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Are Indian Farmer's Ready to Seek ICT based Extension Services? A Study on the Measurement of e-Readiness

Ravinder Naik Vankudothu^{1*} and Rabindra Nath Padaria²

¹Agriculture Extension, AICC and PJTSAU Press, PJTSAU R Nagar, Hyderabad, India

²Extension, Division of Agriculture Extension, IARI, New Delhi, India

*Corresponding author:

ABSTRACT

The world of twenty first century is a century of uncertainties. The advent of Information Technology has changed the world a lot without leaving any domain of life including agriculture. Information and Communication Technology plays an indispensable role in the transfer of agricultural information to the farming community. But, factors such as e-readiness of the farming community plays an important role in the effective transfer of technology using ICT mediated extension services. The present study was an attempt to measure the e-readiness level of the farmers as a part of PhD research work at the Division of Agriculture Extension, IARI, New Delhi using e-readiness index developed for the purpose. Data were gathered from about 435 farmers (270 users and 165 non users of ICT based extension service) from Andhra Pradesh (includes parts of present Telangana), Madhya Pradesh and Karnataka states. Results shown that, majority of the mobile advisory beneficiaries (95.00%) and community radio listeners (93.30%) were less e-ready. The ICT beneficiaries of Mandya district showed higher e-readiness (0.368) as compared to other districts namely Chitradurga, Dharwad, Gwalior, Chhindwara, Vidisha, Anantapur, Mahaboobnagar and Medak. The composite e-readiness index value of the ICT beneficiaries of Karnataka was higher (0.344) than Andhra Pradesh (0.331) and Madhya Pradesh (0.323). The findings of the study related to e-readiness could provide guidance to the relevant organisations and policy makers for designing and implementation of ICT programmes for the effective utilisation of ICT based extension projects.

Keywords

Information technology, Information and communication technology, E-readiness, Mobile advisory, Community Radio

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Introduction

The era of twenty first century has seen an unprecedented impact of Information and Communication Technology (ICT) across all sections of society. Kudos to the Information Technology, due to which the whole world has

become a global village, and information on any part of the world is just a click away where about 70% of the world's youth are online (ITU, 2017) ICT's have become an integral part of human life and is being utilised as an effective medium for information dissemination and knowledge management in

agriculture. Various issues across different levels have made farm related queries/concerns at an alarming level that, it is becoming very difficult to the extension agents to cater to the multifarious needs of the farming community. Adding to this, to supplement the existing extension machinery, various attempts have been made by different international and national organisations including the non-profit organisations and private agencies to reach the farming community with a view to addressing their farm related queries and to act as a link between the information requirements of the farmers and scientific knowledge domain. However, there has been a limitation that projects or initiatives were majorly on pilot scale.

It is a matter of pride that, in the country like India where agriculture is the livelihood for majority of them, the efforts made by the ICT based extension initiatives to reach the unreached is praise worthy. It is true that, the acceptability of these extension methods and end results finally depend on the farmers who are the final players of the knowledge transfer chain. The success of any project depends largely upon how best it is taken by the end users and their readiness/ preparedness towards such interventions after having convinced.

e- readiness in the study has been operationally defined as the degree to which an individual or a community is prepared to participate in the networked world. Over the years, the concept of e-readiness index is assuming prominence at national and international level. India's position at 58th rank by the International Telecommunications Union (ITU, 2010) and classification of Indian states into six different categories (NCAER, 2008) on the basis of e-readiness index clearly signify its importance at all levels. Purnomo and Lee (2010) reported that farmers'

readiness towards ICT tended to be negatively perceived by Agriculture Extension Officers, while personal readiness, infrastructure readiness and management readiness towards ICT tended to be positively perceived by them.

It was evident from the above studies that, e-readiness played a major role in the effective utilisation of ICT based extension services by the farming community. The present study is an attempt to measure the farmers' level of e-readiness and e-readiness across the selected districts of the India towards ICT based extension services.

Materials and Methods

The study was carried out during 2014 across three states namely Andhra Pradesh (including present Telangana), Karnataka and Madhya Pradesh with two ICT models i.e., Mobile based ICT model (IFFCO-IKSL) and Community Radio. Two districts from each state were selected to study the IFFCO-IKSL model while three districts were selected for the Community Radio (one district from each state where the Community Radio is operating). Thirty mobile advisory beneficiaries and twenty non- beneficiaries from each district were selected to study the IFFCO-IKSL model, while thirty listeners and fifteen non-listeners were selected to study the community radio.

