Preferential Perception Towards Use of ICTs in Agricultural Extension System: A Study from Telengana

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ABSTRACT

With emerging needs of farmers, role of agricultural extension personnel has been diversified and widened. To tackle the agricultural challenges in present scenario, there is a need to take advantages of newer communication technologies with blend of traditional technologies to solve the farmers' problems. In this connection, Information and communication technologies have emerged as a convenient ways to resolve the complications in agricultural extension system. From more than two decades, Indian agriculture has witnessing and benefitting from the use of ICTs in agriculture. Various offline and online efforts are made and use of modern ICTs in agricultural extension service delivery has enhanced the efficiency of Research-Extension-Farmer-Market linkage system much greatly. But the users of this new technology are also facing operational problems. The present study focused on the constraints faced by the extension personnel to use ICTs in agricultural extension professionals. Findings showed that only implementation of ICTs are not important for the success of any ICTs initiative. Instead issues like budget, policy, administration, infrastructural, capacity building and other soft issues has to be catering to make ICTs a more successful and profitable in agricultural extension system with the focus on sustainability.

Key words: *ICTs; Constraints; Problems; RBQ; Agriculture extension system;*

The 'Task Force on India as Knowledge Superpower' (*GOI, 2001*) emphasized the necessity of developing the capacity to generate, absorb, disseminate and protect knowledge and exploit it as a powerful tool to derive societal transformation. Information and Communication Technology (ICT) can play a significant role in achieving such a transformations it consists of three main technologies; Computer Technology, Communication Technology and Information Management Technology. These technologies are applied for processing, exchanging and managing data, information and knowledge. Recent developments in information and communications technology (ICT) offer a great opportunity to facilitate the flow of information and technology services delivery especially to the farmers (*Maningas, 2006*).

With emerging diverse needs of farmers, role of agricultural extension personnel has been diversified and widened. To tackle the agricultural challenges in present scenario, there is a need to take advantages of newer communication technologies with blend of traditional technologies to solve the farmers' problems. In this connection, Information and communication technologies have emerged as a convenient ways to resolve the complications in agricultural extension system. Agricultural extension is central in formulating and disseminating knowledge, and in teaching farmers to be competent decision makers. Therefore, extension plays an important role in most of agricultural development projects. The primary goal of agricultural extension is to assist farming families in adapting their production and marketing strategies to rapidly changing social, political and economic conditions so that they can shape their lives according to their personal preferences and those of the community in the long term. Information and Communication Technology (ICT) in agriculture is focusing on the enhancement of agricultural and other development in India. The Agriculture sector is gearing

itself to make optimal use of the new information and communication technologies. The diffusion of ICTs has contributed enormously to the growth of economies in developed nations and developing nations and is earnestly facilitating policy framework to ensure an equitable diffusion of new technologies. According to *Swanson and Rajalahti (2010)*, ICTs in agriculture promote and distribute new and existing farming information and knowledge which is communicated within the agricultural sector since information is essential for facilitating agricultural and rural development as well as bringing about social and economic changes.

METHODOLOGY

The present study was conducted in Ranga Reddy district of Andhra Pradesh purposively. A proportionate number of respondents were selected both from public and private sectors. For public organizations, respondents were taken from State Department of Agriculture. For R&D sector, respondents were drawn from National Institute of Agricultural Extension Management (MANAGE), Krishi Vigyan Kendras, District Agricultural Advisory and Transfer of Technology Centre *(DAATTC)*of State Agricultural University-Acharya N G Ranga Agricultural University (ANGRAU) and ICAR institutes. For private sector, respondents were taken from Nagarjuna fertilizers, ETV, TV5, e-choupal (ITC) etc. A proportionate sample of 60 respondents from each of these categories was selected randomly for the study. Thus, a total of 180 respondents were selected for the study. Care was taken to draw a representative sample involved in ICT enabled extension.

The data obtained from the respondents regarding the problems faced with reference to (ICTs) was quantified in terms of the number of respondents who gave the particular rank. The ranks attributed for different problems and the frequency of respondents who gave ranks used for the calculation of Rank Based Quotient (RBQ). The formulae for RBQ calculation is as follows.

$$RBQ = \frac{\sum_{i=1}^{n}(Fi)(n+1-i)}{Nn} \times 100$$

Where,

Fi = Frequency of respondents for $_{i}^{th}$ rank

N = Number of respondents

n = Number of Ranks

$\sum_{i=1}^{n}$ = It directs to sum multiple factors

$\sum_{i=1}^{n}(Fi)(n+1-i) = F_1 \times n + F_2 \times n\text{-}1 + F_3 \times n\text{-}2 \ldots\ldots F_n \times 1$

