Assessment of e-Readiness of Extension Functionaries of Southern States of India in Agricultural Technology Dissemination

K. Bhagya Lakshmi[1], K.S. Purnima[2] and B. Jamuna Rani[3]

1.Asso. Prof., 2.Asstt. Prof., College of Home Science, ANGRAU, A.P., 3. Dean, PGS, PJTSAU, Telangana
Corresponding author e-mail: purnimanaiduguntur@gmail.com

ABSTRACT

The world has witnessed the birth of a new era –The Information communication era, which has changed considerably the way people live and communicate. The scope and potential of application of ICT tools in technology dissemination in agricultural and allied sectors is well recognized. Agricultural extension functionaries in India have an important role in dissemination of agricultural technologies to enhance the productivity of the farming community. But to implement e-extension initiatives into effectual function, an extension officer must be e- ready to adopt new initiatives for quicker dissemination. A congenial eco system for e-extension is need to be created for effective implementation of ICT enabled extension. The study investigated the preparedness of the extension professionals and extension organizations to implement ICT enabled extension services for farming community. In this study, e-readiness is defined in terms of Awareness, Knowledge, Accessibility, Perception and Extent of utilization of ICT tools by extension personnel in agricultural extension system. The present study was conducted in five southern states of India to measure the e-readiness of the public sector agricultural extension functionaries towards use of ICTs. A total number of 500 officers of agriculture and allied departments from Telangana, Andhra Pradesh, Tamil Nadu, Karnataka, Kerala, Odisha, Union Territories of Andaman & Nicobar Islands, Puducherry and Lakshadweep were selected randomly for the study. The data was collected from development officers using structured Interview schedules, questionnaires and check lists. The study also focused on identification of gaps and constraints involved in the implementation of e extension initiatives in agriculture and allied sectors in the dissemination of technologies can be assessed so as to streamline the policies accordingly. The findings of the study showed that more than 60 per cent of officers perceived positively on the usage of ICT tools for dissemination of farm information

Key words: *e-readiness; Information communication technologies; Extension functionaries;*

The new paradigm of agricultural development is emerging at a faster pace, Information Technology applications never required more visionary leadership than now. The extent of e-readiness of extension officers will also give a boost to the dissemination of agricultural information and technologies.

A complete transformation of traditional societies to the knowledge societies has been increasingly felt all over the world. It is being increasingly felt that IT can be a major vehicle for all round socio-economic development. In other words, IT can play spectacular role in the societal transformation so as to realize the concept of "Knowledge Society" in the Indian context (*World Development Report, 2008*). Being an agriculturally rich country, India cannot overlook the field of agricultural development as the main domain of societal transformation. Here comes the enormous potential of the IT that has to be harnessed for societal transformation in general and overall agricultural development in .particular.

Meera et al (2005) reported that a strong agricultural extension linkage complimented by flawless information flow enhanced by the effective use of information and communication technologies (ICT) would significantly boost agricultural production and improve rural livelihoods in developing countries.

Information and communication technology in agriculture includes internet, radio/community radio,

television, wireless communication tools, cell phone, audio visuals, digital camera, Geographic Information System (GIS), Global Positioning System (GPS) and other technologies which direct the agricultural activities towards precision agriculture (*FAO, 2004*).

Hence, it is important to make an assessment of the readiness at the national level. To what extent it will be possible to apply and use IT for agricultural development. Of course, their readiness is greatly influenced by the knowledge of what is possible with the technology (*Raksha et al., 2015*). The present study was undertaken to assess e-readiness parameters and the predictions made by selected experts in the field on the future state of e-readiness parameters in India for agricultural development with the following objectives.

i. To identify the socio-demographic characteristics of the extension workers;

ii. To assess the factors influencing the adoption of ICT tools for effective extension service delivery;

iii. To determine the relationship between the selected characteristics of the respondents and the factors influencing the adoption of ICT tools.