To study the e-readiness level of the farmers, a composite e-readiness index was constructed which comprised of six indicators namely; e-awareness, e-skill, e-ownership, e-accessibility, e-frequency of use and e-willingness. Each indicator was measured with respondents' response to a set of statements. The collected data were analyzed using SPSS. The era of twenty first century has seen an unprecedented impact of Information and Communication Technology (ICT) across all

sections of society. Kudos to the Information Technology, due to which the whole world has become a global village, and information on any part of the world is just a click away where about 70% of the world's youth are online (ITU, 2017) ICT's have become an integral part of human life and is being utilised as an effective medium for information dissemination and knowledge management in agriculture. Various issues across different levels have made farm related queries/concerns at an alarming level that, it is becoming very difficult to the extension agents to cater to the multifarious needs of the farming community. Adding to this, to supplement the existing extension machinery, various attempts have been made by different international and national organisations including the non-profit organisations and private agencies to reach the farming community with a view to addressing their farm related queries and to act as a link between the information requirements of the farmers and scientific knowledge domain. However, there has been a limitation that projects or initiatives were majorly on pilot scale.

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Results and Discussion

e- Readiness of the Farmers

The data in the table 1 show the distribution of the farmers based on their e-readiness level. The respondents were categorised into five equal classes based on the obtained e-readiness values viz., Least e-ready (e-readiness index value ≤ 0.2), Less e-ready (e-readiness index value 0.21-0.40), e-ready (e-readiness index value 0.41-0.60), Highly e-ready (e-readiness index value 0.61-0.80) and Very Highly e-Ready (e-readiness index value >0.80). The result showed that majority of the community radio listeners (93.3 %) were less e- ready, and about 7 per cent of them were e- ready, whereas 95 per cent of the mobile advisory beneficiaries were less e-ready and only 5 per cent were e-ready. Pooled data of both ICT models showed that most of the

respondents (94.44%) were less e-ready and only 5.56 per cent were found to be e-ready.

The data the above table also reveal that a majority of the community radio non- listeners (66.66%) were less e-ready and nearly one third (33.3%) were least e-ready, while 85 per cent non-beneficiaries of the mobile based advisories were found to be less e-ready and 14.16 per cent as least e-ready. The findings disclosed that two third of the (66.66%) non-beneficiaries of the community radio were less e-ready followed by the remaining percentage of the farmers (33.3%) as least e-ready, where as majority (85%) of the mobile advisory non-beneficiaries were less e-ready and only 0.83 per cent were e-ready. About 14 per cent were least e-ready. Similar results were shown in the case of pooled data of non-beneficiaries, where more than three fourth of the respondents (80.00%) were less e-ready and a little less than one-fifth (19.39%) of the respondents were least e-ready.

The e-readiness index for the beneficiaries of mobile advisory was highest for Mandya district (0.368) in Karnataka (Table 2), followed by Gwalior (0.356) in Madhya Pradesh (Fig.1) and Anantapur (0.346) in Andhra Pradesh (Fig.2). The average e-readiness index value for mobile advisory group was highest in Karnataka (0.346) followed by Andhra Pradesh (0.336) and Madhya Pradesh (0.329).

The overall average across the six districts was found to be 0.336. It reflects poor level of e-readiness amongst the mobile advisory beneficiaries. The overall average e-readiness among the beneficiaries of the community radio was lower (0.324) as compared to the mobile advisory (0.336).

Among the listeners of the community radio, the e-readiness index was higher for Dharwad district of Karnataka (0.341) followed by

Medak district of Andhra Pradesh (0.321) and Vidisha district of Maharastra (0.309). Among the three states taken for the study, Karnataka (Table 3) had higher e-readiness index (0.344) as compared to Andhra Pradesh (0.331) and Madhya Pradesh (0.323). The composite e-readiness index for the beneficiaries of mobile advisory of IFFCO-IKSL and community radio was found to be 0.332 (Table 3).

It reflects that concerted efforts are to be made in areas of capacity building and support system for easy accessibility.

Determinants of e-readiness

An investigation was made to identify the determinants of e-readiness using the binary logistic regression. To find out the influence of independent variables on e-readiness, binary logistic regression analysis was used. The e-readiness score was substituted by 1 for above average and 0 for below average. The estimate of parameter, standard error, wald values and odds ratios are furnished in the table 4.

It was revealed from the above table 4 that three out of 26 variable namely Zaid crops ($p<0.05$), innovativeness ($p<0.05$) and risk orientation ($p<0.05$) showed significant and positive effect on e-readiness of the farmers while age ($p<0.01$) showed significantly negative effect on e-readiness. It is inferred from the odds ratio that one unit increase in innovativeness, risk orientation and area under zaid crop would lead to 1.1, 1.1 and 3.5 times increase in the e-readiness level of the farmers.