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 total respondents were young followed by middle (28.33%) and old age (20.00%). With respect to gender, it is evident from the table that about 65 per cent respondents were male while only about 35 per cent respondents were female. Although the percentage of male is more in comparison to the female, still the percentage of women, who had experience in using ICTs, is encouraging. 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 was belonged to graduate category because either post-graduation or the doctorate was the minimum educational criteria for R&D and private sector to enter into the job. 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%). Numbers of years of service was categorized as low, medium and high. Majority of the respondents fall into low category of years of service (59.44%) followed by medium (22.22%) and high (18.33%). The low percentage of number of years of service might be due to the reason that majority of the respondents belonged to the young age category. 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 the administration. From the table, it is clear that majority (70.00%) of respondents belonged to the area of extension as the major job responsibility followed by research (13.33%), training (11.11%) and administration (05.56%).

Thus it could be concluded from the Table 1 that majority of the respondents were young, male, post graduate, belong to urban area, falling into low category of service and extension as the major job responsibility area.

Table 1 also gives the detailed in depth information

on the personal profile of the respondents belonging to R&D, SDA and Private sector.

It could be seen from the Table 1 that from the R&D sector, majority (36.37%) of the respondents were of old age followed by middle (33.33%) and young (30.00%) whereas in SDA, majority of the respondents belong 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 (05.00%).

With respect to Gender, near about the same trend was found in R&D sector, SDA and private sector. Majority (65.00%) of respondents from R&D sector were male followed by female (35.00%). In SDA, the majority of the respondents were male (60.00%) followed by female (40.00%). About 69 per cent respondents were male followed by female (31.67%) from private sector. It is evident that the percentage of women taken for study was more in R&D and SDA in comparison to private sector. The reason behind this difference might be due to more work specialization focus in R&D and SDA in comparison to private sector.

The educational status of the respondents shows that majority (58.33%) of the R&D sector respondents were doctorate followed by post-graduate (41.67%). Not a single respondent was graduate. The reason of absence of graduate respondents is the minimum essential educational level of 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 was post-graduate (95.00%) followed by doctorate (05.00%). Not a single respondent was found graduate in private sector as well as in R&D sector.

With regard to number of years of service from R&D sector, a slightly higher than half of the respondents (51.56%) were belonged to low years of service followed by high (25.00%) and middle (23.33%). About 67 per cent respondents from SDA were falling into low category of number of years of service followed by middle (21.67%) and high (11.67%). From private sector 60 per cent respondents were belonging to low years of service followed by middle (21.67%) and high (18.33%).

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 respondent's major job area was 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 administration side of the job. The present research findings are supported by *Hedjazi et al. (2006), Adesope et al. (2007)* and *Kiran (2007).*

So, it could be summarized from the table that in R&D sector, majority of the respondents were old, male, doctorate, hailing from both rural and urban areas, have 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, have less years of service and extension was the major job responsibility.

Possession of Smart Gadgets (ICTs) : Table 2 gives the picture of possession of smart gadgets (ICTs) by the respondents. It is clearly evident from the table that majority (82.22%) of the respondents have personal computer/laptop. About 69 per cent of the respondents have personal computer/laptop with internet connection. Cent percent respondents have the mobile phone while a little less than half of the respondents (45.56%) have smart phone. It is also interesting finding that until possession of smart phone is not much but use of internet in mobile phone/smart phone (46.67%) is a welcoming effort. It shows that regardless of type of mobile like smart phone/mobile phone, the internet use percentage is good among the respondents.

So, it can be concluded from the above table that the respondents have better possession of smart gadgets (ICTs) at their personal level with internet facility. This

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

Characteristics	Category	R&D (n=60)	SDA(n=60)	Private (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)
Major job responsibility area	Extension	32 (53.33)	53 (88.33)	41 (68.33)	126 (70.00)
	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

trend can be better utilize in future to train the extension personnel on use of ICTs in transfer of technology, especially through mobiles, which they have at their own level. The research findings are supported with *Frempong et al. (2006).*

Table 2. Distribution of Respondents according to possession of Smart Gadgets (ICTs) (N=180)

Smart Gadgets	No.	%
Personal computer / Laptop	148	82.22
Personal computer/ Laptop with internet	123	68.33
Mobile phone	180	100.00
Smart phone	82	45.56
Mobile phone/Smart phone with internet	84	46.67

