Usage Pattern of E-Resources by Scientists in Select Plantation Research Institutes in South India: A Study

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Abstract

This paper is an attempt to study the issues of use of electronic information resources by the scientists of selected Plantation Crops Research Institutes in South India. The survey was conducted and primary data were obtained from the scientist through structured questionnaire. The research findings shows that majority of the respondents are having rural social background (66.18%) and the majority of them possess PhD degree in Plantation Crops Research Institute in South India. All the scientists visits library for gathering the various information. The most important purpose of visit to the library was to refer the periodicals 86.96% and to borrow and return of the books were 73.91%. Majority of the scientists used their department (93.24%) and home (42.51%) for accessing the electronic information resources. The electronic journals (full text / abstracts) (56.52%), Internet websites (66.18%), Search engines (68.12%) were used to greater extent and Online Access to databases (33.33%) & Electronic Reference Services (38.16%) used to a moderate extent by the scientists. The most of the scientists learnt requisite skill of using electronic information resources through self-study by trial and error method, browsing through internet and guidelines from friends & colleagues. It is very much clear through WA values that, the subjects such as Plantation Crops (3.52), Plant Physiology (2.65), Plant Pathology/ Entomology (2.59), Biotechnology (2.55), Botany / Clone Evaluation (2.63), Agronomy / Soils (2.51), Crop Physiology (2.51) were found to be priority subjects in plantation crops research. The study also found that majority of the scientists (84.54%) used databases to get the needed information and less number of scientists 15.46 were not used to databases. According to WA values, it is very much clear that Springer link (2.66) Science Direct (2.59), CAB Abstract / e books (2.19), CeRA (2.2) are the occasionally used databases in plantation crops research. The study also found that majority of scientists (69.56%) used CeRA consortium for accessing the electronic information resources and rest of the 30.43% of the scientists were not using CeRA.

Keywords: E-resources, databases, CeRA consortium, Plantation Crops Research Institutes, etc.

Introduction

The electronic revolution driven by Information Communication Technologies (ICT) has transformed Plantation Crops Research Institute libraries. It has an impact on every sphere of research institute library activities e.g. collection development strategies and services strategies of the libraries. The collection development has been transferred from print media to electronic media and the users reading habits have got transformed from print media to electronic media. The computers and networked electronic information resources have become an integral part of the research institute libraries. The Indian Council of Agricultural Research (ICAR) and the National Agricultural Research System (NARS), have developed and provided electronic information resources through online access facilities like CeRA (Consortium for e-resources in Agriculture) and for providing easy access to all the Agricultural and other allied disciplined Research Institute libraries (Chandrasekharan et. al., 2012).

The present study is an attempt to analyse the usage pattern of e-resources by the scientists of Plantation Crops Research Institutes in South India and analyze to the constraints faced by the scientists while accessing to the e-resources with some useful suggestions for their development.

Objectives of the Study

- To examine the respondents' use of library and information resources.
- To examine the respondents' use of electronic information resources and services.

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- To examine the respondents' methods of learning skills to the use of electronic information resources and services.
- To examine the respondents' priority subjects of plantation crops research towards electronic information resources.
- To examine the respondents' use of electronic databases.
- To examine the respondents' use of National Agricultural Research System' CeRA consortium (NARS-CeRA).
- To examine the respondents' perception towards electronic information resources.
- To examine the respondents' extent of satisfaction in using electronic information resources & services.

Literature Review

Over the last decade, numerous studies have been undertaken to explore the possibility of more usage of the electronic information sources and services, moresoever on the information seeking behaviour of scientists in the research institutes in the area of electronic journals and online databases.

Agricultural Information Transfer System (AITS) is ever-evolving due to ongoing development in Information and Communication Technology (ICT), transforming the methods of Development, Documentation, Dissemination, and Diffusion (4 Ds) of information (Reddy, 2008). The advent of information technology has resulted in reducing the size of libraries. In fact, these smaller modern libraries have rich potential of information. This has been possible due to the digitization of information (Thanuskodi, 2012). The agricultural undergraduates often use search engines (96%) and Wikipedia (73%) than any other type of resources (Wijetunge, 2015). The change in traditional document delivery services, from print to electronic, has come about very quickly and libraries and information services have undergone significant transformation in order to effectively deliver electronic resources to the academic community (Appleton, 2006). The study explores that scientists working in CISH are more dependent on electronic resources for their work in comparison with scientists of IISR. The number of agricultural scientists who visited library daily is found to be more in IISR institution (Devi 2010).

The study reveals that majority of the respondents (88.9%) were using the Electronic Information Services (EIS) for the purpose of thesis/project work. 76.5% of the respondents had learnt to use of the EIS with the assistance of colleagues/ friends. Nearly 40.7% of the respondents have been using EIS for more than five years. Nearly 69.1% of the respondents have been access to the computer and use it for EIS also access it from campus computer center and rest of them accessing in cybercafé, home and individual department. Selection of the right data from the retrieved irrelevant information is the most severe constraint faced by the respondents while using EIS (Sujatha & Mudhol, 2008). The study conducted by Hewitson (2002) showed a direct link between electronic information resource use and perceived information Technology competency. In another study the author found that the internet was the most widely used service and electronic indexes, abstracts & electronic journals were not heavily used. The study describes the evolving role of the AGRIS bibliographic database into becoming a hub of agricultural research literature. The large database of 3 million agricultural resources, collected by more than 150 institutions over the last 35 years, becomes the starting point to access the diverse knowledge in agricultural science and technology available globally on the web. AGRIS has for many years provided a large database of bibliographic references, such as research papers and theses, which includes metadata such as conferences, researchers, institutions and keywords using different thesauri such as AGROVOC (Fogarolli, 2011).

