

Perceived Utility of Information and Communication Technologies in Agricultural Extension System

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ABSTRACT

A study was carried out in Ranga Reddy district of Andhra Pradesh to get the perception of extension personnel towards utility of information and communication technologies in agricultural extension. Total 180 respondents were taken for the study. A list of different ICTs was made with their possible diverse uses in agricultural extension system *viz.* planning, monitoring, evaluation, group discussion, exhibition, discussion, field visit, training, lecture *etc.* The findings showed that respondents have positive perception towards the use of ICTs tools in agricultural extension system and its use depends on the needs and utility of the ICT tools as per the purpose served.

Key words: Utilization, ICTs, extension system, agriculture

INTRODUCTION

Agricultural Extension is a service or system which assists farmers through educational procedures in improving farming methods and techniques, increasing production efficiency and income, bettering their levels of living and lifting the social vsit *etc.* and educational standards of rural life (Maunder, 1973). Agricultural extension services include transferring knowledge to farmers, advising and educating farmers in their decision making, enabling farmers to clarify their own goals and possibilities, and stimulating desirable agricultural developments. Traditional public-sector extension services use a variety of extension programmes to overcome barriers to technological adoption without much success (Aker, 2010).

Access to information and improved communication is a crucial requirement for sustainable agricultural development. Modern communication technologies when applied to conditions in rural areas can help to improve communication, increase participation, and disseminate information and share knowledge and skills.

Agricultural Extension, in the current scenario of a rapidly changing world, has been recognised as an essential mechanism for delivering knowledge (information) and advice as an input for modern farming and the role of ICT in actualizing so has drawn interest of practitioners (Richardson, 2003).

Traditionally, extension use to transfer the knowledge from researchers or external experts to farmers through training, demonstrations and field visits. These programmes rely on face-to-face teaching and learning, tend to be propagated slowly, and are small in scale and limited in coverage. Hence, limited extension service could not be able to reach the majority of the farmers scattered over larger geographical area. This gap remains a challenge for extension system even today. The extension system has yet to exploit the full potential of the ICT tools, mass media and other communication techniques. However development of communication and mass media like radio and print media have long been part of extension systems but not received adequate attention or finance. At present the information and communication technology (ICT) revolution has made the extension function more efficient and effective and provide extension systems with opportunities to deliver new information services to the clients. Now-a-days, it also provides new options for accessing information by providing it directly to farmers and rural households by extension agents, agribusiness, and other intermediaries.

METHODOLOGY

A descriptive research design and exploratory study were adopted for present investigation. The present study was conducted in Ranga Reddy district of Andhra Pradesh purposively as it is the one of the major state where a

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number of ICT projects are being implemented. A proportionate number of respondents were selected both from public and private sectors. For public organizations, respondents were taken from State Department of Agriculture, Ministry of Agriculture-National Institute of Agricultural Extension Management (MANAGE) GoI, State Agricultural University-Acharya NG Ranga Agricultural University (ANGRAU) and ICAR institutes. For private sector, respondents were purposively selected from Nagarjuna fertilizers, ETV, TV5, e-choupal (ITC) *etc.* for the study. A proportionate sample of 60 respondents were randomly selected from State Department, Research and Development (R&D) sector and private organizations for the study respectively. Thus a total of 180 respondents were selected for the study. R&D sector has respondents from SAU (ANGRAU)-KVKs, DAATTCs and ICAR institutes. The data were collected with the help of questionnaire.

RESULTS AND DISCUSSION

Personal Profile of the Respondents

Personal profile of the respondents has the basic information on age, gender, education, nativity, number of years of service and major job responsibility area. The same was presented in Table 1.

