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Utilization of selected Information Technology Enabled Systems by Agricultural Extensionists of Kerala

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ABSTRACT

Several information technology enabled systems (ITES) are available for providing valuable information to agricultural extensionists which in turn would help them to assist famers, and increase crop production. The present study was aimed at assessment of knowledge and extent of use of selected ITES among agricultural extensionists of Kerala. Data were collected from randomly selected 60 computer literate agricultural officers and 60 computer literate agricultural assistants of Kerala State. The study revealed that knowledge of agricultural extensionists on web browsing and agricultural portals was comparatively higher. The knowledge of agricultural expert system and digitized databases was found to be very low. On the other hand the extent of use of all the selected ITES was found low among the agricultural extensionists. This points towards the need of sensitizing agricultural extensionists on the importance and value of ITES.

Keywords: *IT in agriculture; web browsing; agricultural portals; agricultural expert systems; digitized databases; online trading.*

INTRODUCTION

Information Technology (IT) plays an important role in agricultural production and marketing (Thiruniraiselvi, 2009). Recently, India has made rapid strides in the field of IT and there is immense scope for its application in agriculture. It has the potential to address the concerns of farmers effectively, stationed even at remote locations. Agricultural extensionists require timely information to assist farmers which is provided through various Information technology enabled systems (ITES). Several ITES are available nationwide but how far they have reached the agricultural extensionists is to be measured.

Among the various ITES, Decision Support Systems (DSS) / Expert Systems which function based on artificial intelligence is a novel ITES which help the agricultural extensionists to provide timely and vital information to farmers. Some of the D.S.S. in Kerala are the KAU Fertulator (Fertilizer calculator for around 140 crops developed by Kerala Agricultural University(KAU),

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KAU e-crop doctor (Medicine prescriber for various crops developed by KAU), Cassava Expert System (developed by Central Tuber Crops Research Institute (CTCRI), Thiruvananthapuram), Oushadham (Online diagnostic system for pest and disease management in cassava developed by CTCRI) and so on. (Husain et al., 2016). Agricultural portals are another category of ITES becoming popular. There are some portals in agriculture suited to farmers of Kerala, includes the portals maintained by the Department of Agriculture, Government of Kerala and the one by Kerala Agricultural University. Similarly several other IT enabled services are available for the agricultural extensonists to facilitate their efforts in total like websites, databases, m-apps etc. The present study was undertaken with the objective of examining the Knowledge and extent of use of selected Information technology enabled systems (ITES) among agricultural extensionists of Kerala.

METHODOLOGY

For the purpose of the study, the State of Kerala was geographically divided into three zones viz., North, Central and South. The study was confined to three districts selected purposively to represent each of the zones. As such Malappuram, Thrissur and Idukki districts representing north, central and south zones respectively were selected. Malappuram district became the first e-literate district in India through the Akshaya project launched on 2002, and Thrissur district houses the headquarters of the State Agricultural University of Kerala which had developed various IT tools and services for farmers apart from imparting trainings to farmers. Similarly, the farmers of Idukki district were engaged in online trading especially of pepper and cardamom. These factors were also considered for the selection of these three districts, which were expected to have more focus on different IT enabled services.

The present study focussed on the grass root level agricultural extensionists of the Department of Agriculture, Kerala State, and includes both agricultural officers and agricultural assistants of *Krishi bhavans* (grass root level agricultural extension unit) of Kerala. For the selection of agricultural extensionists, the list of computer literate agricultural officers and agricultural assistants in the *Krishi bhavans* of the three selected districts were obtained. From this list 60 agricultural officers and 60 agricultural assistants were selected at random, constituting a sample of 120.

Five platforms of ITES viz., Web Browsing, Agricultural Portals, Agricultural Expert Systems, Digitized databases, and Online Trading were assessed for their knowledge and use by the agricultural extensionists of Kerala. The personal profile of agricultural extensionists, their social profile, IT profile, knowledge and extent of use of ITES were the major items of analysis.