This could be because of the fact that the individuals with high level of innovativeness could try to find out the ways of maximising their potential at all levels by adopting the recently novel technologies such as ICT mediated extension, and those with higher risk

taking ability could be venture some and prepared to take risk in order to seek future prospects.

Those farmers who grow zaid crops are generally profit motivated to get the higher returns in lean season for which they need various types of information such as crop related, market based and weather information which leads to dependence on ICT mediated extension services.

In case of the community radio listeners (Table 5) mass media exposure, risk orientation, decision making behaviour and self confidence showed positively significant effect while type of family and extension contact showed negatively significant effect on e-readiness. Odds ratio reflect that one unit increase in mass media exposure, risk orientation, decision making behaviour and self-confidence would respectively lead to 2.4,1.8,2.16 and 1.8 times increase in the e-readiness. This could be because the farmer with higher mass media exposure will have better adoption of the available technologies at

his level and further improve his decision making behaviour and orienting himself to take risk. Odds ratio from the above table 4.12 also shows that one unit increase in extension contact would lead to 0.4 times decrease in e-readiness which could be because of the fact that the faith they repose in the traditional extension machinery and contact with opinion leaders blocks them to look for other alternatives of information search behaviour either through ICTs or any other same.

The study revealed interesting facts about the e-readiness of Indian farmers. Majority of the respondents (beneficiaries and non beneficiaries) had low level of e-readiness which depicted the general scenario of Indian farming community, as they were still not acquainted with different ICT tools and limited use of such ICT tools by them. Higher mean value of e-readiness status of ICT users compared to non-users could be because the ICT beneficiaries were regularly exposed to the ICTs to avail ICT based extension services, while non-users were still relying on the traditional sources of extension services.

Table.1 Distribution of the respondents based on the e-readiness index values

(N=435)

S. No	Category	Community radio		IFFCO-IKSL mobile advisory		Combined	
		Listeners (n=90)	Non listeners (n=45)	Users (n=180)	Non users (n=120)	ICT users (n=270)	ICT non users (n=165)
1.	Least e-ready (≤ 0.20)	0.00	15 (33.3)	0.00	17 (14.16)	0.00	32 (19.39)
2.	Less e-ready (0.21-0.40)	84 (93.3)	30 (66.66)	171 (95)	102 (85.00)	255 (94.44)	132 (80.00)
3.	e-ready (0.41-0.60)	6 (6.67)	0.00	9 (5)	1 (0.83)	15 (5.56)	1 (.60)
4.	Highly e-ready (0.61-0.80)	0.00	0.0	0.00	0.00	0.00	0.00
5.	Very Highly e-ready ($>.80$)	0.00	0.00	0.00	0.00	0.00	0.00
Mean e-readiness score		0.324		0.337		0.332	

*Figures in parenthesis indicates the percentage

Table.2 e-readiness status of the beneficiaries of mobile advisory and community radio

S. No.	Name of the district	e-readiness index value
A. Mobile Advisory		(n ₁ =180)
Madhya Pradesh		
1.	Gwalior	0.356
2.	Chhindwara	0.304
Average		0.329
Karnataka		
1.	Mandya	0.368
2.	Chitradurga	0.325
Average		0.346
Andhra Pradesh		
1.	Anantapur	0.346
2.	Mahabubnagar	0.327
Average		0.336
Overall average of six IKSL districts		0.337
B. Community radio		(n ₂ =90)
1.	Vidisha	0.309
2.	Dharwad	0.341
3.	Medak	0.321
Average of 3 CR districts		0.324
Composite e-readiness index (9 districts)		0.332

Table.3 State wise e-readiness index values of ICT beneficiaries

(n=270)

S. No.	STATE	District	e-readiness index value
I	Madhya Pradesh	1.Gwalior	0.356
		2.Chhindwara	0.304
		3.Vidisha	0.309
		Average	0.323
II.	Karnataka	1.Mandya	0.368
		2.Chitradurga	0.325
		3.Dharawad	0.341
		Average	0.344
III.	Andhra Pradesh	1.Anantapur	0.346
		2.Mahabubnagar	0.327
		3.Medak	0.321
		Average	0.331
Composite e-readiness index of three states			0.332

Table.4 Logistic regression analysis of e-readiness of mobile advisory beneficiaries
(n=180)

