Automation and networking of agricultural university libraries in Karnataka: A study

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Abstract
This study covers six agricultural universities libraries in Karnataka and comprise of Teaching Faculty, Research Scholars, PG and UG students and Non-Teaching Staff Members, budget sanctioned agricultural university libraries from the year 2011-12 to 2015-16 for the purchase of books, journals, e-database, e-journals, e-books, computer accessories, library software and networking, back volumes, and other items by the state, ICAR and World Bank funds is presented in this study and also library collection on print and digital form in the six agricultural universities.

Keywords: Library automation, Library budget, Hardware infrastructure and Databases.

Introduction
The meaning and definition of the important concepts used in the study are described in the following sections for conceptual clarity. Further, this also gives a description of a theoretical background for the study. A few national and international organizations like UNESCO, IFLA, etc., which supported the cause of library automation in their own way is delineated. The local, regional and national level initiatives of library networks like INFLIBNET, DELINET, CALIBNET, MALIBNET, BONET, etc., and specialized networks like ARISNET, HELINET, etc., are also described in this study.

The following table provides a list of a few different library software packages available for library automation with the name of their manufacturing companies.

Table 1.1: List of Library Software's and their Manufacturers

S. No	Name of the Software	Manufacturer	Place
1.	SOUL	INFLIBNET	Ahmedabad
2.	KOHA	Horowhenua Library Trust	New Zealand
3.	ARCHIVES	MIFIFAX Electronics Ltd.	Mumbai
4.	CDS/ISIS	UNESCO	Paris
5.	DELSIS	Libsys Corporation	New Delhi
6.	GRANTHALAYA	NISCAIR	New Delhi
7.	LIBMAN	Datapro Consultancy Service	Pune
8.	LIBRIS	Frontier.I.T. Pvt. Ltd.	Hyderabad
9.	LIBSUITE	Softaid Computer Pvt. Ltd.	Pune
10.	LIBSYS	Libsys Corporation	New Delhi
11.	MAITRAYEE	CMC Ltd.	Kolkata
12.	NEWGENLIB	Kesavan Institute of Information and Knowledge Management	Hyderabad
13.	MINISIS	International Development Research Centre	Canada
14.	OASIS for DOS	Softlink Pvt.	Australia
15.	SANJAY	DESIDOC	New Delhi
16.	SLIM	ALGORYTHMS Co.	Pune
17.	TULIP	Tata Unisys	Noida
18.	WILISYS	WIPRO India	Bangalore
19.	E- LIB	Local	Hubbali
20.	LIBSOFT	Environ software (P) Ltd	Bangalore

Objectives of the Study
The main objectives of the study are stated as follows:
1. To identify the areas and existing library resources and facilities for networking of agricultural university libraries in Karnataka.
2. To examine the status of Information and Communication Technology infrastructure in respect of hardware, software and networking and the extent of its use for library services.
3. To identify the software's used for automation by the agricultural university libraries in Karnataka.

4. To identify the constraints in implementing library automation and networking of agricultural university libraries in Karnataka.
5. To identify the training and orientation needs of library professional staff and the opportunities open for their continued education to keep abreast with the state –of – art ICTs being evolved.
6. To assess the utilization of library resources and services by the users.
7. To propose a model integrated library and information system using the latest ICT's.

Research Methodology

A fairly comprehensive review of literature covering the period 2000-2016, pertaining to the library automation and networking and users' usage is conducted to provide an insight to design the objectives of the study with clear vision to proceed with research work.

Survey method has been employed to study the library automation and networking. A designed questionnaire was framed to collect the required data from library professional staff, faculty and postgraduate students to meet the objectives of this study.

Hypotheses of the Study

The following hypotheses have been formulated for the present study.

1. Library professional staff needs more intensive training to handle the library software, automation and networking and web-enabled library services.
2. The ICT infrastructure is not fully utilized by the agricultural university libraries selected for the study.
3. The lack of MOU among the agricultural university libraries in Karnataka is found to be a major hurdle for resource sharing activities like inters library loan, document delivery service and technical processing of documents among them.
4. The university libraries selected for the study have not made initiatives to develop institutional repositories/digital libraries.

A brief profile of each of the six agricultural universities selected for the present research work has been described in the following sections.