The 40 leading publishers under the aegis of Food and Agriculture Organization of the United Nations started a programme called, 'Access to Global Online Research in Agriculture' (AGORA), which provides toll-free or low-cost access to major scientific journals in the disciplines of agriculture and related sciences to public institutions in developing countries. Started in October 2003, AGORA programme provides access to 1278 journals across 107 countries (Wu & Ochs, 2006). Wyoming University libraries in Developing Selenium Database: a bibliographic database dealing with the effects of selenium on environment and covering references from the disciplines of agriculture, biology, botany, geology, environmental chemistry, medicine, veterinary science and wildlife biology. Development issues include software requirement, search term identification and distribution via. World Wide Web (Wolfe, 1996). The agricultural scientists working in different agricultural research institutes of Odisha

mostly prefer AGRICOLA (84.53%), Elsevier Science Direct (70%), followed by the preferred database like Bio Science Information Services, Philadelphia and BIOSIS (67.97%) and Emerald database (50.27%) (Pattanaik, & Parida 2013). The four information modules are designed for Agricultural Research Information System Network (ARISNET) to standardize the usage of different software for the day-to-day activities of the scientists and office automation. ARISNET has four information modules namely Agricultural Research Personnel Information System (ARPIS); Agricultural Research Financial Information System (ARFIS); Agricultural Research Library Information System (ARLIS) and Agricultural Research Management Information System (ARMIS) (Sharma, 1989).

Library consortia facilitated effective resources sharing amongst the libraries. Their importance is increasing all over the world, where the libraries are facing significant budget cuts and continual increases in the price of electronic and printed materials (Kirlidog & Bayir 2007). The Study highlights the use of e-learning resources in medical colleges, and found that medical education popularized only after the independence of the country. It is found that majority of the colleges under the study area have e-information resources and e-databases. Almost all colleges under study have provided very good infrastructure faculties to their libraries to serve their clients effectively (Kannappanavar & Rajanikanta 2008).

Scope of the Study

The present study is limited to scientists of following seven Plantation Crops Research Institutes in South India.

1. Central Plantation Crops Research Institute (CPCRI) Kasaragod, Kerala.
2. Rubber Research Institute (RRI), Kottayam, Kerala.
3. Indian Institute of Spices Research (IISR), Kozhikode, Kerala.
4. Directorate of Cashew Research (DCR), Puttur, Karnataka.
5. Central Coffee Research Institute (CCRI) Chikmagalur, Karnataka.
6. Indian institute of Oil Palm Research (IIOPR) Pedavegi, Andhra Pradesh.
7. Tea Research Foundation (TRF) Valparai, Tamil Nadu.

Methodology

To fulfil the objectives of the study, a structured questionnaire covering relevant aspects of the study was circulated to all the scientists of seven plantation crops research institute in south India between the months of January and March 2016. Total 275 questionnaires were distributed to the scientists of seven plantation crops research institutes and the investigator has been received only 207 filled questionnaire from the scientists. This constitutes 75% (207/275) percent of the total response. Data collected through the questionnaire were organised and tabulated using simple statistical methods and presented in the form of table. In certain part of the analysis, in calculating the weighted average of the arithmetic average, each value of the variable is multiplied by its corresponding assigned weights and the products so obtained are aggregated. This is divided by the weights and the resulting figures are the weighted arithmetic averages.

Symbolically:

$$\bar{X} = \frac{W_1X_1 + W_2X_2 + \cdots + W_nX_2}{W_1 + W_2 + \cdots + W_n}$$

Where , X_w stands for the weighted arithmetic average. X_1, X_2, X_3 etc… for the values of the variable and W_1,W_2, W_3 etc…., for the respective weights.

Data Analysis

Analysis of data is the ultimate step in research process. It is the link between raw data and significant results leading to conclusions. This process of analysis has to be result oriented.

Demographics of Respondents

Gender of Respondents

Table 1, indicate the gender wise distribution of the respondents. It could be noted that out of the total 207 respondents, majority of the respondents (59.90%) belong to the male group and the rest of them (40.10%) are females. The study also noted that Rubber Research Institute (RRI) has majority of the female scientists (59.32%) as compare to male (40.67%) and rest of the research institute has the majority of male scientists i.e. CCRI 79.31%, IISR 60.71%, CPCRI 56.25%, DCR 75%, IIOPR 80% and TRF 75%. The female scientists in CCRI is 20.68%, IISR 39.28%, CPCRI 43.75%, DCR 25%, IIOPR 20% and TRF is 25%.

Table 1: Gender of Respondents

Gender of Respondents	CCRI	RRI	IISR	CPCRI	DCR	IIOPR	TRF	Total
Male	(23) 79.31%	(24) 40.67%	(17) 60.71%	(27) 56.25%	(9) 75%	(12) 80%	(12) 75%	(124) 59.90%
Female	(6) 20.68	(35) 59.32%	(11) 39.28%	(21) 43.75%	(3) 25%	(3) 20%	(4) 25%	(83) 40.10%
Total	29	59	28	48	12	15	16	207

Social Background of the Respondents

The data presented in table 2, is about the Social Background of the Respondents. It is observed that majority of the scientists are having rural social background (66.18%) in Plantation Crops Research Institute in South India and rest of them having urban social background (33.82%). If we observed individual research institutes, CCRI has 82.75% rural social background scientists, RRI has 49.15%, IISR has 57.14%, CPCRI has 70.83%, DCR has 58.33% IIPOR has 86.66% and TRF has 87.5%. Similarly urban social background scientists ratio in CCRI 17.24%, RRI 50.84%, IISR 42.85%, CPCRI 29.16%, DCR 41.66%, IIOPR 13.33% and TRF 12.5%.

Table 2: Social Background of the Respondents

Social Background	CCRI	RRI	IISR	CPCRI	DCR	IIOPR	TRF	Total
Urban	(5) 17.24%	(30) 50.84%	(12) 42.85%	(14) 29.16%	(5) 41.66%	(2) 13.33%	(2) 12.5%	(70) 33.82%
Rural	(24) 82.75%	(29) 49.15%	(16) 57.14%	(34) 70.83%	(7) 58.33%	(13) 86.66%	(14) 87.5%	(137) 66.18%
Total	29	59	28	48	12	15	16	207

Educational Qualification of the Respondents

The data presented in table-3, educational qualification of the respondents, it could be noted that out of the total 207 respondents, majority of the respondents (73.91%) are having PhD degree and only few respondents has MPhil degree (3.86%) and master degree 21.25% and under graduate degree (0.92%).

