Access and Usage of Internet in Agricultural Institutions

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Introduction

Advances in Information and Communication technologies (ICTs), particularly Internet technologies have changed the mechanism of information access and dissemination. ICTs have impacted all sectors including the agriculture sector. These technologies provide effective ways to transfer information, improve information management and meet information needs more effectively. New tools are increasing the ability to access, store, process and disseminate information and giving a mechanism for sharing of information resources in a faster and more effective manner.

Agricultural professionals need information which is multidisciplinary in nature, covering different aspects of agriculture and allied areas and related areas including rural development, social development, management etc. They require different types of data, information and knowledge pertaining to production, processing, market information and statistical information. They use different information resources to obtain the information viz books, journals (both print and electronic), handbooks, statistical publications, research reports, training materials, electronic databases, websites and to some extent, for reference purposes, encyclopedias, thesis and dissertations, Census and Plan documents, etc. They use the Internet and collaborate with or contact colleagues in other institutions for information.

Internet

The Internet - a network of networks as it is aptly called - is a combination of computers and telecommunication, which gives access to a world of information on a mouse click. Internet is changing traditional ways of managing information by establishing new sources of information and new methods of communication. All the information is available to everyone on the network regardless of physical location of the resources or the user. National and International organizations have hosted their homepages on the World Wide Web, and have started offering information on their organizations and activities enabling its sharing and wider dissemination. Databases on

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a variety of topics are accessible on the Internet. The net enables one to share resources including documents, data, software and network services.

The Internet apart from being a vast storehouse of information is also a virtual meeting place. People can communicate through mailing lists, newsgroups, discussion forums, electronic bulletin boards etc. It is possible to have instant access to many people in a particular field, and it is possible to send a question to a discussion group and get responses from different perspectives. The Internet provides an ideal platform for collaboration and partnerships between organizations and among professionals. Currently there is a shift towards more dynamic web applications and more interactivity between users. This shift in web technologies is known as Web 2.0. As internet technology is advancing from Web 1.0 to Web 2.0, the manner in which information is generated, accessed, organised and disseminated is changing.

Keeping in view the potential of the Internet for access to information and enabling creation of knowledge bases and knowledge networks and the collaboration it facilitates, an attempt was made to study the extent to which it is being utilized in agricultural institutions.

The objectives of the study were

1. to examine access to Internet by agricultural professionals including faculty, scientists and development officials in agricultural institutions
2. to study extent of use of Internet services by these professionals for meeting their information needs and
3. to understand effectiveness of information services on the web as perceived by the agricultural professionals.

Methodology

The study covers agricultural institutions in the public sector in the state of Andhra Pradesh. These institutions include: National institutions: viz., institutions under the Indian Council for Agricultural Research (ICAR), Ministry of Agriculture, Ministry of Rural Development; State level institutions: State Agricultural University, State Department of Agriculture, State Agricultural Management and Extension Training Institute, and district level institutions viz., Krishi Vigyan Kendras. Respondents include researchers, extension managers and other faculty from the above mentioned agricultural institutions at national, state and district level. The respondents were selected using random sampling technique.

For data collection, questionnaire method was employed. The questionnaire was mailed to 240 respondents. A total of 166 responses (69%) were received. The data

collected from the questionnaires was analyzed and tabulated. Data pertains to the year 2007.

Results and Discussion

Of the 166 responses received, there are 89 from national level institutions, 45 from state level institutions and 32 from district level institutions. The respondents are from diverse areas of specialization in agriculture and allied aspects and management including agronomy, crop production, plant physiology, plant breeding, plant protection, entomology, biotechnology, veterinary science, fisheries, agricultural extension, communication, agricultural economics, organizational behavior, human resource development, horticulture, soil science etc.

1. Access to Internet and other Communication Facilities

Regarding access to communication facilities including telephone, fax and Internet, all the respondents (100 per cent) have access to the telephone, 71.1 per cent have access to fax, and 83.7 per cent have access to internet. Access to communication facilities by national, state and district level institution groups is presented in Table 1.

