Awareness and Utilization of Information and Communication Technology (ICT) in Agriculture - Farmer's perspective

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Abstract

In recent times, Information and Communication Technology (ICT) has become relevant in the Indian agricultural sector. In this age of information technology, extension can empower the farming community with agricultural knowledge through ICT for the inclusive development of agriculture. The physical distance and logistic problems are the major impediments for extension services. In this context, strengthening extension services with effective use of ICT seems indispensable. Hence a study was conducted with an objective to know the awareness and utilization of ICT among farmer users of Aksahya e-kendra in Adat Grama Panchayat of Thrissur district, Kerala. The data were collected by administering a pre-tested, structured interview schedule. The study reveals that the awareness regarding information provided through ICT tools was medium. The utilization of computer enabled ICT tools for seeking agricultural information was not substantial. However, the information provided through ICT tools was found to be useful to farmers and they have expressed medium level of satisfaction towards its usage. Major constraints in utilization of ICTs by the respondents were difficulty in further clarification of information, lack of location specific information, lack of awareness, and high cost of technology.

Introduction

In the changing agricultural scenario and rapid development of agricultural science and technology, the importance of agricultural information services is vital to the progress of agriculture. Farmers need to access a wide range of information, related not only to production technologies but also to post harvest and value addition processes, access to remunerative markets and price

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information etc. Agricultural information is provided through different sources to cater the needs of the farming community, by utilizing both traditional communication methods with a blend of contemporary Information and Communication Technology (ICT). However, the question still remains as to why the farming community does not access information adequately; whether it is because the information is not available or not relevant or they face difficulties in accessing through ICT channels, or these farmers are unaware and do not have the means to access and use the information. Therefore a study was taken up to understand where information gaps exist and to know why farmers are not accessing information. Considering the huge investment made in this area of ICT, an attempt was made to study the awareness and utilization of ICT tools among the farmers.

Methodology

The study was conducted with the farmers of Adat Panchayath of Thrissur district, Kerala. The sample comprised of 90 farmers, selected by using simple random sampling method from the prepared sampling frame. The primary data required for the study was collected by administering a pre-tested and structured interview schedule in the non sampling area. In this study Information and Communication Technology (ICT) encompasses information sources such as Print Media, Radio, Television, Telephone (landline and mobile) and computer enabled ICT tools like websites, agricultural portals and as well as the various services and applications associated with them. The data was analyzed with the help of appropriate tools like simple percentage, indices and rank order scale. The usefulness index and satisfaction index regarding accessing agricultural information through ICT was measured through 5 point continuum scale and index calculated as indicated below.

Index	**Scale and score used**				
Usefulness Index	Highly Useful (5)	Useful (4)	Somewhat Useful (3)	Less Useful (2)	Not at all Useful (1)
Satisfaction Index	Highly Satisfied (5)	Satisfied (4)	Somewhat Satisfied (3)	Less Satisfied (2)	Not at all Satisfied (1)

$$\text{Index} = \frac{\text{Total score obtained from ICT tool}}{\text{Maximum obtainable score from ICT tool}} \times 100$$

Maximum obtainable score

= maximum score for the opinion x total number of respondents

$$\text{Overall Index} = \frac{\text{Sum of total scores of all ICT tool}}{M \times N \times S}$$

M= Maximum score, N= Number of respondents, S= Number of ICT tools

The indices were then classified into three zones as follows for interpreting the results

Limit	Calculation	Zone
Upper limit	Above M.I + SD	High
Middle limit	(M.I –SD) to (M.I+SD)	Medium
Lower limit	Below M.I- SD	Low

MI: Mean Index. SD: Standard deviation

Findings and Discussion

Awareness Level of Farmers on Agricultural Information through ICT tools

The awareness of agricultural information through ICT tools by means of various sources or programmes were collected and are presented in Table 1.

It is evident from Table 1, that more than fifty percent (55.8%) of the respondents were aware of agricultural information through newspapers viz., Malayala Manorama (81%) and Mathrubhumi (74%), the leading dailies in the local language (Malayalam) with highest circulation and exclusive pages for agricultural information to serve the farming community. The respondents were aware of agricultural information through farm magazines, like Karshakasree (58.8%), and Kerala Karshakan (41.1%). Regarding agricultural radio broadcasts, Vayalumveedum (52.2%) Karshikavarthakal (37.7%) and Karshikarangam (36.6%) served as better rated ICT tools for creating awareness on agricultural information. The result also shows that only one fifth (26.6%) of respondents were aware of the exact time of broadcasting agricultural programmes. The mean percent of awareness regarding agricultural information broadcast through TV telecasts was 43.5 percent. Krishidarshan programme of Doordarshan and