The Breakup of the PhD degree holder is as follows, CCRI has 65.51%, RRI has 72.88%, IISR has 89.28%, CPCRI has 79.16%, DCR has 75%, IIOPR has 53.33%, TRF has 68.75% respectively. The MPhil degree holder in RRI has 10.16%, CPCRI has 4.16%, and there was no MPhil degree holder in CCRI, IISR, DCR, IIOPR and TRF. Master degree holders, in CCRI have 31.03%, RRI has 16.94%, IISR has 10.71%, CPCRI has 16.66%, DCR has 25%, IIOPR has 46.66% and TRF has 25%. The undergraduate degree holder, on CCRI is 3.44% and in TRF it is 6.25%.

It can be evaluated from the table that PhD degree respondents constitute more in number than the M Phil & UG degree in Plantation Crops Research Institute in South India.

Table 3: Educational Qualification of the Respondents

Educational Qualification:	CCRI	RRI	IISR	CPCRI	DCR	IIOPR	TRF	Total
Doctorate (PhD)	(19) 65.51%	(43) 72.88%	(25) 89.28%	(38) 79.16%	(9) 75%	(8) 53.33%	(11) 68.75%	(153) 73.91%
M Phil	--	(6) 10.16%	--	(2) 4.16%	--	--	0	(8) 3.86%
Master Degree	(9) 31.03%	(10) 16.94%	(3) 10.71%	(8) 16.66%	(3) 25%	(7) 46.66%	(4) 25%	(44) 21.25%
Others – UG	(1) 3.44%	--	--	--	--	--	(1) 6.25%	(2) 0.96%
Total	29	59	28	48	12	15	16	207

Library visit

It is very much clear from the table 4, that all the scientists of South Indian Plantation Crops Research Institutes are visiting the library to acquire needed information.

Table 4: Respondents Library Visit

Visit to Library	*CCRI*	*RRI*	*IISR*	*CPCRI*	*DCR*	*IIOPR*	*TRF*	*Total*
Yes	(29) 100%	(59) 100%	(28) 100%	(48) 100%	(12) 100%	(15) 100%	(16) 100%	(207) 100%
No.	--	--	--	--	--	--	--	--

Frequency of library visit

The use of library resources can be measured in various ways. One such a way has been the frequency of users visit to the library. It is observed from the table 5, that 41.55% of the plantation crops scientists were visiting to library on weekly once, 27.05% was occasionally, 15.46% were Fortnightly, 8.70% were daily and 7.25% of scientists were visiting to library monthly once.

Table 5 Frequency of library Visit

N=207		
Frequency of library Visit	*No.*	*Percentage*
Daily	18	8.70%
Weekly	86	41.55%
Fortnightly	32	15.46%
Monthly	15	7.25%
Occasionally	56	27.05%
Total	207	100 %

Purpose of visit to the library

A study of data in table-6, indicates the purpose of visit to the library. It is found that most important purpose to visit to the library was to refer periodicals 86.96% and to borrow and return of the books were 73.91%. To consult Thesis and Dissertations was 46.86%, to take photo copies (Xerox) was 31.88%, to read newspapers & magazines were 31.40%, to use the online resources (e-books/journals & databases etc.) were 30.92% and to prepare for assignments / seminars were 28.02%. At the same time, to the use of electronic resources CDs and Floppies (7.73%), to refer the reference books (0.97%), to refer to the Institutional publication (0.97%) was not found to be major purpose for their visit to library.

Table 6: Purpose of Visit to the Library (multiple responses were allowed)

N=207		
State the purpose of your visit to library.	*No.*	*Percentage*
To borrow / return books	153	73.91
To read newspapers & magazines	65	31.40
To refer periodicals	180	86.96
To use of electronic resources (CDs, Floppies)	16	7.73
To use of online resources (e-books/ journals & databases etc.)	64	30.92
To consult Thesis and Dissertations	97	46.86
To prepare for assignments / seminars	58	28.02
To take photo copies (Xerox)	66	31.88
To refer Reference books	2	0.97
To refer Institutional publication	2	0.97

Use Electronic Information Resources

It was observed from the table-7, that all the scientists were using electronic information resources for their research activities at South Indian Plantation Crops Research Institutes.

Place of Accessing Electronic Information Resources

A study of the data in table-8, indicates the place of accessing e-resources by scientists. Majority of the scientists (93.24%) used their department for accessing the electronic information resources and 42.51% of the

scientists are accessing e-resources from their home, 28.50% of the scientist used library for accessing electronic information resources and 7.73% of the scientists are accessing e-resources at other institutional libraries and at hostel was 0.97% and using mobile phone was 2.42%.

Table 7 Use Electronic Information Resources

Response	*CCRI*	*RRI*	*IISR*	*CPCRI*	*DCR*	*IIOPR*	*TRF*	*Total*
Yes	(29) 100%	(59) 100%	(28) 100%	(48) 100%	(12) 100%	(15) 100%	(16) 100%	(207) 100%
No.	--	--	--	--	--	--	--	--

Table 8: Place of Accessing Electronic Information Resources (multiple responses were allowed)

Place of accessing electronic information Resources	*No.*	*Percentage*
Library	59	28.50
Department	193	93.24
Home	88	42.51
Cyber café	07	3.38
Other institutional Libraries	16	7.73
Hostel	02	0.97
Mobile	05	2.42

Extent of using electronic information sources

The electronic information resources provided wider access to information in research institutes', research and innovation activities. A study of the data in table-9, indicates extent of using electronic information resources by the respondents. With regard to usage of different categories of electronic resources, it was found that Electronic journals (full text / abstracts) (56.52%), Internet websites (66.18%), Search engines (68.12%) were used to greater extent, whereas Online Databases (41.06%), Electronics Books (39.61%), online reference books (32.85%), Institutional Repositories (33.82%) were used to moderate extent. The Data bases on CD/DVD (33.33%), Library OPAC (40.58%), e-thesis & Dissertation (34.78%), e-newspapers (37.68%), were used to little extent.