METHODOLOGY

Ex-post facto and exploratory research design was followed for the study. The study was conducted in four southern states of India viz. Andhra Pradesh, Telangana, Tamil Nadu, Karnataka and Kerala. A total number of 500 officers, 100 from each state, working in the client departments of EEI were selected randomly for the study. The extension officers who attend the training programmes (On and off campus programmes of EEI) organized by EEI during the years 2014-15 were selected. A pre-tested interview schedule was used to collect data from the respondents. Selected characteristics of the respondents' viz. age, gender, education, work experience, training on ICT, job satisfaction, innovativeness, cosmopoliteness, use of information sources and higher aspiration were considered as independent variables of the study. e-Readiness was measured based on four parameters such as Awareness, Knowledge, Perception and Accessibility of ICTs in Agricultural technology dissemination. To measure the awareness of ICT tools an interview schedule was developed and the respondents were scored on Yes/No continuum. The Total awareness score was further categorized into low, medium, high based on mean and standard deviation.

To measure the knowledge on ICT utilization 35

statements were selected regarding 11 ICT tools. These were presented to the respondents with 5 possible answers for each ICT tool. A score of one was given to the right answer and zero to the wrong answer. The possible obtainable scores ranged between 50 and 0 respectively. Based on the total score obtained by the respondents of each ICT tool Knowledge Index was worked out by using the following formula.

$$\text{Knowledge Index} = \frac{\text{Score obtained}}{\text{Obtained score}} \times 100$$

To measure perception of the respondents towards ICT utilization a 5-point Likert type scale ranging from 1 as 'strongly disagree' to 5 as 'strongly agree' used for the measurement. The respondents were asked to rate 10 statements based upon a five-point Likert type scale towards ICT utilization in agriculture. A perception score of a respondent was obtained by summing up the weights for his 10 statements regarding ICT utilization in agricultural extension. The perception score of a respondent could range from 10 to 50, while 10 indicating low perception and 50 indicating highest level of perception. To measure the accessibility of ICT tools an interview schedule was developed and the respondents were scored on Yes/No continuum. The Total accessibility score was further categorized into Low, Medium and High based on Class interval range.

RESULTS AND DISCUSSION

Personal profile of the extension officers : It is evident from the Table 1 that majority of the respondents were middle aged, Graduates, Agriculture officers and men. It is also observed from the tale that majority of the people are middle aged (50.60%) followed by old (32 %) and young (17.70%). With respect to gender majority of the respondents (87.40 %) were male followed by female (12.60%). It could be seen from the Table 1 that majority of the respondents belong to the category of Graduates (72.8% followed by Post Graduates (24.4%) and only 2.80 were Doctorates. Majority of the officers had medium term experience (59.40%). Regarding remaining variables majority were Low with respect to Training on ICT (71.60%), Innovativeness (43.20%) and Higher aspirations (53.8%) and Medium with regard to variables such as Job satisfaction (69.40%), Cosmopoliteness (66.66%) and Information seeking behavior (42.40%). Hence while implementing e- extension programmes the profile of the officers is crucial and need to be considered.

Table 1. Personal Profile of the Extension officers (N=500)

Characteristic	Category	No	%
Age	Young (18-35)	87	17.7
	Middle (35-50)	253	50.60
	Old (50)	160	32.00
Gender	Male	437	87.40
	Female	63	12.6.
Education	Graduate	364	72.8
	Post graduate	122	24.4
	Doctorate	14	2.80
Work experience	Short term (upto 10yrs)	68	13.6
	Medium term (11-20 years)	297	59.4
	Long term (> 20 years)	135	27.0
Training on ICT	Low	358	71.60
	Medium	131	26.20
	High	11	2.20
Job satisfaction	Low	86	17.20
	Medium	347	69.40
	High	67	13.40
Innovativeness	Low	216	43.20
	Medium	198	39.60
	High	86	17.20
Cosmopoliteness	Low	54	10.80
	Medium	333	66.66
	High	113	22.60
Information seeking behavior	Low	88	17.60
	Medium	212	42.40
	High	200	40.00
Higher aspirations	Low	269	53.83
	Medium	155	1.00
	High	76	15.20

e –readiness of the respondents was measured based on the following variables :

Awareness on ICT tools: Table 2 revealed that out of the 10 ICT tools listed, extension officers indicated cent percent awareness on mobile telephony, television programmes (98.40%), Internet Kiosk (92.60%), Radio programmes (88.20%), video recordings (75.20 %), web portals (60.20%), Kisan Call centres (55.40%), tele conferencing(33.40%), Video conferencing (17.60%) and mobile apps (3.60%). Majority of the officers aware of the usage of sending Short Message Services (SMSs), through their mobile phones which are accessible in remote areas also. Similarly their usage of Television, Radio and video recordings is also good. Internet Kiosk is being extensively used more for personal reasons than extension work owing to the revolution of Information technology. But very less percent of the respondents were aware of the Multimedia enabled interactive tools like

audio video conferencing. These finding are in line with those of *Pegu (2014)* and *Prodhan et al (2014)*. Mobile apps being a recent innovation very few officers are aware of it. Nevertheless its potential as an effective channel is proven. Hence, the extension functionaries should be aware of the recent tools be used for agricultural extension.