Table 1: Awareness Level of Farmers on Agricultural Information through ICT

N=90

Sl. No.	ICT Services related to Agriculture	Awareness	
		No. of Respondents	Percentage
A	Newspapers		
	i. Malayala Manorama	73	81.1
	ii. Mathrubhumi	67	74.4
	iii. Deshabhimani	32	35.5
	iv. Kerala Kaumudhi	29	32.2
	Mean Percentage		55.8
B	Farm Magazines		
	i. Karshakasree	53	58.8
	ii. Kerala Karshakan	37	41.1
	iii. Kalpadhenu	32	35.5
	iv. Karshakan	26	28.8
	Mean Percentage		41.05
C	Radio Programmes		
	i. Vayalumveedum	47	52.2
	ii. Karshikavarthakal	34	37.7
	iii. Karshika rangam	33	36.6
	iv. Broadcasting time	24	26.6
	Mean Percentage		38.2
D	Television Programmes		
	i. Krishidarshan	47	52.2
	ii. Krishideepam	46	51.1
	iii. Harithabaratham	43	47.7
	iv. Harithakeralam	37	41.1
	v. Broadcasting time	23	25.5
	Mean Percentage		43.5
E	Telephone		
	i. Kisan Call Centers	19	21.11
	ii. IFFCO Farmers Helpline	15	16.67
	iii. SMS Agro Information	10	11.12
	Mean Percentage		16.29
F	Computer		
	i. Ekrishi	19	21.11
	ii. Kissan Kerala	18	20.00
	iii. Krishi World	12	13.34
	iv. Agropedia	8	8.89
	Mean Percentage		15.83

Source: Compiled from primary data

*Multiple responses

Krishideepam program of Asianet channel were known to 52 per cent and 51 per cent of respondents respectively. A reasonably good percentage of the respondents (21.11 %) were found to be knowing about Kisan Call Center (the agricultural help line) as a source of agricultural information. About 16.67 per cent of the respondents were aware of IFFCO farmers' helpline. However, only a small percentage of the respondents (11.12%) were aware about "SMS based Agro Information" through mobile.

The reported findings may due to the promotional activities of IFFCO supported service cooperative society operated in the study area. Regarding the agricultural portals and agricultural websites, about 21 per cent of the respondents were aware about the e-krishi portal of the Directorate of Agriculture, Kerala followed by Kissan Kerala (20%). Only a small percentage of respondents (13.34%) were aware about the national agricultural web portal like Krishi World followed by Agropedia (8.89%). The mean percent (15.83 %) computed was low as compared to other ICT tools. However the reported percentage of results might be due to the service of Akshaya e-kendra which operated in the study area and closer linkage of study group farmers with ATIC of Kerala Agricultural University (KAU). It may be concluded that as a whole, the awareness of farmers regarding agricultural information through various ICT tools and its programmes was found to be low except in case of print media.

Frequency and Usage of ICT Tools for seeking Agricultural Information

The frequency and usage of ICT tools for seeking agricultural information was collected and is presented in Table 2.

Table 2 discloses that, majority (79%) of farmers used newspaper for seeking agricultural information, followed by television (52%), radio (42%), telephone (20%) and computer (12.23%) respectively with differed frequencies. However, only 19 per cent were using farm magazines, relatively with less frequency. It is clear that a majority of them used newspaper and television for seeking agricultural information, with differential frequency ranging from mostly 10 to 40 per cent, as it has high reach effect in the life of rural farmers, when compared to modern ICT tools. Furthermore, the State being a cent percent literate one, naturally there seems to be more orientation towards print media. The use of Computer related ICT tools, and Telephone (mobile) accounted for

12.23% and 20% respectively which might be due to the membership of farmers in the state sponsored 'Akshaya' programme and as well as penetration of mobile communication facility in the rural area. It may be noted, that only 6 respondents (12.23%) depended upon computer aided tools for getting agriculture related information through Akshaya e-kendra. Among the 6 respondents, only 4 respondents (66.66%) used computer rarely for seeking agricultural information as and when required. Hence it may be concluded that all ICT tools except computer and telephone are used most often by the farmers.