Looking at the WA scale of the respondents, it is known that Internet websites (3.57), Search engines (3.51) were used marginally to greater extent. The Online Databases (3.04), Electronic journals (full text / abstracts) (3.37), Electronics Books (2.74), Online reference books (2.62), and Institutional Repositories (2.53) were used marginally to moderate extent. The rest of the resources such as Data bases on CD/DVD (1.72), Library OPAC (1.71), e-newspapers (2.40), e-thesis & Dissertation (2.16) were used too little extent.

Table 9: Extent of using Electronic Information Sources

Electronic information Sources	*N=207*					*WA*
	4	*3*	*2*	*1*	*-1*	
Data bases on CD/DVD	(9) 4.35%	(59) 28.50%	(69) 33.33%	(38) 18.36%	(32) 15.46%	1.72
Online Databases	(77) 37.20%	(85) 41.06%	(31) 14.98%	(9) 4.35%	(5) 2.42%	3.04
Electronic journals (full text / abstracts)	(117) 56.52%	(70) 33.82%	(13) 6.28%	--	(7) 3.38%	3.37
Electronics Books	(55) 26.57%	(82) 39.61%	(54) 26.09%	(5) 2.42%	(11) 5.31%	2.74

Electronic information Sources	*N=207*					*WA*
	4	*3*	*2*	*1*	*-1*	
Library OPAC	(7) 3.38%	(40) 19.32%	(84) 40.58%	(57) 27.54%	(19) 9.18%	1.71
E-thesis & Dissertation	(30) 14.49%	(58) 28.02%	(72) 34.78%	(28) 13.53%	(19) 9.18%	2.16
Online reference books	(54) 26.09%	(68) 32.85%	(58) 28.02%	(17) 8.21%	(10) 4.83%	2.62
E-newspapers	(56) 27.05%	(41) 19.81%	(78) 37.68%	(13) 6.28%	(19) 9.18%	2.40
Internet websites	(137) 66.18%	(56) 27.05%	(9) 4.35%	(5) 2.42%	--	3.57
Search engines	(141) 68.12%	(48) 23.18%	(10) 4.83%	(3) 1.45%	(5) 2.42%	3.51
Institutional Repositories	(47) 22.71%	(70) 33.82%	(54) 26.09%	(27) 13.04%	(9) 4.35%	2.53

Note: a. Weighted average assigned for values are, 4 - To a great Extent, 3- To moderate Extent, 2 - To a little Extent, 1 - Cannot say, -1 - Not at all.
b. Values presented in parentheses are associated weighted values
c. Multiple responses are allowed

Extent of using Electronic information Services

The table-10, data describes the extent of use of electronic information services by scientists in plantation research institutes. As per the extent of use of electronic information services, it was found that Online Access to databases (33.33%) & Electronic Reference Services (38.16%) are being used to a moderate extent. Whereas, Access to Library OPAC (37.68%), CD-ROM Database Services (38.16%), Institutional digital Repositories (36.71%) and Access to internet in the library (39.85%) used to a little extent and 32.85% of the scientists were opined 'cannot say' to Online CAS/SDI services.

Considering the WA scale Online Access to databases (2.77), Electronic Reference Services (2.43), Institutional digital Repositories (2.22) was found to be used to moderate extent, whereas Access to internet in the library (1.81), Access to Library OPAC (1.83), CD-ROM Database Services (1.47) was found to a little extent. The electronic information service Online CAS/SDI (WA 1.34) is perceived to be not influenced the scientists as they are unable to say the extent of their usage.

Table 10: Extent of using Electronic Information Services

Electronic Services	*N=207*					*WA*
	4	*3*	**2**	**1**	**-1**	
Access to Library OPAC	(13) 6.28%	(58) 28.02%	(78) 37.68%	(27) 13.04%	(31) 14.98%	1.83
CD-ROM Database Services	(8) 3.86%	(44) 21.26%	(79) 38.16%	(29) 14.01%	(47) 22.71%	1.47
Online Access to databases	(65) 31.40%	(69) 33.33%	(54) 26.09%	(9) 4.35%	(10) 4.83%	2.77
Electronic Reference Services	(33) 15.94%	(79) 38.16%	(68) 32.85%	(13) 6.28%	(14) 6.76%	2.43
Institutional digital Repositories	(32) 15.46%	(60) 28.99	(76) 36.71%	(19) 9.31%	(20) 9.66%	2.22

Electronic Services	N=207					WA
	4	3	2	1	-1	
Access to internet in the library	(17) 8.21%	(54) 26.09%	(82) 39.6%	(17) 8.21%	(37) 17.87%	1.81
Online CAS/SDI	(6) 2.90%	(31) 14.98%	(65) 31.40%	(68) 32.85%	(37) 17.87%	1.34

Note: a. Weighted average assigned for values are, 4 - To a great Extent, 3- To moderate Extent, 2 - To a little Extent, 1 - Cannot say, -1 - Not at all.
b. Values presented in parentheses are associated weighted values
c. Multiple responses are allowed

Methods of Learning Skills to Use of Electronic Information Resources & Services

A study of the data in figure-11, indicates the methods of learning skills to use of electronic information resources by the respondents. 80.19% of the scientists learnt requisite skill of using electronic information resources through self-study by trial and error method and browsing through internet 75.85%, followed by 59.90% of them who had acquired the skill through guidelines from friends and colleagues. Further, nearly one fourth of the scientists (26.57%) also said that they have learnt through with the help of library staff and 12.08% of the scientists learnt through attending library training programme. However less number of the scientists had acquired the required skill with the help of printed guides available at library (4.35%) and guidance from teachers (9.18%).