Table 1. Access to Internet and other Communication Facilities

N=166

	National		State		District		Total
	No. of Respondents	%	No. of Respondents	%	No. of Respondents	%	%
Internet	88	98.9	31	68.9	20	62.5	83.7
Telephone	89	100.0	45	100.0	32	100.0	100
Fax	72	81.0	20	44.0	26	81.0	71.1

As seen in Table 1, 98.9 per cent faculty in national institutions have access to Internet followed by 68.9 per cent in state level institutions and 62.5 per cent in district level institutions. Communication facility with reference to telephone connectivity is well established up to the district level. Eighty one per cent of respondents from national institutions, 44 per cent from state institutions and 81 per cent from district level institutions have access to fax facility.

2. Frequency of Internet Access

Respondents were asked how frequently they accessed the Internet. As seen in Table 2, a majority (77.3 per cent) of the respondents from national institutions indicated that they access the Internet on daily basis. At the state level, 41.7 per cent of respondents

indicated that they accessed the Internet 1 to 3 times a week.

At the district level 27 per cent of the respondents accessed Internet one to three times a week and an equal proportion accessed it once a fortnight. Efforts are on to establish necessary infrastructure and connectivity in the institutions under various schemes and projects.

Table 2. Frequency of Internet access

Frequency	No. of Respondents (%)		
	National	State	District
Daily	68 (77.3%)	9 (25.0%)	5 (22.7%)
1 to 3 times a week	15 (17.0%)	15 (41.7%)	6 (27.3%)
Once a Fortnight	3 (3.4%)	7 (19.4%)	6 (27.3%)
Once a month	2 (2.3%)	2 (5.6%)	3 (13.6%)
Not at all		3 (8.3%)	2 (9.1%)

3. Access to Internet Services

Internet offers seamless access to a variety of information sources including electronic journals, reports, e-books and databases; facts and figures; business related information, weather, news, electronic discussion forums, online education etc. There are an increasing number of websites related to agriculture. Most of the agricultural organizations at the national level, state departments and some KVKs at the district level have a web presence by way of their websites.

Respondents were asked about services they accessed on the Internet. The use of services on the Internet varies across institutions and the purpose it is used for, as data in Table 3 indicates.

Across institutions, 78 per cent of respondents used it often for email, followed by 62 per cent of respondents who often used Internet for browsing websites, followed by 52 per cent who accessed for research information. Forty four per cent sometimes accessed online databases; 36 per cent sometimes participated in discussion forums; while 77 per cent of the respondents have never accessed RSS feeds. RSS, which stands for Really Simple Syndication or Rich Site summary is a service which enables users to quickly obtain the latest news and updates from a site in a headline or news digest format. Data reveals that only 15 per cent are members of discussion groups across institutions, majority being from national institutions. However all those who are members of discussion groups indicated that they find the platform very useful. Discussion Groups have made the Web a virtual meeting place. These groups offer a platform for

collaboration and partnerships between organizations and among professionals, who can share their experiences. Many of the respondents did not respond to the question relating to RSS feeds. This is a relatively new Internet tool and many of the respondents may not be aware of this service.

Table 3. Access to Internet services

Institutions	Email	Browse Websites	Read E-journals	Participate in Discussion Forums	Access RSS	Research on information	Access online Databases
National							
Often	81 (94%)	67 (77%)	37 (45%)	8 (10%)	1 (1%)	54 (64%)	43 (54%)
Sometimes	5 (6 %)	20 (23%)	43 (52%)	35 (42%)	22 (28%)	22 (26.5%)	32 (40%)
Never			3 (3%)	39 (48%)	56 (71%)	8 (9.5%)	5 (6%)
State							
Often	26 (65%)	21 (54%)	5(14%)	1 (3%)		16 (41%)	6 (17%)
Sometimes	9 (23%)	14 (36%)	15 (43%)	7 (21%)	5(16%)	11 (28%)	17 (49%)
Never	5 (12%)	4 (10%)	15 (43%)	26 (76%)	27 (84%)	12 (31%)	12 (34%)
District							
Often	15 (48%)	10 (31%)	1 (3%)			10(33%)	5 (17%)
Sometimes	13 (42%)	19 (59%)	22 (73%)	10 (33%)	4 (13%)	12 (40%)	14 (47%)
Never	3 (10%)	3 (9 %)	7 (23%)	20 (67%)	26 (87%)	8 (27%)	11 (36%)
All institutions							
Often	122 (78%)	98 (62%)	43 (29%)	9 (6%)	1 (1%)	80 (52%)	54 (37%)
Sometimes	27(17%)	53 (34%)	80 (54%)	52 (36%)	31 (22%)	45 (29%)	63 (44%)
Never	8 (5%)	7 (4%)	25 (17%)	85 (58%)	109 (77%)	28 (18%)	28 (19%)
Total responses	157	158	148	153	146	141	145

