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Utilization pattern of ICT tools among scientists of agricultural universities

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Abstract

Information and Communication Technology (ICT) is an inevitable part of agricultural education, research and extension. Inevitably, as ICT tools are being used to access scientific knowledge, conduct research and also be able to communicate with other peers and disseminate this knowledge. The present study was done in 3 purposively selected agricultural universities of the state, which includes Birsa Agricultural University, Ranchi; Dr. Rajendra Prasad Central Agricultural University, Pusa, Samastipur and Bihar Agricultural University, Sabour, Bhagalpur to find out the ICT tools utilization pattern by scientists. The sample population consisted of 60 scientists, with 20 respondents from both universities. Data were collected through a structured questionnaire and analyzed using appropriate statistical techniques. Results indicated that most of the scientists reported medium use of ICTs followed by high and low use categories. The most widely used ICT tool was Web services followed by Agricultural applications, Kisan Call Centre and Geographical Information System (GIS). The analysis based on purpose showed that ICT tools are predominantly used for knowledge purpose, research information, reading articles and project-based work. The study underpins the increasing role of ICT tools at the service of scientific and academic activities, reiterates the need for strengthening ICT infrastructure and capacity – building programmes in agricultural universities.

Keywords: Information and communication technology, utilization pattern, scientists, agricultural universities, web services, agricultural applications

Introduction

For the last decades, Information and Communication Technology (ICT) completely changed the processes of generating, processing, storing and spreading information in multiple sectors of society. Information Communication Technology (ICT) has proven to be one of the most valuable drivers, as it provides access to a flow of information, communication networks and knowledge transfer for all stakeholders within agriculture. Rapidly evolving digital technologies have dramatically impacted agricultural education, research, and extension through timely scientific information, resulting in better decision-making.

Agricultural technology generation and dissemination is an important role of agricultural universities. The associated scientists with these institutions regularly engage in research, teaching and extension activities which needs the updated information. ICT tools including internet services, digital libraries, expert systems, geographical information systems, video conferencing and agricultural applications were found to be important sources of scientific communication and useful sources of information and knowledge.

One can effectively use the ICT tools which help scientists in accessing research publications, interaction with researchers regardless of geographical distances, virtual meetings and getting real-time information regarding agricultural innovations. So, ICT can also help to manage the research data effectively and make scientific reports for disseminating technologies to farmers' communities. Accordingly, they may be measured and have become observed as key pointers of digital readiness of agricultural establishments, main to the degree/tendency of ICT use amongst scientists.

While the improvement of ICT infrastructure has improved tremendously, numerous differences exist in both the extent and type of ICT tools used by scientists. Knowledge of the pattern of use,

such as identifying which technologies are used the most and for what functions is important in order to make decisions regarding targeted solutions or models designed to facilitate effective ICT usage. Such data can support policymakers, educational administrators and extension professionals in strengthening ICT-enabled education systems.

Considering the above facts, the present study was conducted with objectives to analyse the use pattern of ICT tools by scientists of selected agricultural universities and to evaluate the ways in which, these tools are used for research, teaching and other professional pursuits.

Materials and Methods

The present study was conducted at three agricultural universities purposively selected, Birsra Agricultural University (BAU), Ranchi; Dr. Rajendra Prasad Central Agricultural University (Dr.RPCA), Pusa, Samastipur and Bihar Agricultural University Bain Sabour, Bhagalpur. Finally, 20 scientists from each university were selected in the sample of 60 scientists.

The present investigation used a descriptive research design since the study parameters have occurred and are beyond the control of the researcher, defining it as an ex-post facto design. Data was obtained from a structured pretested questionnaire. Then, other methods combined with field study such as observation, personal interaction and conducting of group discussions were used to bolster the data from the respondents.

ICT tools selected for the analysis are Internet/Web Services, Mobile Map Technology, Digital Storytelling, Radio/Community Radio, Video Conferencing Teleconferencing, Digital Library Expert System Kiosks Kisan Call Centre Satellite Telecommunication (SATCOM), IMCD (interactive multimedia compact disc and GIS Agricultural Applications.

Operationally, utilization pattern is defined as how and to what extent scientists used various ICT tools in conducting research, extension and teaching activities. The utilisation pattern was

appraised on the basis of three indicators including extent of utilisation, ranking of utilization and purpose of utilization.

Thus, for each item on the questionnaire, ICT tools were being used was assigned to one of three categories: frequently (score = 2), rarely (score = 1) and never (score = 0). And the respondents were organised into low, medium and high uses groups by mean and standard deviation approach based on their total scores.