Table 11: Methods of Learning Skills to Use of Electronic Information Resources & Services (multiple responses were allowed)

N=207		
Methods of learning skill	No.	Percentage
Self-study by trial and error methods	166	80.19
With the help of library staff	55	26.57
By attending library training programme	25	12.08
Printed guides provides by library	09	4.35
Guidance from teachers	19	9.18
Guidance from friends / colleagues	124	59.90
Browsing through internet	157	75.85

Priority subjects of Plantation Crops Research for Electronic Information Resources

A study of data in table-12, indicate the subject priority on spices research for electronic information resources by the respondents. In plantation crops research subjects, the top priority by the scientists are plantation crops 61.84%, agricultural economics 8.70%, agronomy / soil 61.84%, plant pathology / entomology 20.29%, plant physiology 30.43%, crop physiology 27.24%, Biotechnology 26.09%, Botany / clone evaluation 34.30%, Genome analysis 19.81%, Germplasm 21.74%, Latex harvest technology 9.18% and Rubber technology 10.14%.

Looking at the collective response with WA values, it is very much clear that Plantation Crops (3.52) was found to be the Top priority, whereas the subjects Plant Physiology (2.65), Plant Pathology/ Entomology (2.59), Biotechnology (2.55), Botany / Clone Evaluation (2.63), Agronomy / Soils (2.51), Crop Physiology (2.51) are found to be priority subject. Agricultural Economics (2.32), genome analysis (2.15), Germplasm (2.20), Latex Harvest Technology (1.46) and rubber technology (1.42), are the low priority subjects.

Use of Electronic Databases

The study of the data in table-13, indicates the use of electronic databases by the Plantation Crops Research Institute scientists. It was found that majority of the scientists (84.54%) were using databases to get the needed information and less number of scientists 15.46 was not using databases. The study also found that in CCRI 72.41 % of scientists were using databases and 27.58% were not using databases, in RRI 69.49 % were using databases

& 30.50% were not using and CPCRI cent percent of the scientists were using databases, in DCR 91.66% were using databases and 8.33% were not using databases, in IIOPR 86.66% were using databases and rest of the 33.33% were not using databases, in TRF 81.25% were using databases and rest of the 18.75% were not using databases.

Table 12: Priority Subjects of Plantation Crops Research for Electronic Information Resources

Subject Priority	*N=207*					*WA*
	4	*3*	**2**	**1**	**-1**	
Plantation Crops	(128) 61.84%	(70) 33.82%	(4) 1.93%	(2) 0.97%	(3) 1.45%	3.52
Agricultural Economics	(18) 8.70%	(80) 38.65%	(79) 38.16%	(20) 9.66%	(10) 4.83%	2.32
Agronomy / Soils	(44) 21.26%	(79) 38.16%	(46) 22.2%	(26) 12.56%	(12) 5.80%	2.51
Plant Pathology/ Entomology	(42) 20.29%	(86) 41.55%	(53) 25.60%	(15) 7.25%	(11) 5.31%	2.59
Plant Physiology	(63) 30.43%	(61) 29.47%	(58) 28.02%	(11) 5.31%	(14) 6.76%	2.65
Crop Physiology	(57) 27.24%	(58) 28.02%	(58) 28.02%	(18) 8.70%	(16) 7.73%	2.51
Biotechnology	(54) 26.09%	(63) 30.43%	(51) 24.64%	(30) 14.49%	(9) 4.35%%	2.55
Botany / Clone Evaluation	(71) 34.30%	(58) 28.02%	(38) 18.36%	(25) 12.08%	(15) 7.25%	2.63
Genome Analysis	(41) 19.81%	(57) 27.54%	(47) 22.71%	(39) 18.84%	(23) 11.11%	2.15
Germplasm	(45) 21.74%	(62) 29.95%	(38) 18.36%	(24) 11.59%	(26) 12.56%	2.20
Latex Harvest Technology	(19) 9.18%	(30) 14.49%	(45) 21.74%	(80) 38.65%	(33) 15.94%	1.46
Rubber Technology	(21) 10.14%	(27) 13.04%	(36) 17.39%	(90) 43.48%	(33) 15.94%	1.42

Note: a. weighted average assigned for values are4 – Top priority, 3 – Priority, 2- Low priority, 1- No Priority, -1 cannot say.

b. Values presented in parentheses are associated weighted values

c. Multiple responses are allowed

Table 13: Use of Electronic Databases

N=207								
use electronic databases	*CCRI*	*RRI*	*IISR*	*CPCRI*	*DCR*	*IIOPR*	*TRF*	*Total*
Yes	(21) 72.41%	(41) 69.49%	(28) 100%	(48) 100%	(11) 91.66%	(13) 86.66%	(13) 81.25%	(175) 84.54%
No	(8) 27.58%	(18) 30.50%	--	--	(1) 8.33%	(2) 33.33%	(3) 18.75%	(32) 15.46%
Total	(29) 100%	(59) 100%	(28) 100%	(48) 100%	(12) 100%	(15) 100%	(16) 100%	(207) 100%

Frequency of use of Electronic Databases for Plantation Crops Research

The study also made an attempt to determine the frequency of use of databases pertaining to plantation crops research by the scientists (Table-14). The databases usage by scientists of the plantation crops research is most frequently are in AGRICOLA (10.29%), AGRIS (14.86%), CAB Abstract / e-book (22.86%), J-Gate Agricultural & biological science (10.86%), John Wiley – Blackwell online (10.86%), CRCnetBASE Online (2.29%), CeRA (40%), India Stat (8%), Agriinfotech portal (9.14%), Acta Horticulture (11.43%), Agricat (4%), Krishiprabha (5.14%), Science Direct 42.29%, Springer link (44%), Web of Science (4.57%), Nature (19.43%) and Pro - Quest Science (0.57%).

