICTs.

Similarly, the education (0.5505), land holding (0.5691), information seeking behaviour (0.7453), extension contact (0.7592), economic status (0.6493), achievement motivation (0.4282), scientific orientation (0.4842) and innovativeness (0.7269) of non-users were positively correlated with attitude towards use of ICTs and the association was found significant at 1 per cent level of probability. The r-values of age (0.4057), farming experience (0.2840) and social participation (0.2908) of non-users also showed non-significant relation with attitude towards use of ICTs.

The above findings could be explained as, the higher the education, land holding, information seeking behaviour, extension contact, economic status, achievement motivation, scientific orientation and innovativeness, the higher would be the attitude towards use of ICTs. It could be concluded that the attitude towards use of ICTs was independent of age, farming experience and social participation.

Multiple Linear Regression of selected independent variables with attitude towards use of ICTs : Multiple linear regression was used to find out the amount of contribution made by the independent variables in explaining the variation in the dependent variable through multiple linear regression.

A critical examination of the data presented in Table 4 shows that age, farming experience and social participation were non-significantly associated with

Table 4. Relationship between profile of users and their attitude towards use of ICTs Users (n=80)

Characteristics	(r)	b-value	SE	t-value
Age	0.1932 ^{NS}	0.206	0.100	2.065 ^{NS}
Education	0.6298 ^{**}	1.275	0.152	4.491 ^{**}
Farming experience	0.4069 ^{NS}	1.260	0.484	2.370 ^{NS}
Land holding	0.5867 ^{**}	1.371	0.341	3.090 ^{**}
Social participation	0.1996 ^{NS}	0.504	0.350	1.114 ^{NS}
Info. seeking behaviour	0.5145 ^{**}	1.012	0.178	3.068 ^{**}
Extension contacts	0.6938 ^{**}	1.951	0.102	4.858 ^{**}
Economic status	0.6655 ^{**}	0.477	0.234	2.039 [*]
Achievement motivation	0.6972 ^{**}	0.417	0.243	2.714 ^{**}
Scientific orientation	0.6345 ^{**}	0.420	0.278	2.792 ^{**}
Innovativeness	0.5937 ^{**}	0.510	0.317	4.611 ^{**}
		a = 0.895	R ² = 0.875	

**1% and *5% level of significance; NS= non-significant

Table 5. Relationship between profile of non-users and their attitude towards use of ICTs (n=80)

Characteristics	(r)	b-value	SE	t-value
Age	0.4057 ^{NS}	0.487	0.203	2.402 ^{NS}
Education	0.5505 ^{**}	0.627	0.248	3.032 ^{**}
Farming experience	0.2840 ^{NS}	0.234	0.266	2.475 ^{NS}
Land holding	0.5691 ^{**}	0.427	0.311	3.373 ^{**}
Social participation	0.2908 ^{NS}	0.254	0.233	0.206 ^{NS}
Info. seeking behaviour	0.7453 ^{**}	0.616	0.308	2.002 [*]
Extension contacts	0.7592 ^{**}	0.778	0.418	4.862 ^{**}
Economic status	0.6493 ^{**}	0.363	0.380	2.955 ^{**}
Achievement motivation	0.4282 ^{**}	0.407	0.223	4.031 ^{**}
Scientific orientation	0.4842 ^{**}	0.384	0.208	4.038 ^{**}
Innovativeness	0.7269 ^{**}	1.338	0.237	5.653 ^{**}
		a = 0.924	R ² = 0.798	

** 1% and *5% level of significance, NS= non-significant

Table 6. Relationship between profile of overall respondents and their attitude towards use of ICTs (N=160)

Characteristics	(r)	b-value	SE	t-value
Age	0.2134 ^{NS}	0.501	0.115	1.758 ^{NS}
Education	0.4848 ^{**}	1.744	0.112	3.451 ^{**}
Farming experience	0.2903 ^{NS}	1.005	0.411	0.905 ^{NS}
Land Holding	0.5388 ^{**}	0.889	0.292	3.305 ^{**}
Social participation	0.1959 ^{NS}	1.697	0.324	1.510 ^{NS}
Info. seeking behaviour	0.7090 ^{**}	0.686	0.182	3.772 ^{**}
Extension contacts	0.6543 ^{**}	1.382	0.115	4.392 ^{**}
Economic status	0.6058 ^{**}	0.527	0.250	2.108 [*]
Achievement motivation	0.5677 ^{**}	0.453	0.187	3.283 ^{**}
Scientific orientation	0.6901 ^{**}	0.640	0.174	3.675 ^{**}
Innovativeness	0.6623 ^{**}	0.365	0.220	2.661 ^{**}
		a = 0.814	R ² = 0.804	

**1% and *5% level of significance, NS= non-significant

the attitude of users with 0.206, 1.260 and 0.504 'b' value, respectively, which indicates that there is no association between age, farming experience and social participation with attitude of users. Attitude has no bar of specific age group. Age, farming experience and social participation are not a determining factor of attitude. While education, land holding, information seeking behaviour, extension contacts, economic status, achievement motivation, scientific orientation and innovativeness were positively and significantly associated with the attitude of users.