It is clear from the Table that slightly more than half (51.67%) of the respondents were young followed by middle (28.33%) and old age (20.00%). From the R&D sector, majority (36.37%) of the respondents were old age followed by middle (33.33%) and young (30.00%) whereas in SDA, majority of the respondents belonged to young age (60.00%) followed by middle (21.67%) and old age (18.33%). The same trend was observed in private sector *i.e.* majority of the respondents (65.00%) were young followed by middle (30.00%) and old age (5.00%). The reason of variability in terms of age between R&D sector, SDA sector and Private sector respondents may be due to minimum educational criteria to be employed in the respective departments. With respect to educational status of the respondents, majority of them were post-graduate (60.56%) followed by doctorates (21.11%) and graduates (18.33%). The percentage of the graduate respondents in the present study was high in State Department of Agriculture. Not a single respondent from Research and Development (R&D) and private sector belonged to graduate category as the minimum educational criteria for R&D and private sector was post-graduate. The educational status of the respondents shows that from R&D sector not a single respondent was graduate. Majority (58.33%) of the respondents were doctorate followed by post-graduate (41.67%). The reason of

absence of exclusive graduate respondents was the minimum essential educational level for entry to the occupation was post-graduation. In SDA, a slightly more than half of the respondents were graduate (55.00%) followed by post-graduate (45.00%). Not a single respondent from SDA was doctorate. The reason might be that the minimum essential qualification to entry into the SDA is graduation, so the higher education is not seen in comparison to R&D and private sector. In private sector also majority of respondents were post-graduate (95.00%) followed by doctorate (05.00%). Not a single respondent was graduate in private sector as well as in R&D sector.

In the area of nativity, majority (36.11%) of the respondents belonged to urban area followed by rural (32.78%) and semi-urban (31.11%). With respect to nativity, it is clear from the table that an equal number of R&D sector respondents belonged to rural (36.67%) and urban areas (36.67%) followed by semi-urban area (26.67%) whereas majority (41.67%) of the SDA respondents were hailing from rural areas followed by urban (30.00%) and semi-urban (38.33%). In private sector majority (41.67%) of the respondents belonged to urban areas followed by semi urban (28.33%) and rural areas (20.00%).

Numbers of years of service was categorized as less, medium and more and majority of the respondents fell into less years of service (59.44%) followed by medium (22.22%) and more (18.33%). The low percentage of number of years of service might be due to the reason that majority of them belonged to the young age category. With regard to number of years of service, from R&D sector, a slightly higher than half of the respondents (51.56%) belonged to less years of service followed by more (25.00%) and medium (23.33%). About 67 per cent respondents from SDA were falling into less number of years of service followed by middle (21.67%) and more (11.67%). From private sector, 60 per cent respondents were falling into less years of service followed by middle (21.67%) and more (18.33%).

The major job responsibility area was the area where the respondent was giving their services to a major portion. It was categorized as extension, research, training and administration. From the table, it is clear that majority (70.00%) of the respondents belonged to the area of extension as the major job responsibility followed by research (13.33%), training (11.11%) and administration (05.56%). In R & D sector, majority (53.33%) of the respondents were involved in extension followed by research (23.33%), training (18.33%) and administration (05.00%). About 89 per cent respondents from SDA

sector were involved in extension followed by 12 per cent involved in the major job area administration. Not a single respondent from SDA was involved in either research or training as major job responsibility. About 69 per cent respondents from private sector were involved in extension followed by research (16.67%) and training (15.00%). Not a single respondent was in administrative side of the job. Thus it could be concluded from the Table 1 that in R&D sector, majority of the respondents were old, male, doctorate, hailing from both rural and urban areas, had less experience in job and extension was the major job responsibility. From SDA, majority of the respondents were young, male, graduate, hailing from rural areas, fall into low category of number of years of service and extension was the major job responsibility. From private sector also, majority of the private sector respondents were young, male, post graduate, hailing from urban areas, had less years of service and extension was the major job responsibility.