Table 2. Awareness of the extension officers on ICT tools

ICT tools	No.	%
Mobile Telephony	500	100
Internet kiosk	463	92.6
Online web portals/ sites	301	60.20
Kisan Call centres	277	55.40
Television programmes	492	98.40
Radio programmes	441	88.20
Video recordings	376	75.20
Tele conferencing	167	33.40
Video conferencing	88	17.60
Mobile apps	18	3.60

Table 3. Distribution of the extension officers based on the extent of awareness (N=500)

Category	No.	%
Low (< 4)	85	17
Medium (4-7)	289	57.8
High (>7)	126	25.2

Table 3 indicates the overall awareness of Extension officers of southern India regarding the ICT tools and the results indicate that majority fell in the medium category (57.80%). There is an immense need for creating awareness on innovative ICT tools for creating awareness among extension officers to enhance its usage.

Knowledge levels of Extension officers about ICT tools : The knowledge of extension officers on ICT tools was scored and Knowledge index was tabulated. Based Table 4 on the knowledge index scores the knowledge of extension workers was highest in case of mobile telephony (KI = 80) with mean score 3.89 because even in the remotest areas mobile extension is very fruitful and convenient to the Extension functionaries, more so with the revolution of smart phones. This was followed by Television programmes (KI = 72) with mean score 3.50 and web portals (KI = 62) with mean score 3.10. This was because Television has been used from decades in extension delivery based on the principle of seeing is believing and has credibility with the rural population. The findings

were in congruence with that of *Prodhan et al (2014)* and *Raksha et al (2015)*. The extension workers are also utilizing the web medium to collect information, statistics, pictures , contacts etc and hence has ranked third. The prerequisite for incorporating ICTs in agricultural development is e- ready extension scientists.

Table 4. Rank order of the ICT tools regarding knowledge of the respondents based on Knowledge index (KI)

ICT tool	KI	Mean	Rank order
Mobile Telephony	80	3.99	I
Internet kiosk	51	2.54	V
Online web portals/ sites	62	3.10	III
Kisan Call centres	49	2.44	VI
Television programmes	72	3.50	II
Radio programmes	58	2.88	IV
Video recordings	62	3.10	III
Tele conferencing	36	1.79	VII
Video conferencing	28	1.43	IX
Mobile apps	35	1.72	VIII

*Perception of Extension officers about ICT too*ls: To measure perception of the respondents towards ICT utilization a 5-point Likert type scale ranging from 1 as 'strongly disagree' to 5 as 'strongly agree' used for the measurement (Table 5). The respondents were asked to rate 10 statements based upon a five-point Likert type scale towards ICT utilization in agriculture. A perception score of a respondent was obtained by summing up the weights for his 10 statements regarding ICT utilization in agricultural extension. The perception score of a respondent could range from 10 to 50, while 10 indicating low perception and 50 indicating highest level of perception.

Majority of the respondents had moderately favourable perception towards the use of ICTs in agricultural extension dissemination (64.40%) followed by Favourable perception (20.00%) and Unfavourable Perception (15.60%). The results indicating that majority of the respondents were aware of the advantages of ICTs in agricultural development though knowledge and usage is not satisfactory.

This can bring a positive impact in future as they are willing to use ICTS in extension. Hence there is a massive need for upgrading the digital literacy of the extension professional in southern India through various capacity building activities. Knowledge, skill and attitude of the extension functionaries are the three important domains which need to be considered for creating e-

readiness among extension functionaries and organizations.