Table 2: Frequency and Usage of ICT Tools for seeking Agricultural Information

Sl. No.	ICT Tools	Usage		Frequency			
		No	%	Always	Often	Occasionally	Rarely
1	Print Media						
	1)Newspaper	31	79	13(18.30)	28(39.44)	23(32.29)	7(9.86)
	2)Farm Magazine	17	19	4(23.53)	9(52.94)	4(23.53)	0(0)
2	Radio	38	42	12(31.57)	14(36.84)	8(21.05)	4(10.52)
3	Television	47	52	6(12.77)	21(44.68)	16(34.04)	4(8.51)
4	Telephone	18	20	4(12.5)	9(28.13)	14(43.75)	5(15.62)
5	Computer aided tools	6	12.23	0(0)	0(0)	2(33.33)	4(66.66)

Source: Compiled from primary data
*Multiple responses

Kinds of Agricultural Information received through ICT Tools

Information is a basic requirement for decision making. Well processed agricultural information enables farmers to take appropriate decisions, related to various spheres in agriculture. The kinds of information received through various ICT tools are presented in Table 3.

The Newspapers provide mainly market information, thus most of them ranked it as first. The others have been providing general agricultural information, crop varieties and new technology. General agricultural information was the prime one received by the farmers through farm magazine followed by information on fertilizer application, pest disease and weed control. However, farmers have relatively received less market related information from this medium. Irfan (2005) extended support to this finding. Radio broadcasts mainly

Table 3: Agricultural information received through ICT Tools

S.No.	Kinds of Information through ICT tools	Number	Percentage	Rank
1	**Newspaper**	**n=31**		
	i) General agricultural information	13	41.93	2
	ii) Crop varieties and new technologies	8	25.80	4
	iii) Fertilizer application, pest disease and weed control	10	32.25	3
	iv) Market information	18	58.06	1
2	**Farm magazine**	**n=17**		
	i) General agricultural information	15	88.23	1
	ii) Crop varieties and new technologies	12	70.59	2
	iii) Fertilizer application, pest disease and weed control	9	52.94	3
	iv) Market information	4	23.52	4
3	**Radio**	**n=38**		
	i) General agricultural information	32	91.42	2
	ii) Crop varieties and new technologies	9	23.68	4
	iii) Fertilizer application, pest disease and weed control	18	47.36	3
	iv) Market information	36	94.73	1
4	**Television**	**n=47**		
	i) General agricultural information	16	34.04	3
	ii) Crop varieties and new technologies	30	63.82	2
	iii) Fertilizer application, pest disease and weed control	12	25.53	4
	iv) Market information	39	82.97	1
5	**Telephone(Call Centers)**	**n=18**		
	i) General agricultural information	4	22.23	4
	ii) Crop varieties and new technologies	13	72.23	2
	iii) Fertilizer application, pest disease and weed control	15	83.33	1
	iv) Market information	8	44.44	3
6	**Computer(aided)**	**n=11**		
	i) General agricultural information	3	27.27	4
	ii) Crop varieties and new technologies	10	90.90	1
	iii) Fertilizer application, pest disease and weed control	7	41.17	3
	iv) Market information	9	81.81	2

Source: Compiled from primary data
Note: Multiple responses

provide market information followed by general agricultural information, Olown (2000) also reported that radio broadcasts play a vital role in sharing market information. Regarding information on crop varieties and new technologies the farmers rated it least. Television broadcasts mainly provide information regarding the market followed by Crop varieties and new technologies while the farmers rated information regarding fertilizer application, pest disease and weed control as least information received from this medium. A similar finding was also reported by Suresh (2007). Farmers have been gathering information related to fertilizer application, pest disease and weed control through telephone, followed by crop varieties and new technologies. Information on general agriculture received though telephone was rated as least preferred. Information relating to crop varieties and new technologies were the main inputs received from computer based ICT followed by Market information and farmers have rated these tools as least preferred regarding general agriculture. The results indicate that majority of the farmers received information relating to the market mostly from all media expect farm magazines.

Degree of Usefulness and Satisfaction regarding Agricultural Information through ICT Tools

The degree of usefulness and satisfaction regarding agricultural information provided through ICT tools is presented in Table 4.