Sources of awareness about ICTs : Table 3 highlights the information on sources of awareness about ICTs by the respondents. It is clear from the table that about 94 per cent respondents have awareness about ICTs through interpersonal communication channels like family members, friends and colleagues followed by mass media channels (84.44%) like newspaper/ magazines/books etc., trainings (81.67%) and internet (57.78%). It could be seen from the table that slightly more than half of the respondents (57.78%) had undergone trainings on ICTs. There is also an interesting finding that internet itself is a good source of awareness about ICTs which will further can be utilized for the above said purpose. Authentic sources for authentic information are the critical factor which needs attention when awareness is created for ICTs. It should be also important to notice that interpersonal sources are still a good source of information on ICTs besides mass media sources whereas trainings as sources of information about ICTs are far lagging behind. So, it should be priority of the respective departments or the policy makers to update and make aware respondents about ICTs through trainings also so that they can get working practical knowledge on ICTs. However it is very difficult to delineate the contribution of each of the sources of information about ICTs.

Table 3. Distribution of Respondents according to sources of awareness about ICTs (N=180)

Source of Information	No.	%
Interpersonal communication (Family members, Friends/Colleagues)	169	93.89
Mass media (Newspaper /Magazines/Books, Office/Institution etc.)	152	84.44
Trainings	104	57.78
Internet	147	81.67

Problems perceived by agricultural extension personnel with reference to use of ICTs in agricultural extension system : Table 4elucidates the problems faced by the respondents in the use of ICTs.

For easy understanding, problems faced in effective utilization of ICTs categorized into six broad categories, i.e., problems related to acquisition of ICTs facilities and services, problems related to information acquisition, problems related to information processing, problems related to information storage and retrieval, problems related to information diffusion and problems related to information utilization.

Two main problems were identified by the respondents under the category problems related to acquisition of ICTs facilities and services. The very first problem was provision of fewer funds received far below the standard costs of ICTs facilities. The second one was the poor perception of ICTs services by the top officials in the parent institutions.

About 89 per cent respondents suggest that Provision of fewer funds received far below the standard costs of ICTs facilities hinders the effective utilization of the ICTs. In general, the agricultural extension system has from many years receiving the very little funds from the government. Normally there are no specific funds allocated for acquisition of ICTs facilities. This implies that funds for acquisition of new ICT facilities and services can only be found by reallocating or redirecting the funds obtained.

About 51 per cent respondents perceived the problem of Poor perception of ICTs services by the top officials in the parent institutions. Lack of knowledge about the potential and value of ICTs in TOT by the top officials will discourage the employees to use the ICTs in their job which is correctly perceived by the respondents.

There were two main problems faced by the respondents in information acquisition. The problem 'Identification of the credible source of information' ranked first with about 82 per cent followed by the problem 'Lack of skill in acquiring information about ICTs' with about 85 per cent.

With regard to problems faced in information processing, there were six main problems perceived by the respondents. 'Difficulty in developing content in local language' was the major problems faced by the respondents followed by ICTs are not in workable condition. The development of content in local language is pivotal to ensuring equitable access to ICTs. Linguistic diversity and widespread illiteracy are the particular challenges. The expertise in understanding, familiarization and use of local languages is not an easy task. Hence the respondents correctly perceived this problem. The content delivered through ICTs should be in vernacular language matching with the diverse needs of the widespread and various categories of the respondents. This content should be validated proper before delivering it to the intended users. But absence of content validation was another important problem perceived by the respondents which ranked among the problems of information processing. The objective behind the use of ICTs IS that more and better information and communication furthers the development of farming community. The extension personnel be sure that the information provided by them should be reasonable, valid, useful and solve the problems of farming community. ICTs cannot check the data whether it is correct or not. It is the extension personnel should verify, check and validate the information before dissemination to the intended users. For this, if validated information is readily available, no problem but identifies the reliable sources of content is of prime importance. For proper content development ICTs are not in working condition and there should be proper facility, this problem expressed by majority of the respondents ranked second as well as non-availability of expertise to process the complex information also felt by the respondents and ranks third.

The other challenge in use of ICTs is that 'development of matching content suitable to various stakeholders'. Firstly, the extension personnel have to identify and analyze stakeholders and their interests. Developing content separately for all the stakeholders is waste time and budget. Development of matching content for all the stakeholders is really a herculean task and need lot of expertise and familiarization. Hence, the respondents correctly perceived this problem in information processing.