FINDINGS AND DISCUSSION

A set of characteristics of agricultural extensionists such as gender, language proficiency, age, educational status, and service

experience were taken into consideration for understanding their personal profile.

Majority of the respondents (53%) were males and the rest (47%) were females. A slight majority was noticed in the number of male agricultural extensionists over females. Age wise segmentation of agricultural extensionists revealed that majority (62.5%) of agricultural extensionists were middle aged with an age range of 36-55. The younger generation whose age group was less than 36 registered only 37.5 per cent. This is quite logical that an individual can attain the job of an agricultural extensionist only after the age of 17, when he acquires the minimum educational qualification, and generally majority get placed after the age of 25. This is the reason for less number of young extensionists as compared to middle aged. None of the extensionists fell in the old age category, because of the fact that 56 is the retirement age in Kerala government service.

While examining the language proficiency of agricultural extensionists, 81.67 per cent of them were able to read, write and speak English, while 100 per cent were able to read and write English. In the case of Malayalam language, 100 per cent agricultural extensionists were able to read, write and speak. The respondent agricultural extensionists were officials of the Kerala State government, and were either degree holders or VHSE (Vocational Higher Secondary Education) Certificate holders, and this is the reason behind the high proficiency in both the languages.

Educational qualification of the agricultural extensionists surveyed showed that 30 per cent of the agricultural extensionists were Degree holders (Degree alone) and 27 per cent postgraduates. This indicates that majority (57%) of agricultural extensionists were having Degree. The rest 43 per cent extensionists were VHSE certificate holders. Majority of the degree holders were Agricultural Officers, who were in charge of *Krishibhavans* (the local agricultural development units at *gramapanchayath* level), while the VHSE Certificate holders were Agricultural Assistants, who come under the control of the Agricultural Officer.

Majority of the agricultural extensionists (45 %) had more than 15 years of service experience, as agricultural extension worker, followed by 35 per cent with 5-15 years of experience, and 20 per cent with less than 5 years of experience. This is in accordance with their age.

Social variables relevant to agricultural extensionists such as innovativeness, research organisation contact, social participation and mass media exposure were considered for the study. The results in this regard are presented in Table 1.

Table 1 reveals that 79 per cent agricultural extensionists were in the medium range of innovativeness, while the rest 21 per cent were highly innovative. None of the extensionists were found with low innovativeness, showing a better innovativeness level of computer literate agricultural extensionists. Table 1 further shows that 55 per cent agricultural extensionists had contact with research

Table 1.
Social Characteristics of Agricultural Extensionists

Sl.No.	Variables	Category	Number	Percentage
1	Innovativeness	Low	0	0
		Medium	95	79
		High	25	21
2	Research organization Contact	Low	22	18
		Medium	66	55
		High	32	27
3	Social Participation	Low	40	33
		Medium	69	58
		High	11	9
4	Mass Media exposure	Low	15	12.50
		Medium	91	75.83
		High	14	11.67

organization which was in the medium range, followed by 27 per cent extensionists with high research organisation contact. Only 18 per cent of them was found with low research organisation contact. Thus, the better position of agricultural extensionists with respect to innovativeness and research organisation contact could be effectively used for ITES use in agriculture.

Majority (58%) of the agricultural extensionists belonged to medium category of social participation, followed by 33 per cent with low social participation. Only 9 per cent of extensionists were having high social participation. This low level social participation of agricultural extensionists may be the result of the high work load, perceived by them, which includes clerical and file works

Table 2.
IT profile of Agricultural Extensionists

Sl. No.	Variable	Category	No.	Percentage
1	Computer use	Self	112	93
		With help	6	5
		No use	2	2
2	Mobile phone use	Smartphone	119	99
		Ordinary mobile phone	1	1
3	Training in IT	Attended	64	53
		Not attended	56	47

in office and field work. Regarding mass media exposure too, majority of the agricultural extensionists (75.83%) belonged to the medium category, followed by an almost equal share of the respondents in low and high category (12.5% and 11.67% respectively). Thus majority of agricultural extensionists fell in the medium category with respect to all the social variables under study.