Analysis by institutions indicated the following: Email was used often by 94 per cent respondents in national institutions, 77 per cent browsed the net, 64 per cent accessed the net for research, 54 per cent accessed online databases, 45 per cent accessed e-journals often while 52 per cent accessed e-journals. Around 71 per cent and 48 per cent of the respondents expressed that they had never accessed RSS and discussion forums respectively.

In state level institutions, 65 per cent respondents access email often, 54 per cent browse websites, 41 per cent research on information. A majority never used RSS facility, nor participated in discussion forums.

At the district level 48 per cent often accessed email, and 59 percent browsed websites for information. It was observed that 73 per cent of the respondents accessed e-journals sometimes. This may be because district level centers do not have access to many print journals. Hence faculty access the same on the Internet. RSS and discussion forums were never used by a majority of the respondents. This may be due to problems with connectivity at the district level and also due to lack of awareness.

4. Information Needs met by Internet

Respondents were asked to indicate the extent to which Internet services meet their information needs. Forty-one per cent of respondents from national level institutions mentioned that the Internet met 50-75 per cent of their information needs; 44 per cent respondents from state institutions mentioned that it met 25-50 per cent of their information needs, while 38 per cent of the respondents in district level institutions said it met less than 25 per cent of information needs.

Across institutions 26.97 per cent mentioned that it met only 25-50 per cent of information needs. The data is presented in Table 4.

Table 4. Internet and Information Needs met

N=152

Information needs met	National	State	District	Total	%
>75%	25 (29.4%)	3 (8.3%)	1 (3.2%)	29	19.08
50-75%	35 (41.2%)	6 (16.7%)	11 (35.5%)	52	34.2
25-50%	19 (22.4%)	16 (44.4%)	6 (19.4%)	41	26.97
<25%	6 (7.1%)	11 (30.6%)	12 (38.7%)	29	19.08
Not at all			1 (3.2%)	1	0.67
Total	85	36	31	152	
%	55.9	23.7	20.4		100

This variation in the extent to which Internet met information needs may be due to the variation in access to the facility and connectivity across institutions. There is good infrastructure and connectivity at national level institutions, and to some extent at the state level institutions. At the district level while infrastructure and connectivity is available at some institutions, in others it is being established. It is also evident that there is variation in information needs of respondents across institutions. Scientists and researchers in national institutions and at the university need the information mostly for research and for teaching purposes while agricultural officers at State Department of Agriculture and scientists at KVKs mostly need field data or information which can be

applied at the field level. However this kind of information and that which would help in tackling problems at the field level is not yet available on the Internet. The crucial issue is content. While rich content exists in institutions it is not packaged in a form as to facilitate access on the web.

Though there is a wealth of information in the institutions in the form of research reports etc. few are accessible on the web. Most institutions specify only the titles of research reports. A number of institutions have websites but do not update their information regularly. It is only a few institutions, which have the content available on their websites or disseminate it through print or CDs.

It is important that available content in research and extension institutions is digitized and made accessible on a web based platform to facilitate quick and easy retrieval. This would give agricultural professionals quick and easy access to information.

5. Impartant features of Internet based information

Respondents were asked to rate features which they perceive as important with reference to Internet based information. Majority of the respondents across institutions, ranked the factors in the following order:

Table 5. Important Features

Sl. No.	Features	Rank
1.	Information should be frequently updated	II
2.	The site should facilitate quick retrieval	III
3.	Information should be well organized with an effective search facility	IV
4.	The site should have substantial information, not just links	I
5.	User friendly	V
6.	Good graphics	VI

The most important factor expressed by respondents is availability of substantial information, not just links. It is observed that most often sites give links to other sites. Many sites often do not update information frequently; currency and updation of information are important. The content on the site should also be organized in a way so as to facilitate easy and quick retrieval. Moreover it should be user friendly. The respondents do not perceive graphics as an important factor. The more the graphics the slower the sites take to download.