Utilisation was measured in using ICT tools to retrieve information on a particular subject or research, collating assessment feedback, and acquiring knowledge and project preparation work. For this purpose, ICT tools were analysed for multiple responses to grasp the varied functions they perform in scientific activities. Data were coded, categorized and analysed using frequency, percentage and mean score. Weighted mean scores were calculated for each of the ICT tools for ranking. The interpretation of the results was aligned with these objectives.

Results and Discussion

Extent of utilization of ICT tools among scientists

Table 1 presents utilization of the ICT tools among agricultural scientists of universities. The results showed that most of the scientists (36.66%) were under medium utilization category followed by high (33.33%) and low (30.00%) utilizations categories respectively.

Extent of utilization of ICT tools by scientists

All scientists of BAU, Ranchi (45.00 per cent) used medium level of utilization followed by low (35.00%) and high (25.00%) utilization category among the selected universities among all scientist utilized all the utilization categories Table 1). For scientists from Dr. RPCAU, Pusa, the proportion of those utilizing these sources in medium and high were equal (35.00%) followed by low utilization (30.00%). In BAU, an analog observation was also made in Sabour as maximum number of scientists (40.00%) belonged to high utilization category, followed by medium (35.00%) and low (25.00%).

Table 1: Extent of utilization of ICT tools by scientists of agricultural universities

S. No.	Utilization categories of students	Scientists						Total (N=60)
		BAU, Ranchi (n=20)		Dr. PCAU, Pusa (n=20)		BAU, Sabour (n=20)		
		F	%	F	%	F	%	
1	Low (<13)	7	(35)	6	(30)	5	(25)	18(30)
2	Medium (13-14)	8	(45)	7	(35)	7	(35)	22(36.66)
3	High (>14)	5	(25)	7	(35)	8	(40)	20(33.33)

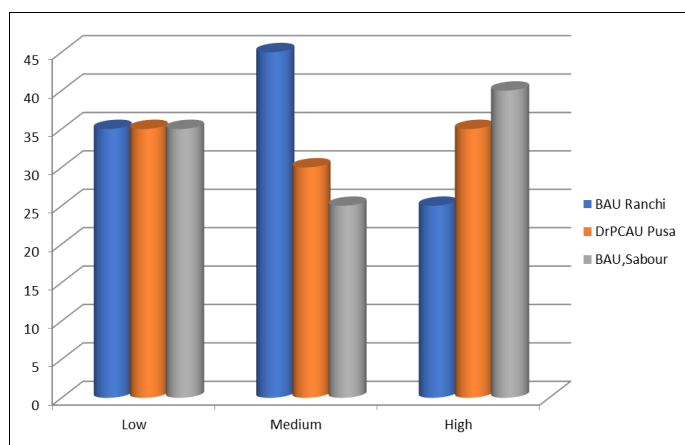


Fig 1: Extent of utilization of ICT tools by scientists of agricultural universities

Results showed that scientists have moderate ICT utilization

level. This can be due to somewhat accessibility of ICT centres, low exposure to use ICT tools and not much specificity for the availability of training in course of ICTs.

Frequency distribution of Utilization pattern of ICT tools

The usage pattern of various types of ICT tools among scientists was evaluated using weighted mean scores and ranks shown in Table 2. Results showed that Internet/Web Services ranked among the most used ICT tool, with the highest weighted mean score and got first rank.

Second rank was for agricultural applications followed by Kisan Call Centre (III), Radio/Community Radio Station (IV), Video Conferencing (V), Kiosks (VI), Expert System (VII), Digital Storytelling (VIII) Digital Library (IX) Geographical Information System, GIS(X); Teleconferencing and Mobile Map Technology; Interactive Multimedia Compact Disc: IMCD and SATCOM (Satellite Telecommunication).

The dominance of Internet/Web Service could be explained by the high adaptability of it to gather all scientific literature,

research databases, online journals and communication paths. The Agri applications and KC were also used heavily, as the use cases pertained to sharing agricultural information or problem-solving. The results showed that scientists preferred to use these ICT tools which are easily accessible, help in communication and also facilitate research.

Purpose of utilization of ICT Tools

Scientists are making use of ICT tools for academic purposes (research information, reviews) and professional tasks (learning, preparing PRS work). The results are provided in table 3. In terms of topic and research information, Internet/Web Services (91.66%) turned out to be the most frequently used ICT tool, followed by Digital Library (83.33%). Regarding access to reviews, Internet/Web Services (86.66%) was the most desirable ICT tool followed by Agricultural Applications (46.66%), GIS

(45.00%) and Video Conferencing (43.33%). Internet/Web Services (90.00%) ranked at first place in addition to Expert System (86.66%), Digital Library (83.33%), Radio/Community Radio Station (76.66%, Agricultural Applications 75% and Kisan Call Centre 71.66% respectively in relation to knowledge enhancement is shown in Table No 3.