S. No.	Parameter	Estimate of Parameter	S.E.	Wald	Sig.	Odds ratio
	Constant	17.224	40193.62	.000	1.000	30214315.35
1.	Gender	-.143	.643	.049	0.824	.867
2.	Marital status	-.498	.618	.650	0.420	.608
3.	Age	-.092	.034	7.354	0.007*	.912
4.	Farming experience	.056	.036	2.400	0.121	1.058
5.	Annual Income	-.247	.318	.599	0.439	.782
6.	Education	.164	.183	.802	0.371	1.178
7.	Type of family	-.239	.417	.327	0.568	.788
8.	Family size	-.349	.309	1.279	0.258	.705
9.	Type of House			2.290	0.318	
10.	Occupation	.315	.554	.323	0.570	1.370
11.	Kharif crops	-.239	.210	1.292	0.256	.787
12.	Rabi crops	.228	.202	1.270	0.260	1.256
13.	Zaid crops	1.248	.597	4.371	0.037*	3.482
14.	Allied agriculture activity			3.343	0.502	
15.	Land holding	-.067	.039	2.857	0.091	.936
16.	Social participation	-.251	.263	.913	0.339	.778
17.	Extension contact	-.052	.084	.393	0.530	.949
18.	Extension participation	-.131	.093	1.977	0.160	.877
19.	Mass media participation	.076	.076	.986	0.321	1.079
20.	Innovativeness	.111	.035	10.292	0.001*	1.118
21.	Economic orientation	.091	.056	2.680	0.102	1.095
22.	Risk orientation	.096	.044	4.888	0.027*	1.101
23.	Decision making behaviour	-.114	.096	1.406	0.236	.893
24.	Self confidence	.015	.039	.157	0.692	1.015
25.	Information networking	.005	.052	.008	0.930	1.005
26.	Market orientation	.072	.107	.452	0.502	1.075

* P<0.05

Table.5 Logistic regression analysis of e-readiness of community radio beneficiaries
(n=90)

S. No.	Parameter	Estimate of Parameter	S.E.	Wald	Sig.	Odds ratio
	Constant	1.196	4.158E4	.000	1.000	3.306
1.	Gender	5.245	2.025	6.707	0.060	.005
2.	Marital status	-.546	5.538	.010	0.921	.579
3.	Age	-.145	.118	1.502	0.220	.865
4.	Farming Experience	.279	.177	2.485	0.115	1.321
5.	Annual income	-1.779	.961	3.423	0.064	.169
6.	Education	.179	.507	.124	0.725	1.196
7.	Type of family	-5.849	2.454	5.681	0.017*	.003
8.	Family size	-1.956	1.292	2.291	0.130	.141
9.	Type of house	-10.148	5.287	3.685	0.055	.000
10.	Occupation	-14.589	4.019E4	.629	0.730	.000
11.	Kharif crops	-.182	.453	.161	0.689	.834
12.	Rabi crops	-.823	1.007	.668	0.414	.439
13.	Zaid crops	-2.079	2.733	.579	0.447	.125
14.	Allied agriculture activity	-37.549	1.064E4	1.123	0.772	.000
15.	Land holding	-.014	.111	.015	0.903	.987
16.	Social participation	.250	.644	.151	0.697	1.284
17.	Extension contact	-.819	.390	4.402	0.036*	.441
18.	Extension participation	.859	.479	3.208	0.073	2.360
19.	Mass Media exposure	.858	.408	4.422	0.035*	2.359
20.	Innovativeness	.123	.144	.724	0.395	1.131
21.	Economic orientation	-.366	.315	1.346	0.246	.694
22.	Risk orientation	.590	.263	5.041	0.025*	1.803
23.	Decision making behaviour	.771	.390	3.907	0.048*	2.161
24.	Self confidence	.590	.246	5.752	0.016*	1.805
25.	Information networking	1.263	.894	1.994	0.158	3.537
26.	Market orientation	.739	.701	1.113	0.292	2.095