6. Preferred Platform for Information Access

Respondents were asked their preferred platform for information access, whether they prefer a print based platform, CD-ROM based platform or a web based platform (assuming infrastructure is available with good connectivity). The first preference was for a web-based platform by majority of the respondents.

Institution wise analysis also indicated that 74.1 per cent respondents from national level institutions, 57.6 per cent from state level institutions and 63 per cent from district level institutions gave the first preference to a web based platform. The data may be seen in Table 6.

Table 6. Preferred Platform for Information Access

	National		State		District	
Platform	No. of Respondents	%	No. of Respondents	%	No. of Respondents	%
CD-Rom	12	14.1%	5	15.2%	4	13.3%
Print	10	11.8%	9	27.3%	7	23.3%
Web	63	74.1%	19	57.6%	19	63.3%
Total	85	100.0%	33	100.0%	30	100.0%

Thus, despite the lack of infrastructure, problems with internet access and connectivity, preference by a majority of respondents is for a web based platform.

Data also indicates that in national institutions 14 per cent of the respondents gave preference to the CD-Rom and 11.8 per cent to print medium. In state institutions, 27.3 per cent preferred a print based platform and 15.2 per cent preferred the CD-Rom. At district institutions, 23.3 per cent of respondents preferred a print based platform with 13.3 per cent giving preference to CD-Rom. Although preference for electronic communication is more, the print format is still important. This is because scientists/faculty who are based at district level centers do not have access to electronic communication or have only one point/node for internet connectivity in their institution, poor connectivity, bandwidth problems and irregular power, inadequate telecommunication infrastructure in rural areas and high cost of electronic communication.

7. Problems in Internet Access

Forty per cent of all the respondents indicated that they had a problem with Internet access. Among institutions, 28 per cent of respondents in national institutions, 46.7 per cent of respondents from state level institutions and 59.4 per cent from district institutions indicated that they had problems in accessing the Internet as can be seen in Table 7. The lack of infrastructure and good connectivity at district level may be the reason for this.

Table 7. Problems with Internet Access

Response	National		State		District	
	No. of Respondents	%	No. of Respondents	%	No. of Respondents	%
Yes	25	28.1%	21	46.7%	19	59.4%
No	64	71.9%	13	28.9%	7	21.9%
No Response			11	24.4%	6	18.8%
Total	89	100.0%	45	100.0%	32	100.0%

Specific problems indicated by respondents with reference to Internet access include problem in connectivity by a majority of respondents, slow speed, few nodes/access points for Internet, technical and operational problems and lack of training in the use of the tool.

8. Problems with Information Access on the Web

Information was also obtained regarding problems in accessing information on the Web. According to 60.4 per cent of respondents there is information overload on the web, 46.9 per cent have responded that information is scattered, 46.3 per cent expressed that source of data is unknown and according to 43 per cent of the respondents information is not updated frequently as can be seen in Table 8.

Table 8. Problems with Accessing Information on the Web

Sl No	Problems	Agree		Not sure		Disagree	
		No. of Resp.	%	No. of Resp.	%	No. of Resp.	%
1	Information overload	75	60.4%	16	12.9%	33	26.6%
2	Source of data unknown	56	46.3%	21	17.4%	44	36%
3	Information is not updated frequently	52	43%	20	16.5%	49	40.5%
4	Information is scattered	54	46.9%	18	15.7%	43	37%
5.	Lack of coordination among agencies	52	44.8%	36	31%	28	24.2%
6.	Information is not available	24	20.2%	26	21.8%	69	58%

Sixty per cent of the respondents across institutions agree that there is information overload on the web. There is an exponential growth of Information on the web and from a few sites when the Internet came into existence, now there are millions of sites on the web. Everyday there are new sites and pages added on the web. An increasing number of people are connecting to the Internet to conduct research and are not only accessing information but also putting a lot of information online. Anyone can publish information on the web. Therefore we see an information overload from the access to so much information, almost instantaneously, says Flew, 2008. Some of the reasons for information overload include: the rapidly increasing rate of new information being produced; the ease of duplication and transmission of data across the Internet;and increase in the available channels of information.