Table 1: Personal profile of the Respondents working in R&D, SDA and Private sector

Characteristics	Category	R&D* Sector (n=60)	SDA** (n=60)	Private Sector (n=60)	Total (N=180)
Age	Young	18 (30.00)	36 (60.00)	39 (65.00)	93 (51.67)
	Middle	20 (33.33)	13 (21.67)	18 (30.00)	51 (28.33)
	Old	22 (36.67)	11 (18.33)	03 (05.00)	36 (20.00)
Gender	Male	39 (65.00)	36 (60.00)	41 (68.33)	116 (64.44)
	Female	21 (35.00)	24 (40.00)	19 (31.67)	64 (35.56)
Education	Graduate	00 (00.00)	33 (55.00)	00 (00.00)	33 (18.33)
	Post graduate	25 (41.67)	27 (45.00)	57 (95.00)	109 (60.56)
	Doctorate	35 (58.33)	00 (00.00)	03 (05.00)	38 (21.11)
Nativity	Rural	22 (36.67)	25 (41.67)	12 (20.00)	59 (32.78)
	Semi-urban	16 (26.67)	17 (28.33)	23 (38.33)	56 (31.11)
	Urban	22 (36.67)	18 (30.00)	25 (41.67)	65 (36.11)
No. of years of Service	Low (less than 5 years)	31 (51.67)	40 (66.67)	36 (60.00)	107 (59.44)
	Middle (5 to 10 years)	14 (23.33)	13 (21.67)	13 (21.67)	40 (22.22)
	High (more than 10 years)	15 (25.00)	07 (11.67)	11 (18.33)	33 (18.33)
	Extension	32 (53.33)	53 (88.33)	41 (68.33)	126 (70.00)
Major job responsibility area	Research	14 (23.33)	00 (00.00)	10 (16.67)	24 (13.33)
	Training	11 (18.33)	00 (00.00)	09 (15.00)	20 (11.11)
	Administration	03 (05.00)	07 (11.67)	00 (00.00)	10 (05.56)

Figures in parentheses indicate percentage
*R&D= Research and Development **SDA= State Deptt. of Agriculture

Utility of ICTs in Extension

An effort was made to know about the basic information on what are the ICT tools that were used and useful in agricultural extension system. A list of ICT tools was prepared with possible areas where ICTs may be used. From the table presented below, it could be understood that the use of ICT tools depends on the purpose and organizational work priority *i.e.*, research, extension or teaching. The use of ICT tools may be from planning to final transfer of the technology. However, this is a primitive work regarding utility of ICTs in extension and more in depth work is needed in future.

The data present in Table 2 showed the detailed scenario of utility of ICT tools in extension. All the listed ICTs tools were perceived useful by all respondents. The only difference was with respect to the utility of particular ICT tool with the particular use. For easy understanding, ICT tools were classified into audio visual systems, telecommunication facilities, computer electronics/communication networks, computer software and other specific tools.

Majorly useful ICT technologies in agricultural extension system accorded by the respondents were digital camera, video camera, e-mail, internet, Kisan Call Centres, landline *etc.* It is interesting to note that respondents had positive perception towards the modern ICT tools. Each ICT tool had utility to some extent according to the purpose served by the particular ICT tool. Senthilvadivoo (2007) from her study concluded that Multimedia (IMCD) aims at the diffusion of good agricultural practices and novel farm technologies. Diffusion fast through active involvement and participation of farmers with the help of computer based user friendly Interactive Multimedia Compact Disc (IMCD).

Television and radio as audio visual systems were near about equally rated ICT technologies, which were found effective in transfer of technology. The usage percentage of telecommunication facilities showed that respondents were well aware about the perceived use of newer technologies in the field of agricultural extension like use of teleconferencing, videoconferencing, and satellite communication besides the effective use of telephone, digital camera and video camera.

With the advancement of development, use of effective and sustainable technologies also increase. Same trend is also true in case of computer electronics/communication networks. The findings clearly showed that with the introduction of information

age, use of internet/e-mail/search engines *etc.* were also making dent in agricultural development as technology transfer mechanism.