* P<0.05

Fig.1 Distribution of the districts based on the e-readiness score

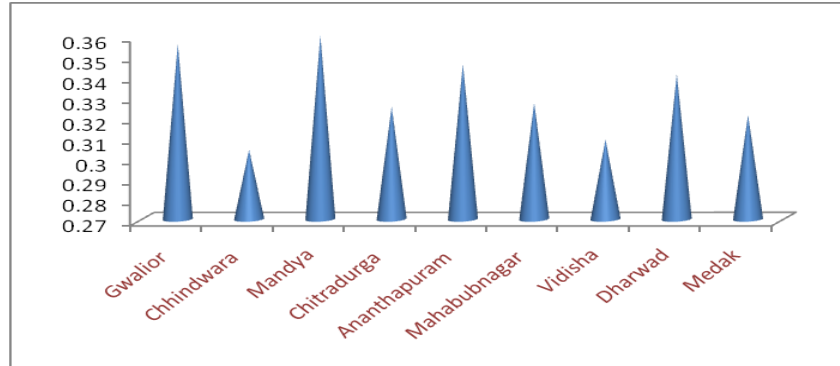
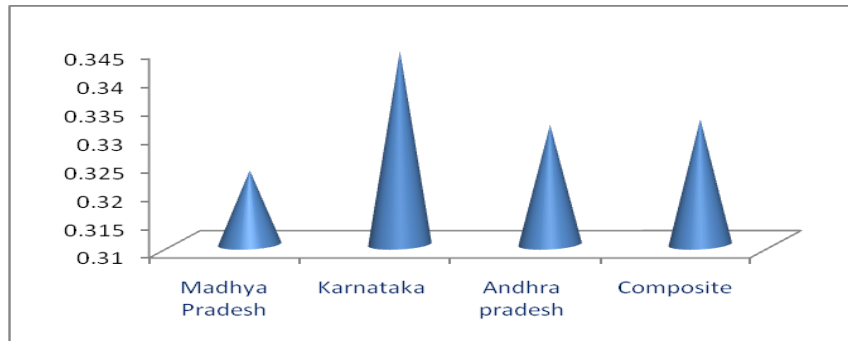


Fig.2 Distribution of states based on the e-readiness scores



In addition to this, the encouragement from ICT service providers and their promotional activities such as incentives for the quiz winners in the form of gifts, phone-in programme activities increased the awareness and enhanced the use of ICT based extension services. The findings reported by Arun Babu (2005) and Pornomo and Lee (2010) were similar to the revelations of the study.

Higher level of e-readiness index value of Mandya district followed by the Gwalior, Anantapur, Mahabubnagar, Chitradurga and Chhindwara district which could be due to the predominance of natural resources and availability of physical infrastructure such as good roads, availability of ICT infrastructure and co-ordinated promotional efforts by the Primary Agriculture Co-operative Societies (PACS) in Mandya district which led to the increased awareness and higher use of the ICT (mobile) based agro advisories. While the

higher literacy level of the Gwalior district (76.65% as per 2011 census report) and the extension efforts by the Green SIM (IFFCO-IKSL SIM Card) distributors led to higher exposure and continuous use of ICTs which ultimately resulted in higher e-readiness index compared to the remaining districts. Community radio listeners of Dharwad had higher e-readiness compared to other CR districts as community radio villages around the city are well connected with roads, network connectivity, availability of enough economic opportunity and the functioning of the state agriculture university where community radio is located, resulted in the higher e-readiness status of the CR listeners from Dharwad. The regular interaction of the community radio listeners of Medak district with Deccan Development Society resulted in the enhanced mass media exposure and thus relatively higher e-readiness index.

The higher e-readiness index values of both Mandya and Dharwad districts from amongst the study districts culminated in the higher e-readiness index position of Karnataka state as a whole, closely followed by Andhra Pradesh and Madhya Pradesh. The findings are similar with the results of NCAER, (2008) which reported that Karnataka and Andhra Pradesh were in the leader category and Madhya Pradesh in the expectant category of e-readiness.

Mass media exposure, innovativeness, risk orientation and self confidence level of community radio listeners were found to be positively and significantly correlated with the e-readiness level. Whereas mass media exposure, innovativeness, risk orientation and self confidence level, economic motivation and information networking of mobile advisory users were found to be positively and significantly correlated with the e-readiness. This made it clear that, the mobile advisory users perceived the agro advisories from the economic point of view to increase the production and net returns and relatively they possessed higher level of information networking.

In conclusion, it was understood from the above study that, majority of the farmers (both users and non users of ICT based extension services) had low level of e-readiness which indicated the need to improve their e-readiness level so as to make them reap the benefits of the ICT based extension services. It was understood that, Gender, family size, mass media exposure, innovativeness, risk orientation and self

confidence were the determinants of e-readiness for community radio listeners while innovativeness and risk orientation were the salient determinants for the mobile advisory users. These things emphasis, the need for refining and re-orienting the programmes as per the needs of the farmers. But, the relatively lower level of e-readiness deserves attention for concerned interventions to make farmers e-ready towards ICT based extension service. Need-based and relevant the ICT based extension services could result in the better spread of such extension services amongst the farming community.

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