According to 46.9 per cent of the respondents, information on the web is scattered. The rapid development of Web sites providing extensive coverage of a topic, along with the development of powerful search engines to help users find these web sites, has enabled users to find information about a topic. However, information seekers often find it difficult to have comprehensive information because the relevant information is scattered across many web sites. Most information is scattered across thousands of institutions, around groups of issues and problems say Ballantyne and Addison, 2000. Due to the Internet's architecture, information on similar subjects is scattered across many different servers around the world (FAO, 2000). According to 44.8 per cent of the respondents, there is also lack of coordination among agencies.

According to 46 per cent of the respondents source of data is often unknown. On the web, authentication of data often becomes difficult as anyone can post information online.

A majority of the respondents (58 per cent) disagree that information is not available on the web. Information availability does not seem to be a problem – there is information overload. However, it was expressed that content related to Indian agriculture is limited. Most institutions give information on their mandate, mission, titles of their publications with not much content in full text. Information, which a scientist or an agricultural officer working at the field level needs, is problem solving information to help farmers find solutions to their problems and enable decision-making. Much of this kind of content is not yet web enabled. Most websites offer only abstracts not full text, and one has to subscribe to access full text. Information published in many of the journals/books on the web is not publicly available restricting access.

Conclusion and Suggestions

Summing up the responses, it is seen that there is reasonably good access to communication facilities in institutions. Over 98 per cent of faculty in national institutions have access to Internet followed by 68.9 per cent in state level institutions and 62.5 per cent in district level institutions. Email is the most used Internet service by respondents in national, state and district institutions. Respondents from national state and district level institutions also browse websites for information, for research and access online databases. Problems with reference to Internet access include problems with connectivity by a majority, lack of training in the use of the tool, lack of internet facility in their organization and technical and operational problems. Despite the lack of Internet access at some of the institutions and problem in connectivity, respondents across institutions have given the first preference to a web-based platform for information access.

Problems in accessing information on the Web, as expressed by respondents across institutions include information overload on the web, scattered information, lack of frequent updation and lack of coordination among agencies. However they find the web, user friendly to access.

Suggestions

ICT infrastructure and Connectivity. Infrastructure needs to be established and connectivity strengthened in institutions where it is currently weak to enable institutions to use the services. In institutions which have the infrastructure and connectivity, there is need to improve the use of the technology for information access and dissemination, through capacity building.

Capacity building. Lack of training in the use of the tool has been mentioned as one of the problems in accessing Internet. Keeping this in view, capacity building is necessary not only to strengthen the ability of people involved in information provision to provide the right information in the right formats in the form of databases, Expert Systems, research support modules etc., but also the capacities of the information users to access information using new ICT tools. There is need for capacity building on use of new technology for better information organization and management and for faster and effective dissemination of information.

Digitization of Content. Content generated by the institutions could be digitized to improve accessibility to agricultural research. One way could be by encouraging open access which allows self-archiving by researchers and is a cost effective way to disseminate and use information. Open access archiving enables scholarly literature to be made available through Institutional Repositories. Platforms used are DSpace, Eprints and Greenstone which are open source software.

Standards. In view of the problems in accessing information due to the information overload and scatter, appropriate vocabularies, guidelines and standards are also needed to facilitate the integration of data from different sources, and for effective data exchange (FAO, 2000a).

Apart from connectivity, collaboration among institutions is also needed to contribute to the digital knowledge. Partnerships among organizations, would ensure availability of information to all stakeholders.

It is apparent that there is an increasing use of the Internet for information access and dissemination. The technology is also evolving from the traditional mode and emerging as a more participatory, user-driven platform. With connectivity improving along with ease of use of various new tools, agricultural researchers, extension managers and development personnel are likely to depend more on these new online resources to access information, collaborate and exchange information. It is imperative that institutions improve the use of these tools by way of building content and capacity building efforts.

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