Table 5. Distribution of respondents based on overall perception score on ICT tools (N=500)

Category	No.	%
Unfavourable (10-23)	78	15.6
Moderate Favourable (24-37)	322	64.4
Favourable (38-50)	100	20.0

Table 6. Distribution of respondents based on their accessibility to ICT tools (N=500)

Category	No.	%
Low (10-17)	123	24.6
Medium (17-34)	278	55.6
High (34-51)	99	19.8
Total	500	100

Accessibility of ICT tools to the Extension officers : To measure the accessibility of ICT tools an interview schedule was developed and the respondents were scored on Yes/No continuum. The Total accessibility score was further categorized into Low, Medium and High based on class interval range (Table 6).

The respondents were scored on a four point continuum of no accessibility, low accessibility, moderate accessibility, and High accessibility with a score of 1,2,3,4 respectively. The respondents were asked to rate for each tool and all the scores were summed up to get the accessibility score of that respondent. The score range that could be obtained was from 10 to 40

Majority of the respondents had medium accessibility towards the use of ICTs in agricultural extension dissemination (55.6%) followed by Low (24.6%) and High (19.8%).

The results indicating that majority of the respondents were accessing their mobile phone, Internet and Television as a medium in agricultural extension dissemination but had poor access to Multimedia such as tele and video conferences. Their access to KIOSKS and Kisan call centres is not satisfactory. Even power and Internet speed were limiting factors in areas of access .Hence there is a massive need for upgrading the available facilities for ICT usage of the extension professional in southern India through various capacity building activities like training.

Relationship between the selected characteristics of the respondents and extent of knowledge and perception towards ICT utilization: The variables studied were subjected to correlation analysis using Pearson product moment correlation to find out the relation between the independent variables and dependent

variables. Results in Table 7 revealed that there was no significant relationship between the age, gender, work experience, job satisfaction, innovativeness, cosmopoliteness and higher aspirations but education, training in ICT and information seeking behavior of the respondents showed a positive and significant relationship with both awareness and Knowledge in ICT utilization. With regard to accessibility of ICT tools training in ICT, innovativeness, Information seeking behavior and higher aspirations only showed significant relationship while other variables were non-significant. Regarding perception of the officers on ICT tools training in ICT, innovativeness , Information seeking behavior and higher aspirations only showed significant relationship whereas for extent of utilization, Education in addition to training in ICT, innovativeness, Information seeking behavior and higher aspirations only showed significant relationship. The findings were in accordance with *Arkhi et al (2008, Meera et al (2004)* and *Raksh et at (2015).*

Table 7. Relationship between the selected characteristics of the respondents and extent of knowledge and perception towards ICT utilization

Profile	Awareness (r value)	Knowledge (r value)	Accessibility (r value)	Perception (r value)
Age	0.143[NS]	0.173[NS]	0.140[NS]	0.177[NS]
Gender	O.033[NS]	0.112[NS]	0.187[NS]	0.143[NS]
Education	0.236[**]	0.578[**]	0.199[NS]	0.193[NS]
Trainining in ICT	0.235[**]	0.245[*]	0.0065[NS]	0.273[*]
Work experience	0.0052[NS]	0.073[NS]	0.017[NS]	0.193[NS]
Job satisfaction	O.135[NS]	0.0445[NS]	-0.134[NS]	0.143[NS]
Innovativeness	0.070[NS]	0.156[NS]	0.236[*]	0.456[**]
Cosmopoliteness	-0.134[NS]	-0.028[NS]	-0.023[NS]	0.240[NS]
Info. behavior	0.286[*]	0.273[*]	0.261[*]	0.245[*]
Higher aspirations	O.005[NS]	0.199[NS]	0.236[*]	0.177[*]

CONCLUSION

ICTs can accelerate and support agricultural development in many ways. ICTs have tremendous potential to revolutionalize the way information, Knowledge and new technology is managed, developed and delivered to farmers though ICTs in Agriculture. The findings of the study revealed that the majority of extension officers were aware of most of the ICT tools except for multimedia tools. Among all the tools, the officers had greatest accessibility to mobile telephony as it is very accessible in remotest locations. Radio and Television though accessible are not being widely used by them in the work front. It was also found that an overwhelming majority of officers had low to medium knowledge with regard to ICT utilization while majority had favorable perception. As training in ICTs showed a significant relationship with these two variables, the study recommends that regular training in the area will definitely increase the knowledge and perception of the officers and there by increase their utilization in technology dissemination.

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