Looking at the collective response with WA values, it is very much clear that Springer link (2.66) Science Direct (2.59), CAB Abstract / e books (2.19), CeRA (2.2), Occasionally used databases in plantation crops research and rest of the databases, AGRICOLA (1.28) , AGRIS (1.46) J-Gate Agricultural & Biological Science (0.90), John Wiley – Blackwell online (1.23), CRCnetBASE Online (0.11), India Stat (0.58), Agriinfotech portal (0.65), Acta Horticulture (1.06), DELNET (-0.62), Agricat (0.41), Krishiprabha (0.32), Web of Science (0.66), Nature (1.46) and Pro - Quest Science (-0.07) were found to be less in usage by the scientists.

Table 14: Frequency of use of Electronic Databases for Plantation Crops Research

Data Base	*N=175*					*WA*
	4	*3*	*2*	*1*	*-1*	
AGRICOLA	(18) 10.29%	(25) 14.29%	(53) 30.29%	(25) 14.29%	(54) 30.86%	1.28
AGRIS	(26) 14.86%	(29) 16.57%	(42) 24.00	(29) 16.57	(49) 28%	1.46
CAB Abstract / e books	(40) 22.86%	(45) 25.71%	(54) 30.86	(9) 5.14%	(29) 16.57%	2.19
J-Gate (Agricultural & biological Science)	(19) 10.86%	(18) 10.29%	(30) 17.14	(38) 21.71	(70) 40%	0.90
John Wiley - Blackwell Online	(19) 10.86%	(33) 18.86%	(37) 21.14	(26) 14.86	(60) 34.28%	1.23
CRCnetBASE Online	(4) 2.29%	(3) 1.71%	(20) 11.43%	(51) 29.14%	(97) 55.43%	0.11
CeRA	(70) 40.00%	(26) 14.86%	(20) 11.43%	(7) 4 %	(52) 29.71%	2.02
India Stat	(14) 8.00%	(17) 9.71%	(30) 17.14%	(24) 13.71%	(90) 51.43%	0.58
Agri-infotech Portal	(16) 9.14%	(16) 9.14%	(27) 15.43%	(32) 18.29%	(84) 48 %	0.65
Acta Horticulture	(20) 11.43%	(29) 16.57%	(36) 20.57%	(18) 10.29%	(72) 41.14%	1.06
DELNET	--	(1) 0.57%	(3) 1.71%	(27) 15.43%	(144) 82.2%9	-0.62
Agricat	(7) 4.00%	(19) 10.86%	(24) 13.71%	(32) 18.29%	(93) 53.14%	0.41
Krishiprabha	(9) 5.14%	(15) 8.57%	(20) 11.43%	(33) 18.86%	(98) 56%	0.32
Science Direct	(74) 42.29%	(47) 26.86%	(22) 12.57%	(2) 1.14%	(30)17.14%	2.59
Springer link	(77) 44.00%	(45) 25.71%	(24) 13.71%	(2) 1.14%	(27) 15.43%	2.66

Data Base	*N=175*					*WA*
	4	*3*	*2*	*1*	*-1*	
Web of Science	(8) 4.57%	(23) 13.14	(34) 19.43%	(28) 16.%	(82) 46.86%	0.66
Nature	(34) 19.43%	(24) 13.71%	(48) 27.43%	(10) 5.71%	(59) 33.71%	1.46
Pro - Quest Science	(1) 0.57%	(8) 4.57%	(13) 7.43%	(43) 24.57%	(110) 62.86%	-0.07

Note: a. weighted average assigned for values are, 4 – Most Frequently, 3 – Frequently, 2 – Occasionally, 1 – Cannot Say, -1 – Do not use
b. Values presented in parentheses are associated weighted values
c. Multiple responses are allowed

Problems in using electronic databases

The study of the data in table-15, indicates the extent of the problems in accessing e-resources from databases by the scientists in Plantation Crops Research Institutes. 30.29% of the scientists face to the little extent, the problem of logging in, 37.71% of the scientists were facing password requirement problem to a great extent, 36.57% of the scientists were facing the slow connection problem to a little extent, 37.14% of the scientists were facing difficulties searching problem to a little extent, 49.14% of scientists were faced the problem of inadequate database subscription to a greater extent, and majority of the scientists were not facing the problem of lack of help from library staff and do not have exposure categories.

Taking into account of WA scale, password requirement (2.75), inadequate database, subscription (2.74), was found to be an important problem to moderate extent. The problems, logging in (2.02), slow connection (2.15), difficulties in searching (1.75), not sure which database to choose (1.62) were found to be to a little Extent, and also the study found that the WA in the category of lack of help from library staff & do not have exposure were 0.85 and -0.61 respectively.

Table 15: Problems in using Electronic Data Bases

Problem while using electronic databases	*N=175*					*WA*
	4	*3*	*2*	*1*	*-1*	
Logging in	(33) 18.86%	(47) 26.86%	(53) 30.29%	(11) 6.29%	(31) 17.71%	2.05
Password requirement	(66) 37.71%	(54) 30.86%	(33) 18.86%	(6) 3.43%	(16) 9.14%	2.75
Slow connection	(33) 18.86%	(40) 22.86%	(64) 36.57%	(17) 9.71%	(21) 12%	2.15
Difficulties in searching	(14) 8.00%	(47) 26.86%	(65) 37.14%	(14) 8%	(35) 20%	1.75
Not sure which database to choose	(8) 4.57%	(49) 28%	(58) 33.14%	(24) 13.71%	(36) 20.57%	1.62
Lack of help from library staff	(12) 6.86%	(11) 6.29 %	(41) 23.43%	(48) 27.43%	(63) 36%	0.85
Inadequate database subscription	(86) 49.14%	(24) 13.71%	(30) 17.14%	(19) 10.86%	(16) 9.14%	2.74
do not have exposure	(5) 2.86%	(8) 4.57%	(4) 2.29%	-	(158) 90.29%	-0.61

Note: a. Weighted average assigned for values are, 4 - To a great Extent, 3- To moderate Extent, 2 - To a little Extent, 1 - Cannot say, -1 - Not at all.
b. Values presented in parentheses are associated weighted values
c. Multiple responses are allowed

Reasons for not using Electronic Databases

It was found from the table-13, that out of the 207 respondents only 32 respondents (15.46%) were not using databases. The investigator tried to establish the reasons why scientists of the Plantation Crops Research Institute were not using the databases. The table 16, depicted that lack of access (53.12%) & cannot find relevant databases (65.62%), inadequate network facilities (31.25%), were the most important hindrance that would discourage them to use databases. Few scientists had expressed the reason for not using the database were due to the quality not equal to print (90.37%) and don't like reading from screen (12.5%) and 15.62% of the scientists did not try it so far.