The IT profile of the respondent extensionists were analysed in terms of their use of computer, mobile phone use and trainings attended in IT, and the results are furnished in Table 2.

It is observed from Table 2, that 93 per cent of the agricultural extensionists used computer by their own and 5 per cent used it with the help of others. Non users of the computer constituted just 2 per cent. Thus it is clear that an overwhelming majority of them were users of the computer. This result was obtained consequent to the purposive inclusion of computer literate extensionists in the sampling frame. Majority of them used computer in offices mainly for operating SPARK, a software used for uploading their salary bills. Some of them utilised the help of their colleagues for doing this.

With respect to the use of mobile phones, it is seen that almost all (99%) agricultural extensionists, except one per cent of them were using smart phones. Thus with the use of smart phones, various purposes surpassed the use of computer, and it is the trend of this era. As regards to trainings attended in IT, it can be seen that 53 per cent of the agricultural extensionists had attended various IT training programmes. Thus the IT profile of the agricultural extensionists is found to support the use of various ITES.

Extent of knowledge of agricultural extensionists on various ITES

The analysis of the knowledge on ITES was done based on the responses of those agricultural extensionists who were aware of each of these ITES in agriculture. Thus the total respondents in this case varied for different ITES as follows: web searching/browsing-114; agricultural portals- 96; agricultural expert systems-24; digitized databases-26; online

Table 3.
Distribution of Agricultural Extensionists based on Knowledge on Various ITES

Sl. No.	Knowledge category	Web Browsing		Agricultural Portals		Agricultural Expert System		Digitized Databases		Online Trading	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Low	32	28	27	28	19	79	21	81	29	43
2.	Medium	27	24	24	25	3	13	3	11	17	25
3.	High	55	48	45	47	2	8	2	8	22	32
	Total	114	100	96	100	24	100	26	100	68	100

trading.-68. The frequency distribution of agricultural extensionists with regard to knowledge on selected ITES is furnished in Table 3.

Table 3 reveals that majority (48 %) of the agricultural extensionists belonged to the high category, with regard to knowledge on web browsing. Twenty eight per cent belonged to low category, while 24 per cent were in the medium category. This shows a good knowledge position of agricultural extensionists on web browsing. Almost similar is the distribution of agricultural extensionists in the case of knowledge on agricultural portals too. In this, 47 per cent fell in the high category, while 28 per cent fell in the low category and 25 per cent in the medium category.

Majority fell in the low category with regard to knowledge on agricultural expert system(79%) and digitized databases (81%). Around 20 per cent of the agricultural extensionists only belonged to either medium or high category. Thus, among agricultural extensionists, the knowledge of agricultural expert system and digitized databases was found very low. Mishra et.al (2014) highlighted the role of expert system in transferring expert driven knowledge instantly at the level of farmer's field. In the case of online trading, majority fell in the low category (43%), followed by 25 per cent in the medium and 32 per cent in the high categories.

Thus, as regards to the knowledge of agricultural extensionists on selected ITES, good knowledge was observed in the case of web searching/browsing, and agricultural portals; average knowledge was observed in the case of online trading, while poor knowledge was observed in the case of agricultural expert system and digitized databases. Web browsing is very common now a days, and browsing for agriculture is no exception. For getting technological information on agriculture, the extensionists resort to various agricultural portals, and this might have improved their knowledge on this. At the same time, agricultural expert system

Table 4.
Distribution of Agricultural Extensionists based on Extent of Use of ITES

Sl. No.	Use category	Web Browsing		Agricultural Portals		Agricultural Expert System		Digitized Databases		Online Trading	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Low	74	65	74	77	22	92	24	92	66	97
2.	Medium	25	22	19	20	1	4	1	4	1	1.5
3.	High	15	13	3	3	1	4	1	4	1	1.5
	Total	114	100	96	100	24	100	26	100	68	100

and digitized databases were not that popular even amongst agricultural extensionists. However, since many of the farmers were involved in online trading, the agricultural extensionists were also forced to be equipped with knowledge on it.