Table 4: Degree of Usefulness and Satisfaction towards Agriculture Information through ICT Tools

Sl. No.	ICT Tools	Usefulness Index	Zone	Satisfaction Index	Zone
1	Newspaper	69.30	U	71.55	S
2	Farm Magazine	78.82	HU	80.00	HS
3	Radio	53.68	LU	72.11	S
4	Television	73.19	U	74.89	S
5	Telephone	76.88	U	76.88	S
6	Computer	53.12	LU	73.75	S

Source: Compiled from primary data

NB: 'HS" Highly Satisfied 'S' –Satisfied, 'DS' –Dissatisfied: "HU" – Highly Utilised, "U"- Utilised, "LU"- Less Utilised

The highest usefulness index noticed for farm magazine (78.82) indicates that it was perceived the most reliable and highly useful source of information even in the electronic era. Newspaper, Television, Telephone with usefulness

indices of 69.30, 73.19, and 76.88 respectively occupied the position in 'useful' zone and the remaining show relatively low indices. Farm magazines had higher satisfaction index (80.00) followed by ICT tools viz., Telephone, Television, Computer Radio, with indices 76.88, 74.89, 73.75, 72.11, respectively representing the 'satisfied' zone. Hence, it can be inferred that the overall usefulness Index (67.08) and overall satisfaction index (73.92) indicates that the agricultural information provided through ICT tools is found to be useful and gives medium level of satisfaction to farmers.

Major Constraints faced in using ICT Tools

Major constraints faced while using ICT tools were analyzed and are presented in Table 5. Newspaper readers mostly encountered problems relating to clarification about information published followed by precise information, which they rated as the first and second constraints respectively. The possible reasons for these might be that detailed information might not have been given and the majority of the respondents had education limited to pre-degree. However, they also encountered problems like small font size and poor reading skills, rated as third and fourth constraints. In the case of farm magazine, the respondents' rated high subscription cost as the first and foremost constraint in using farm magazine, followed by 'further clarification of the information being difficult'. The reason for high subscription cost might be due to the high cost of printing and other distribution costs. Regarding the radio and television broadcasts, respondents ranked broadcasting time and relay transmission barriers as the main constraints which might be due to the uneven timing of broadcast and not matching the farmers' convenience. Telephone users rated the time limit and delay in getting connected as the major problems they encountered while making calls to the help lines. Availability of limited number of call centers and poor coverage might be the contributing reasons. In case of computer enabled ICT, most of the respondent users stated cost of the technology along with lack of awareness as major constraints. Since a majority of the respondents belong to middle income group, affordability besides their limited education and exposure to modern technologies were expressed as constraints.

Table 5: Major Constraints faced in using ICT Tools

Sl no	ICT tools and its Constraints	Number	Percentage	Rank
1	Newspaper	n = 31		
	i. Poor reading skills	8	25.80	4
	ii. Small font size	14	45.16	3
	iii. Precise information	20	64.51	2
	iv. Further clarification about information is difficult	25	80.64	1
2	Farm magazine	n = 17		
	i. Poor reading skills	4	23.52	4
	ii. Small font size	10	58.82	3
	iii. High subscription cost	16	94.11	1
	iv. Further clarification about information is difficult	13	76.47	2
3	Radio	n = 38		
	i. Poor listening skills	12	31.57	4
	ii. Power failure	8	25.00	5
	iii. Broadcasting time	26	68.42	1
	iv. Relay transmission barriers	15	39.47	2
	v. Further clarification about information is difficult	20	34.48	3
4	Television	n = 47		
	i. Power failure	12	25.53	4
	ii. Broadcasting time	41	87.23	1
	iii. Relay transmission barrier	20	42.55	3
	iv. Further clarification about information is difficult	34	72.34	2
5	Telephone (Call Centers)	n = 18		
	i. Delay in getting connection	9	50.00	2
	ii. Connectivity breakdowns	6	33.34	3
	iii. Time limit	13	72.23	1
6	Computer (aided)	n = 11		
	i. Computer illiteracy	6	54.54	3
	ii. Cost of technology	10	90.90	1
	iii. Lack of awareness	9	81.81	2
	iv. No proper updated information	3	27.27	4

Source: Compiled from primary data.
Note: Multiple responses

Conclusion

It can be concluded that the farmers in the study village had reasonable awareness about ICT tools available for agricultural information and utilized them to an average extent. Farmers felt that the ICTs are useful and expressed medium level of satisfaction. Difficulty in further clarification of information, broadcasting time, lack of awareness and cost of technology were reported as major constraints in utilizing ICT tools for seeking agricultural information. In the light of the study conducted, the following Policy Implications are suggested.

1. The utility of ICT could be popularized by conducting master training programs for e-centre personnel with a focus on agriculture.
2. ICT users group can be constituted at village level to disseminate and educate on the importance of ICT tools to fellow farmers.
3. Attempt could made to prepare content for ICT tools in local vernacular language.
4. Mobile communication can be further strengthened by giving timely information through SMS.
5. As far as possible, content for Information kiosks should made available in local language and it should placed in prominent locations.
6. DEMIC can extend their service in Kerala through mobile communication.

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