Table 16: Reasons for not using electronic databases (Multiple responses are allowed)

No= 32		
reasons for not using electronic databases	*No. of Respondents*	*Percentage*
Cannot find relevant databases in my field	21	65.62%
Quality is not equal to print	03	9.37%
Inadequate network facilities	10	31.25%
Don't like reading from screen	04	12.5%
Lack of access	17	53.12%
I did not try it so for	05	15.62%

Use of National Agricultural Research System (NARS-CeRA) Consortium

The study of the data in table-17, indicates the usage of 'NARS – CeRA consortium by the scientists of the Plantation Crops Research Institute. It was found that the majority of the scientists (69.56%) were using CeRA consortium for accessing the electronic information resources and rest of the 30.43% of the scientists were not using CeRA.

Table 17: Awareness & use of the National Agricultural Research System (NARS-CeRA)

N=207		
Use of NARS-CeRA consortium	*No. of Respondents*	*Percentage*
Yes	144	69.56%
No	63	30.43%
Total	207	100%

Frequency of use of the Consortium for e-resources in Agriculture (CeRA).

The study of the data in table-18, indicates the frequency of use of electronic information resources of various publishers and aggregators in CeRA consortium by the respondents. It was found that the databases that the Springer link (45.14%) and science direct (39.58%) were being used more frequently from the CeRA consortium followed by the Annual Reviews (40.97%) which were frequently used and CSIRO (47.22%) were used occasionally.

Looking at the overall response rates with the WA scale Science Direct (3.98), Springer link (3.10), Annual reviews (2.56) were frequently used databases in CeRA consortium and rest of the database CSIRO (1.88) were used occasionally.

User Perception towards Electronic Information Resources

The study of the data in table-19, that User Perception towards Electronic Information Resources, it was found that large number of scientists were feeling excellent and good on each feature of electronic information resources. The levels of satisfaction expressed were excellent in both towards the feature of Easy to use (56.52%) and accessibility (42.51%). The level of satisfaction expressed by majority of scientists as good towards features such as Speed & quickness (47.83%), Hypertext links (47.83%), Organised information (44.44%), Content of information (49.76%), Comprehensiveness (41.55%), Flexibility (45.41%).

Looking at the WA scale, the features Easy to Use (2.51), Usefulness (2.36) & Accessibility (2.29) were expressed by scientists as marginally excellent. The rest of the features, Speed & quickness (2.09), Hypertext links (1.77), Organised information (1.88), Content of information (1.93), Comprehensiveness (1.93) and flexibility (1.87) were found to be good.

Table 18: Frequency of use of the Consortium for e-Resources in Agriculture (CeRA).

Frequency use of CeRA.	*N=144*					*WA*
	4	*3*	*2*	*1*	*-1*	
Springer Link	(65) 45.14%	(41) 28.47%	(32) 22.22%	(3) 2.08%	(3) 2.08%	3.10
Annual Reviews	(26) 18.06%	(59) 40.97%	(44) 30.56%	(7) 4.86%	(8) 5.55%	2.56
CSIRO	(11) 7.64%	(32) 22.22%	(68) 47.22%	(14) 9.72%	(19) 13.19%	1.88
Science Direct	(57) 39.58%	(49) 34.03%	(30) 20.83%	(1) 0.69%	(7) 4.86%	2.98

Note: a. weighted average assigned for values are, 4 – Most Frequently, 3 – Frequently, 2 – Occasionally, 1 – Cannot Say, -1 – Do not use
b. Values presented in parentheses are associated weighted values
c. Multiple responses are allowed

Table 19: User Perception towards Electronic Information Resources

Rating of EIRs	*N=207*				*WA*
	3	*2*	*1*	*-1*	
Easy to Use	(117) 56.52%	(78) 37.68%	(12) 5.80%	--	2.51
Accessibility	(88) 42.51%	(91) 43.96%	(28) 13.53%	--	2.29
Speed & quickness	(63) 30.43%	(99) 47.83%	(45) 21.74%	--	2.09
Usefulness	(101) 48.79%	(81) 39.13%	(24) 11.59%	(1) 0.48%	2.36
Hypertext links	(38) 18.36%	(99) 47.83%	(62) 29.95%	(8) 3.86%	1.77
Organised information	(51) 24.63%	(92) 44.44%	(58) 28.02%	(6) 2.90%	1.88
Content of information	(47) 22.71%	(103) 49.76%	(55) 26.57%	(2) 0.97%	1.93
Comprehensiveness	(53) 25.60%	(86) 41.55%	(62) 29.95%	(6) 2.90%	1.93
Flexibility	(54) 26.09%	(94) 45.41%	(58) 28.02%	(1) 0.48%	1.87

Note: a. weighted average assigned for values are, 3-Excellent, 2–Good, 1–Fair, -1-poor.
b. Values presented in parentheses are associated weighted values
c. Multiple responses are allowed

Extent of Satisfaction in using Electronic Information Resources and Services

The study of the data in table-20, indicate the levels of satisfaction in using electronic information resources by the scientists. User satisfaction has been identified as an important variable associated with the use of electronic information resources. It is observed that 23.67% of the scientists were found to be highly satisfied in usage of electronic information resources and majority of the scientists (37.68%) were found to be satisfied in using the electronic resources, 36.71% of the scientists were found to be moderately satisfied. The rest of the 1.93% of the scientists was found to be dissatisfied towards the use of electronic resources.