Although use of very sophisticated technologies like mobile telephony, community radio, specific knowledge portals digital video transmissions, expert database, learning management system, global positioning system, decision support system *etc.* were less in comparison to landlines, farmers call centres and other technologies. The most probable reason of this may be due to less technical and working knowledge of sophisticated technologies among its stakeholders specially extension personnel in technology dissemination. It can be concluded from the table that majority of the ICT tools were useful in transfer of technology except few like

Satellite Tele-communication, internet, intranet, Spreadsheets, Learning Management System (LMS), Global Positioning System (GPS) units/Geographical Information System, Statistical Package for Social System and Decision Support System. As in general the use of more sophisticated and advance form of ICTs is associated with complex nature of extension/technology dissemination system.

The use of online social networking sites for various extension activities is still very less. The reason for this may be extension personnel are unaware about the diverse and innovative use of online social networking in agricultural extension system besides its entertainment purpose uses.

Table 2. Utility of ICTs in Extension as perceived by the Respondents

ICTs Technologies	Useful	Purpose of Utility															
		P	I	E	M	F	GM	GD	FV	FM	A	Ex	D	L	C	T	TOT
Audio-visual systems																	
Television sets	180 (100.0)	34 (18.8)	93 (51.0)	56 (31.1)	23 (12.8)	42 (23.3)	62 (34.4)	56 (31.1)	69 (38.3)	81 (45.0)	91 (50.6)	139 (77.2)	96 (53.3)	72 (40.0)	69 (38.3)	173 (96.7)	167 (92.7)
Radio	180 (100.0)	23 (12.7)	79 (43.8)	56 (31.1)	34 (18.9)	69 (38.3)	72 (40.0)	72 (40.0)	52 (28.9)	79 (43.8)	132 (73.3)	21 (11.7)	83 (46.1)	42 (23.3)	21 (11.7)	94 (52.2)	174 (96.6)
Telecommunication facilities																	
Telephone	180 (100.0)	69 (38.3)	74 (41.1)	112 (62.2)	103 (57.2)	149 (82.2)	21 (11.6)	11 (6.1)	120 (66.7)	69 (38.3)	180 (100.0)	62 (34.4)	11 (6.1)	42 (23.3)	11 (6.1)	162 (90.0)	180 (100.0)
Satellite Tele Communication	180 (100.0)	82 (45.5)	64 (35.6)	82 (45.6)	110 (61.1)	45 (25.0)	52 (28.8)	43 (23.8)	63 (35.0)	83 (46.1)	156 (86.7)	151 (83.9)	162 (90.0)	172 (95.6)	132 (73.3)	65 (36.1)	94 (52.2)
Video Conferencing	180 (100.0)	93 (51.6)	126 (70.0)	106 (58.9)	168 (93.3)	180 (100.0)	110 (61.1)	102 (56.6)	00 (0.0)	93 (51.6)	78 (43.3)	52 (28.9)	174 (96.7)	173 (96.1)	169 (93.9)	162 (90.0)	157 (82.2)
Tele Conferencing	180 (100.0)	70 (38.8)	103 (57.2)	106 (58.9)	168 (93.3)	180 (100.0)	110 (61.1)	102 (56.6)	00 (0.0)	93 (51.6)	78 (43.3)	52 (28.9)	174 (96.7)	173 (96.1)	169 (93.9)	121 (67.2)	145 (80.5)
Digital Camera	180 (100.0)	91 (50.5)	52 (28.9)	156 (86.7)	162 (90.0)	69 (38.3)	180 (100.0)	180 (100.0)	180 (100.0)	162 (90.0)	180 (100.0)	93 (51.6)	78 (43.3)	92 (51.1)	62 (34.4)	82 (45.6)	175 (97.2)
Video Camera	180 (100.0)	89 (49.4)	68 (37.8)	156 (86.7)	162 (90.0)	69 (38.3)	180 (100.0)	180 (100.0)	180 (100.0)	162 (90.0)	180 (100.0)	93 (51.6)	78 (43.3)	92 (51.1)	62 (34.4)	142 (78.9)	134 (74.4)
Computer Electronic/ Communication networks																	
Internet	180 (100.0)	173 (96.1)	89 (49.4)	83 (46.3)	78 (43.3)	149 (82.2)	145 (80.5)	162 (90.0)	00 (0.0)	136 (75.5)	139 (77.2)	90 (50.6)	145 (80.6)	52 (28.9)	67 (37.2)	42 (23.3)	89 (49.4)
Search engines	180 (100.0)	168 (93.3)	110 (61.1)	83 (46.3)	78 (43.3)	149 (82.2)	145 (80.5)	162 (90.0)	00 (0.0)	136 (75.5)	139 (77.2)	72 (40.0)	145 (80.6)	77 (42.8)	67 (37.2)	51 (28.3)	102 (56.6)
Email	180 (100.0)	152 (84.4)	127 (70.0)	32 (17.8)	42 (23.3)	115 (63.9)	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	113 (62.2)	00 (0.0)	00 (0.0)	64 (35.6)	132 (73.3)	63 (35.0)	134 (74.4)
Intranet	180 (100.0)	38 (21.1)	57 (31.7)	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	00 (0.0)	67 (37.2)	00 (0.0)	78 (43.3)	56 (31.1)	56 (31.1)	82 (45.5)