The further analysis of Table 4 gave the R² (Coefficient of multiple determination) value of 0.875. Hence, it could be inferred that independent variables put together contributed 87.50 per cent of the overall variation in the attitude towards use of ICTs by the users, leaving the rest to other factors. Whereas analysis of Table 5 revealed that the co-efficient of multiple determination value of independent variables of non-users put together contributed 79.80 per cent of the overall variation in the attitude towards use of ICTs, leaving the rest to other factors.

It was observed from Table 6 that the independent variables of overall respondents viz., education, land holding, information seeking behaviour, extension contact, achievement motivation, scientific orientation and innovativeness of the respondents had contributed significantly at 0.01 level of probability while economic status had contributed significantly at 0.05 level of probability towards the variation in the attitude towards use of ICTs. The present findings are supported by the findings of *Samatha and Vijayabhinandana (2011)*.

CONCLUSION

The findings revealed that most of the users were in medium category, whereas non-users were low and medium in their profile characteristics. In case of attitude towards use of ICTs 93.75 percent users were found in moderately favourable to more favourable attitude. While 92.50 percent of non-users had moderately favourable to less favourable attitude towards use of ICTs. The study also indicated education, land holding, information seeking behaviour, extension agency contact, achievement motivation, scientific orientation and innovativeness had significant effect on attitude towards use of ICTs.

Hence the extension functionaries need to give attention on low and medium level of profile characteristics of farmers to make improvement rather than others. Steps may be initiated by the Government to mobilize the farmers for their involvement in formal and informal organizations. In case of attitude towards use of ICTs extension functionaries should give attention on the respondents belonging to less favourable attitude by providing timely, useful, needy information to change their attitude towards use of ICTs.

CONFLICTS OF INTEREST

The authors have no conflicts of interest.

REFERENCES

- Agarwal, S., Singh, S.R.K. and Rajan, P. (2014). Correlation of technical knowledge of Kisan Mobile Sandesh. *Hind Agri-Horti. Society*, 9(2): 237-242.
- Ganeshkumar, P. (2008). Information and communication technologies enabled agricultural extension system in Andhra Pradesh-A critical analysis. Ph.D. (Ag.) Thesis. ANGRAU, Hyderabad, AP
- Jain Nilesh (2011). *Pratiyogita Darpan*, New Delhi.
- Jeeva, C.J.; Balasubramaniam, S. and Vasanthakumar, J. (2006). Attitude towards participatory technology development- A study among fishery researchers. *J. Ext. Edu.*, 18 (3&4):3851-3856.
- Kabir, Khondokar Humayun (2015). Attitude and level of knowledge of farmers on ICT based farming. *European Academic Res.*, 2(10): 15-21.
- Kailash; Mishra, O.P.; Kumar, Lokesh and Singh, S.K. (2017). Utilization pattern of mobile phone technology (smart phone) among the farmers of Nagaur District in Rajasthan. *Indian Res. J. Ext. Edu.*, 17(4): 117-121.
- Patel, B. (2015). A study on utilization pattern of communication channels by the farmers of Sehore block of Sehore district, Madhya Pradesh. M.Sc.(Ag.) Thesis. RSKVV, Gwalior, MP
- Patidar, R. (2015). A study on role of online communication in transfer of agricultural technology. M.Sc. (Ag.) Thesis. JNKVV, Jabalpur.
- Rumman, Akter Kafura (2016). Use of ICT as extension tool by the farmers of Gazipur district in Bangladesh. *Indian Res. J. Ext. Edu.*, 16(2): 1-5.
- Samatha, J. and Vijayabhinandana B. (2011). Extent of use of ICTs by the farmers in Guntur district. M.sc.(Ag.) Thesis. ANGRAU, Hyderabad, AP.
- Shely, Mary Koshy and Kumar N. Kishore (2016). Attitude of farmers towards kisan call centres. *J. Ext. Edu.*, 28