Use of various ITES by agricultural extensionists

The frequency distribution of agricultural extensionists with regard to extent of use of selected ITES is furnished in Table 4.

Table 4 shows that 65 per cent agricultural extensionists were in the low category with respect to web browsing, while 22 percent in the medium and 13 per cent in the high categories. Thus the use of web browsing was found to be low. Even though the selected agricultural extensionists were computer literate, and majority of them had knowledge about web browsing, its use was restricted by high work load in their office, and lack of computer in many of their homes.

Similarly, 77 percent agricultural extensionists belonged to low category with respect to use of agricultural portals, while 20 per cent in the middle and three per cent in the high categories. Here also it can be inferred that the use of agricultural portals by agricultural extensionists was low. The same reason mentioned in the case of web browsing is applicable here also. Among the selected ITES, the training need of agricultural extensionists was found high on agricultural portals (Boniface et.al, 2019a). With respect to use of the ITES viz., agricultural expert system, and digitized databases, 92 per cent agricultural extensionists were in low use category. Only a very few belonged to medium and high category (4 each in both the case of agricultural expert system and digitized data bases). Thus the use of agricultural expert system and digitized data bases was found to be very low. Majority of the agricultural extensionists possessed low knowledge regarding these two ITES, and this might be the major reason behind its very low use. Rafea (2002) revealed that net production in agriculture increased by 25% using expert system which shows the importance of agricultural expert system.

The use of online trading by the agricultural extensionists was found to be the lowest among all the ITES. The very poor use of online trading was due to the lack of necessity of its use by the extension functionaries, as it was mainly related to and used by farmers, sellers and buyers. Still, there were a very few agricultural extensionists, who used this ITES, they may be involved in online trading as farmers or traders.

Overall, it can be easily inferred that the use of ITES was low among the agricultural extensionists. Of the ITES, the use of web browsing and agricultural portals was found to be low, while the use of agricultural expert systems and digitized databases was very low, and that of online trading was extremely low. Thus, even though they had knowledge on web browsing and agricultural portals, the extent of use did not match with their knowledge. Besides, it was also observed that 77 per cent belonged to low use category with respect to agricultural portals whereas, 65 per cent

belonged to the low use category in respect of web browsing. This points to the need of imparting training to agricultural extensionists on web browsing and agricultural portals.

Further, the low use of agricultural expert systems and digitized databases, as mentioned earlier was mainly due to their low knowledge. The non-availability of suitable ITES and the lack of knowledge on the value of the available ITES in these two categories also might have contributed to this condition.

CONCLUSION

The study revealed that knowledge on web browsing was comparatively higher for agricultural extensionists than other ITES such as agricultural portals, agricultural expert system, digitised databases and online trading. Similarly, the use of different ITES was found to be low among the respondents. This was very low in respect of agricultural expert systems and digitised data bases. Even, the agricultural portals were seen used at very low level. ITES, especially the agricultural portals and agricultural expert systems/decision support systems are tools that can provide authentic information, technical support, and expert guidance to the stakeholders. Now, we have very good agricultural portals suited to the state of Kerala like KAU agri info tech portal (celkau.in), portal of the Kerala State Department of Agriculture(krishi.info), TNAU agri tech portal, IRRI's cereal knowledge bank etc., and the first two are available in both English and local language, Malayalam. Still, in depth knowledge on and use of these portals by the agricultural extensionists were low. Similarly agricultural expert systems were also not seen explored. This is an indication towards the need for sensitizing and to give hands on training to agricultural extensionists on various agricultural portals, so as to satisfy their information needs, especially in the context of the immense practical utility and potential of a quality agricultural information technology portal. Similar efforts are to be made to explore the scope and potential of the use of agricultural expert systems. The agricultural extensionists are technical experts in their concerned fields and they may perceive that the ITES, at present does not provide much more than what they know and what they can refer to by other means. Hence a detailed orientation on various available ITES and its content and coverage should be provided to agricultural extensionists for effective utilisation of these ITES.

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