PERCEIVED UTILITY OF INFORMATION AND COMMUNICATION TECHNOLOGIES
IN AGRICULTURAL EXTENSION SYSTEM

137

Computer software																		
Spreadsheets	180	59	45	00	00	00	00	00	00	00	00	00	00	00	63	23	31	34
	(100.0)	(32.7)	(25.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(35.12)	(12.78)	(17.22)	(18.89)
Community Radio/Farm Radio	180	32	61	52	68	92	123	76	12	65	52	35	134	36	67	112	135	
	(100.0)	(17.7)	(33.89)	(28.89)	(37.78)	(51.11)	(68.33)	(42.20)	(6.67)	(36.11)	(28.89)	(19.44)	(74.44)	(20.00)	(37.22)	(62.22)	(75.00)	
Specific Knowledge Portals (Rice Doctor, Honey bee, RKMP, AGMARKNET, Digital Mandi, e-Sagu etc.)	180	79	93	12	54	83	134	156	00	127	162	135	162	128	139	153	161	
	(100.0)	(43.8)	(51.67)	(6.67)	(30.00)	(46.11)	(74.44)	(86.67)	(00.00)	(70.56)	(90.00)	(75.00)	(90.00)	(71.11)	(77.22)	(85.00)	(89.44)	
Mobile telephony (Mobile SMS, Mobile learning)	180	69	83	78	53	104	156	23	65	163	175	11	00	83	00	172	180	
	(100.0)	(38.3)	(46.11)	(43.33)	(29.44)	(57.78)	(86.67)	(12.78)	(36.11)	(90.56)	(97.22)	(06.11)	(00.00)	(46.11)	(00.00)	(95.56)	(100.00)	
Landline	180	52	89	56	56	180	34	52	00	67	129	134	12	00	00	180	180	
	(100.0)	(28.8)	(49.44)	(31.11)	(31.11)	(100.00)	(18.89)	(28.89)	(00.00)	(37.22)	(71.67)	(74.44)	(06.00)	(00.00)	(00.00)	(100.00)	(100.00)	
Farmers Call Centre	180	79	112	78	93	180	62	00	00	00	156	00	00	00	00	180	180	
	(100.0)	(43.8)	(62.22)	(43.33)	(51.67)	(100.00)	(34.44)	(00.00)	(00.00)	(00.00)	(86.67)	(00.00)	(00.00)	(00.00)	(00.00)	(100.00)	(100.00)	
Online social networking	180	61	82	56	89	83	42	59	00	54	180	12	31	21	11	27	89	
	(100.0)	(33.8)	(45.56)	(31.11)	(49.44)	(46.11)	(23.33)	(32.78)	(00.00)	(30.00)	(100.00)	(06.07)	(17.22)	(11.07)	(06.11)	(15.00)	(49.44)	
Digital video transmissions	180	106	132	11	16	82	134	129	172	152	180	156	162	124	116	69	154	
	(100.0)	(58.8)	(73.33)	(06.11)	(08.89)	(45.56)	(74.44)	(71.67)	(95.56)	(84.44)	(100.00)	(86.67)	(90.00)	(68.89)	(64.44)	(38.33)	(85.56)	
Expert database /Expert system	180	134	145	56	32	92	153	132	00	142	31	67	82	101	103	51	104	
	(100.0)	(74.4)	(80.31)	(31.11)	(17.78)	(51.11)	(85.00)	(73.33)	(00.00)	(78.89)	(17.22)	(37.22)	(45.56)	(56.11)	(57.22)	(28.33)	(57.78)	
Kiosks/Common Service Centers (CICs)	180	156	167	72	94	180	167	162	00	173	180	129	132	82	73	61	158	
	(100.0)	(86.6)	(92.78)	(40.00)	(52.22)	(100.00)	(92.78)	(90.00)	(00.00)	(96.11)	(100.00)	(71.67)	(73.33)	(45.56)	(40.33)	(33.89)	(87.78)	
Learning Management System (LMS)	180	92	117	73	92	131	80	134	00	67	72	00	00	92	00	31	73	
	(100.0)	(51.1)	(65.00)	(40.56)	(51.11)	(72.78)	(44.44)	(74.44)	(00.00)	(37.22)	(40.00)	(00.00)	(00.00)	(51.11)	(00.00)	(17.22)	(40.56)	
Global Positioning System (GPS) units/Geographical Information System	180	79	95	82	97	15	82	74	42	56	82	92	132	92	82	120	47	
	(100.0)	(43.8)	(52.78)	(45.56)	(53.89)	(08.33)	(45.56)	(41.11)	(23.33)	(31.11)	(45.56)	(51.11)	(73.33)	(51.11)	(45.56)	(96.67)	(26.11)	
Statistical Package for Social System	180	52	84	134	00	00	00	00	00	00	00	00	00	00	00	26	41	
	(100.0)	(28.8)	(46.74)	(74.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(14.22)	(22.78)	
Decision Support System	180	61	156	60	40	45	00	00	00	00	00	00	00	00	00	23	41	
	(100.0)	(33.8)	(86.67)	(33.33)	(22.22)	(25.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(00.00)	(12.78)	(22.78)	