In use of ICT tools related to project implementation, Internet/Web Services (56.66%) was most widely used followed by Digital Library (53.33%), Expert System (50.00%), Agricultural Applications (50.00%) and Kiosks (48.33%).

The results show that Internet/Web Services was the most generic ICT tool and was used in high proportions within all scientific activity groups. Internet resources are most probably preferred for their convenience, instant availability after searching and access to very large amount of scientific literature, research report, electronic journal and world knowledge banks.

Table 2: Frequency distribution of Utilization pattern of ICT tools of agricultural scientists

Sl. No.	ICT tools	Frequency of utilization				Rank
		BAU, Ranchi Weighted mean Score (n=20)	Dr. RPCAU, Pusa Weighted mean Score (n=20)	BAU, Sabour Weighted mean Score (n=20)	Total weighted mean Score (N=60)	
1	Internet/web services	2	2	2	6	I
2	Mobile map technology	0.65	0.85	0.95	2.45	XII
3	Digital storytelling	0.6	1.7	1.5	3.8	VIII
4	Radio/community radio station	1.45	1.6	1.6	4.65	IV
5	Video conferencing	1.5	1.55	1.55	4.60	V
6	Tele conferencing	0.7	1	1	2.7	XI
7	Digital library	0.76	1.2	1.2	3.16	IX
8	Expert system	1.03	1.6	1.65	4.28	VII
9	Kiosks	1.5	1.55	1.5	4.55	VI
10	Kisan call center	1.5	1.55	1.7	4.75	III
11	SATCOM	0.33	0.5	0.5	1.35	XIV
12	IMCD	0.5	0.55	0.55	1.60	XIII
13	GIS	0.95	0.95	0.95	2.85	X
14	Agricultural apps	1.6	1.7	1.65	4.95	II

The internet has made it easier and more convenient than ever before to find information - search and research, or just refer

from any second title; it is the most important source of knowledge on which contemporary science rest upon.

Table 3: Purpose of utilization of ICT Tools of agricultural scientists

Sl. No.	ICT tools	Purpose of utilization			
		For specific topic/ research information	For getting reviews	For gaining knowledge	For making project
1	Internet/web services	55 (91.66)	52 (86.66)	54 (90)	34 (56.66)
2	Mobile map technology	30 (50)	7 (11.66)	28 (46.66)	3 (5)
3	Digital storytelling	35 (58.33)	15 (25)	40 (66.66)	15 (25)
4	Radio/community radio station	45 (75)	23 (38.33)	46 (76.66)	12 (20)
5	Video conferencing	20 (33.33)	26 (43.33)	35 (58.33)	12 (20)
6	Tele conferencing	23 (38.33)	21 (35)	34 (56.66)	9 (15)
7	Digital library	50 (83.33)	15 (25)	50 (83.33)	32 (53.33)
8	Expert system	45 (75)	12 (20)	52 (86.66)	30 (50)
9	Kiosks	46 (76.66)	23 (38.33)	45 (75)	29 (48.33)
10	Kisan call center	43 (71.66)	24 (40)	43 (71.66)	12 (20)
11	SATCOM	15 (25)	15 (25)	23 (38.33)	3 (5)
12	IMCD	12 (20)	12 (20)	13 (21.66)	2 (3.33)
13	GIS	24 (40)	27 (45)	21 (35)	15 (25)
14	Agricultural apps	50 (83.33)	28 (46.66)	45 (75)	30 (50)

Note: 1. Figures in the parenthesis indicate percentage

2. Multiple responses are possible

Conclusion

The study revealed that a majority of the scientists of agricultural universities exhibited a medium level of ICT utilization, indicating moderate adoption of digital technologies in their professional activities. Internet/Web Services emerged

as the most frequently utilized ICT tool, followed by Agricultural Applications, Kisan Call Centre and Radio/Community Radio Station. The findings further indicated that ICT tools were primarily utilized for obtaining research information, accessing reviews, gaining knowledge and

preparing project-related work. Internet/Web Services proved to be the most versatile ICT tool and was extensively used across all categories of scientific activities.

The results emphasize the growing importance of ICT tools in supporting agricultural research, teaching and extension functions. Strengthening ICT infrastructure, improving accessibility to digital resources and organizing regular capacity-building programmes can further enhance the utilization of ICT tools among scientists. Increased adoption and effective utilization of ICTs can contribute significantly to improving research efficiency, scientific communication and dissemination of agricultural technologies.

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