Information storage and retrieval is another important advantage of ICTs which facilitate creation, searching and modification of stored data. It should be accessible to all the stakeholders but not all the information. For storage and retrieval it requires strong centralization network with latest hardware and should rapidly adapt to changing demands and resources. Otherwise, it may ensure catastrophic data loss. In this context, the respondents rightly pointed out that 'Virus problem', 'no technical knowhow' and 'outdated ICTs'

Table 4. Problems perceived by the respondents with reference to use ofICTs in agricultural extension system (N=180)

Problems	No. (%)	Rank						RBQ (%)	Ranking[1]	Rank[2]
		1	2	3	4	5	6			
Problems related to acquisition of ICTs facilities and services										
Provision of fewer funds for ICTs	160 (88.89)	108	52	-	-	-	-	71.11	I	VI
Poor perception of ICTs services by the management	145 (80.56)	94	51	-	-	-	-	66.39	II	VII
Problems related to information acquisition										
Identification of the credible source of information	147 (81.67)	131	16	-	-	-	-	77.22	II	V
Lack of skills in information acquisition through ICTs	153(85.00)	143	10	-	-	-	-	82.22	I	II
Problems related to information processing										
Difficulty in developing content in local language	167(92.78)	105	29	11	10	04	08	80.09	I	IV
Matching content for the various stakeholders in their form	85 (47.22)	30	19	16	06	10	04	35.67	VI	
Difficult to compiled and disseminate huge information	117(65.00)	38	24	16	09	14	16	44.72	V	
Absence of content validation	112(62.22)	40	24	18	12	10	08	45.93	IV	
Most of the ICTs are not in workable condition	142(78.89)	52	28	25	19	12	06	59.17	II	VIII
No availability of expertise	121(67.22)	47	24	10	15	15	10	48.80	III	
Problems related to information storage and retrieval										
Virus problem	156(86.67)	134	12	10	-	-	-	80.74	I	III
Outdated ICTs	96(25.56)	65	21	10	-	-	-	45.74	III	
No Technical know how	134(74.44)	78	26	30	-	-	-	58.52	II	X
Problems related to information dissemination										
Power cut/interrupted power supply know how	180(100.00)	160	20	-	-	-	-	97.78	I	I
Lack of proper communication tools	106(58.89)	36	26	24	12	08	-	43.11	V	
Lack of awareness about ICTs tools	143(79.44)	63	32	20	18	10	-	52.00	IV	
Slow internet connectivity	118(65.56)	58	26	14	12	08	-	58.67	II	IX
Problems related to information utilization										
Lack of proper knowledge on usage of different internet modules	104(57.78)	54	30	10	10	-	-	46.67	II	
No timely availability of resource person	82 (45.56)	45	15	10	12	-	-	39.17	IV	
Latest ICTs mostly not available	92 (51.11)	43	26	13	10	-	-	39.72	III	
Lack of trainings on ICTs	114 (63.33)	79	15	10	10	-	-	54.31	I	

Figures in parentheses indicate percentage; Ranking[1]=Ranking within category; Rank[2]=Overall Rank

were the main problems in information storage and retrieval.

Five problems were identified by the respondents in information dissemination. The major problem was Power cut/interrupted power supply followed by Slow internet connectivity, No Technology know how, Lack of awareness about ICTs tools and Lack of proper communication tools. When one is planning about the technology dissemination through ICTs, regular power supply is the most important fact as dissemination of right information at a right time to right users at right cost matters a lot. For this, one should also know about

the proper communication tools/ICTs tools which are suitable for particular type of information and its dissemination. For effective information dissemination not only the proper technology but the proper techniques for content development and technology dissemination is also necessary.

The last category of the problem identified was problems in information utilization and four problems were perceived by the respondents under this category. The most important problem identified was lack of trainings on ICTs followed by lack of proper knowledge on usage of different internet modules, latest ICTs mostly not available and no timely availability of resource person. It could be interpreted from the table trainings are vital in developing ICTs starting from the information acquisition to diffusion and utilization. Besides trainings, availability of experts and the knowledge of using ICTs are also very important.

CONCLUSION

To sum up, it can be reiterate from the findings that power supply is one of the major problems identified by the respondents in all stages of effective use of ICTs followed by content development, expert availability, trainings and working conditions of ICTs. As these all problems are connected to each other so these problems should handle with care and in integrated mode instead of isolation mode.

From the same table, it could be inferred that on an average, power cut problem was ranked first followed by lack of skills in in information acquisition through ICTs. The third ranked problem was virus problem during storage or retrieval followed by difficulty in developing content in local language. The fifth and sixth ranked problems were identification of the credible source of information followed by provision of less budget/fewer funds for ICTs. Consequently other problems were poor perception of ICTs services by the management as seventh ranked problem, most of the ICTs were not in working conditions as eight ranked problem, slow internet connectivity as ninth ranked problem and no technical knowhow as tenth ranked problem.

From the findings it could be viewed that only implementation of ICTs is not important for the success of any ICTs initiative. Instead all the points like budget, policy, administration, infrastructural, capacity building and other soft issues has to be cater to make ICTs a more successful and profitable in agricultural extension system with the focus on sustainability.

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