Table 20: Extent of Satisfaction in using Electronic Information Resources and Services

N=207		
Level of satisfaction	*No. of Respondents*	*Percentage*
Highly satisfied	49	23.67
Moderately Satisfied	76	36.71
Satisfied	78	37.68
Dissatisfied	4	1.93
Highly dissatisfied	--	--
Total	207	100%

Findings

1. Majority of the scientists belong to the male group (59.90%) and the rest of them are females (40.10%). Majority of the scientists are having rural social background (66.18%) and rest of them having urban social background (33.82%). Majority of the respondents having PhD. degree (73.91%) and only few respondents have M.Phil. degree (3.86%) and master degree 21.25% and under graduate degree (0.92%) in Plantation Crops Research Institute in South India.
2. Most important purpose to visit to the library was to refer periodical 86.96% and to borrow and return of the books were 73.91%. To consult Thesis and Dissertations was to the tune of 46.86%, to take photo copies (Xerox) was 31.88%, to read newspapers & magazines were 31.40%, to use of online resources (e-books/journals & databases etc.) 30.92%.
3. Majority of the scientists (93.24%) used their department for accessing the electronic information resources and 42.51% of the scientists are accessing e-resources from their home. The usage of different categories of electronic resources, it was found that Electronic journals (full text / abstracts) (56.52%), Internet websites (66.18%), Search engines (68.12%) were used to a greater extent, whereas Online Databases (41.06%), Electronics Books (39.61%), online reference books (32.85%), Institutional Repositories (33.82%) were used to a moderate extent. The Data bases on CD/DVD (33.33%), Library OPAC (40.58%), E-thesis & Dissertation (34.78%), E-newspapers (37.68%), were used to a little extent.
4. Considering the WA scale, the Online Access to databases (2.77), Electronic Reference Services (2.43), Institutional digital Repositories (2.22) was found to be used to moderate extent, whereas Access to internet in the library (1.81), Access to Library OPAC (1.83), CD-ROM Database Services (1.47) was found to a little extent. The electronic information service Online CAS/SDI (WA 1.34) is perceived to be not influenced the scientists as they are unable to say the extent of their usage.
5. Majority of the scientists (80.19%) learnt requisite skill of using electronic information resources through self-study by trial & error method and browsing through internet (75.85%), followed by (59.90%) of them who had acquired the skill through guidelines from friend and colleagues.
6. Looking at the collective response with WA values, it is very much clear that the subject Plantation Crops (3.52) was found to Top priority whereas the subjects Plant Physiology (2.65), Plant Pathology/ Entomology (2.59), Biotechnology (2..55), Botany / Clone Evaluation (2.63), Agronomy / Soils (2.51), Crop Physiology (2.51) are found to be priority subject. Agricultural Economics (2.32), genome analysis (2.15), Germplasm (2.20), Latex Harvest Technology (1.46) and rubber technology (1.42) are the low priority subjects.
7. It was found that majority of the scientists (84.54%) were used databases to get the needed information and less number of scientists (15.46%) was not used databases. Similarly majority of the scientists (69.56%) were used CeRA consortium for accessing the electronic information resources and rest of the (30.43%) of the scientists were not used CeRA.
8. According to WA scale, the problems of database usage was Password requirement (2.75), inadequate database, subscription (2.74), was found to be an important problem to moderate extent. The problems, Logging in (2.02), Slow connection (2.15), Difficulties in searching (1.75), Not sure which database to choose (1.62) were found to be to a little Extent, and also study found that Lack of help from library staff (0.85) & do not have exposure (-0.61).
9. The investigator tried to establish the reasons why scientists of the plantation crops research institute were not using the databases. It was found that Lack of access (53.12%) & cannot find relevant databases (65.62%), Inadequate network facilities (31.25%), were the most important hindrance that would discourage them to use databases. Few scientists were expressed the reason for not using the database was Quality is not equal to print (90.37%) and don't like reading from screen (12.5%) and 15.62% of the scientists did not try it so for.
10. It was found that 23.67 % of the scientists were found to be highly satisfied in usage of electronic information resources and majority of the scientists (37.68%) were found to be satisfied in using the electronic resources, 36.71 % of the scientists were found to be moderately satisfied. The rest of

the 1.93% of the scientists was found to be dissatisfied towards the use of electronic resources.

Suggestions

Based on the findings of the study the following recommendations are suggested for the effective use of electronic information resources by the scientists of Plantation Crops Research Institutes in South India.

- Research institute libraries should take a leading role to create awareness among scientists about the CeRA consortium by conducting training programmes, workshops, audio video presentations, demonstrations, etc. on regular basis. The top management of the research institutes should support the library in every possible way and scientists should cooperate in this regard by fully utilizing in an effective manner.
- The research libraries should convert the non-users to actual users by educating them about the potentiality of the e-resources for their research activities. In this context the website of the library and newsletter of the institution should highlight the available e-resources in the library regularly.
- Research libraries should increase the number of internet nodes exclusively for scientists and internet bandwidth should be increased.
- The scientists should be divided on the basis of their knowledge to use of ICT for imparting user education. Those who lack knowledge to use the e-resources should be given special training on computer and internet.
- Each of the scientists should be given computer system with the internet connectivity.
- Higher speeds wi-fi facilities in the campus need to be developed by the research institute library, so that scientists can use the online e-resources and internet within the campus according to their convenience.
- Qualified Information Technology (IT) experts should be made available to solve the problems of networking and hardware.

Conclusion

The finding shows that scientists were used to various electronic information resources to do the research activities in Plantation Crops Research Institute in South India. The study reveals that Plantation Crops Research Institute library gave more importance to providing access to electronic information resources. The library professionals should take leading role to create awareness among scientists about the CeRA consortium and online databases such as Science direct, Springer link, Annual Reviews, CAB abstracts, Nature, CSIRO etc. by conducting training programmes, workshops, audio video presentations, demonstrations, etc. on regular basis. The top management of the Research Institute should support the library in every possible way and scientists should cooperate in this regard by fully utilizing in an effective manner.

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