Figures in parentheses indicate percentage

P=Planning, I=Implementation, E=Evaluation, M =Monitoring, F =Feedback, GM= Group Meetings, GD= Group Discussions, FV= Field Visits, A= Awareness, FM= Farmers' Meetings, Ex= Exhibition, D= Demonstration, T =Training, TOT= Transfer of Technologies, L= Lectures, C= Conferencing

CONCLUSION

The findings show the perception of the extension personnel towards the use of ICTs in agricultural extension system. It should be the responsibility of the policy makers that they should promote and make the extension personnel aware towards the diverse use of the modern ICT tools as per need and utility in present agricultural extension system. According to a study conducted by Hedjazi *et al.* (2006) on factors affecting the use of ICTs by Iranian agriculture extension specialists the results revealed that specialist's level of knowledge

and skill in producing and preparing papers were more than their skill in producing other ICT-related materials. This could be achieved by focusing on the issues like proper planning, management, provision of budget, budgeting, capacity building and promotional activities. In the present scenario of agricultural development, the importance on ICTs cannot be neglected. The future of agriculture demands the proper use of the effective technologies to cater the diversified emerging needs of the clientele which can be fulfilled by the effective use of the effective technologies whether traditional or the modern or the blended form and no doubt ICTs could be a better

option to achieve the aim of sustainable agriculture. In the same connection, Mishra (2008) suggested that more research and development in the ICTs will not only help in the development and information area but will also help people to get skill, knowledge etc. easily if the gadgets are in affordable limits. The information and communication technology has got a very high stake for development of various combinations, which can be adopted in the traditional market and society.

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