Table 1.2: Name and Year of the establishment of the Agricultural Universities and Libraries

S. No.	Name of the university Libraries	Year of Establishment
1.	University of Agricultural Sciences, Bengaluru.	1964
2.	University of Agricultural Sciences, Dharwad.	1986
3.	Karnataka Veterinary Animal and Fisheries Sciences University, Bidar	2004
4.	University of Agricultural Sciences, Raichur.	2008
5.	University of Horticultural Sciences, Bagalkote.	2008
6.	University of Agricultural and Horticultural Sciences, Shivamogga.	2012

Library comprises of three important components: information resources, users and the library staff. The users of all the six Agricultural University libraries selected for the study comprise of Teaching Faculty, Research Scholars, PG and UG students and Non-Teaching staff members. The details of the different categories of the users are furnished in Table 1.3.

Table 1.3: Six Agricultural University Library Users' details

S. No	University Library	Users						Total
		Teaching Faculty	Non –Teaching staff	Research Scholars	PG Students	UG Students	Diploma students	
1.	UASLB	616	252	283	475	1159	-	**2785**
2.	UASLD	345	189	204	459	1451	31	**2679**
3.	KAVFSULB	45	40	15	60	350	-	**510**
4.	UASLR	202	272	102	261	602	66	**1505**
5.	UHSLB	54	20	45	128	286	-	**533**
6.	UAHSLS	97	47	45	92	455	-	**736**

Table 1.3 shows the library users' community of the six Agricultural Universities under study. The UASLB has the maximum (2785) number of users followed by UASLD (2679), UASLR (1505), UAHSLS (736), UHSLB (533), whereas the KVAFSULB has least (510) number of users i.e., may be due to the fact that this university was established in 2004, over and above it offers the courses of UG, PG, and PhD in the specialized subject fields of Veterinary, Animal Husbandry, Dairy and Fisheries Sciences.

The user's category wise analysis of the data reveals that UASLB has the maximum faculty members (616) followed by UASLD (345) and UASLR (202). Likewise, UASLD has the maximum number (1451) of UG students followed by UASLB (1159) and UASLR (602). The UASLB has the maximum number (475) of PG students followed by UASLD (459) and UASLR (261). Similarly, the UASLB has the highest number (283) of research scholars followed by UASLD (204) and UASLR (102).

The data collected by the researcher in relation to the library building and the seating capacity are presented in the following table.

Table 1.4: Library building and the seating capacity

S. No.	University Library	Independent Library Building		Library Space Sq. Fts	Users Seating Capacity
		Yes	No		
1.	UASLB	√	--	40000 Sq. Ft's	950
2.	UASLD	√	--	30000 Sq. Ft's	700
3.	KAVFSULB	√	---	2355 Sq. Ft's	200
4.	UASLR	√	---	4000 Sq. Ft's	300
5.	UHSLB	--	√	---	70
5.	UAHSLS	√	--	3990 Sq. Ft's	200

It can be observed from the Table 1.4 that among six university libraries, five libraries are having spacious independent building while one library i.e. UHSLB does not have independent library building; housed in the administrative block of the university campus. With regard to the seating capacity of these libraries, the UASLB is having 950 seating capacity followed by UASLD (700), UASLR (300), UHSLB (70), KVAFSULB and UAHSLS (200) respectively; which are planned based on the users' population of the libraries which are 2785 (UASLB), 2679 (UASLD), 1505 (UASLR), 736 (UAHSLS), 533 (UHSLB), and 510 (KVAFSULB).

Table 1.5: The human resources in agricultural university libraries in Karnataka

S. No.	University Library	Professional staff	Semi -Professional staff	Administrative staff	Others	Total
1.	UASLB	4	2	7	9	**22**
2.	UASLD	6	6	3	8	**23**
3.	KAVFSULB	1	3	0	2	**06**
4.	UASLR	5	1	2	4	**12**
5.	UHSLB	4	1	1	2	**08**
6.	UAHSLS	3	1	0	5	**09**

Table 1.5 shows the human resource in all the six agricultural university libraries. The UASLD has large number (23) of staff, has better professional staff position with six professional and six semi-professionals. UASLB has second largest professional, semi-professionals and other staff position. KVAFSULB has only one professional and three semi-professionals, UASLR and UHSLB were established in 2008 and UAHSLS established in 2012 have 5, 4 and 3 professionals respectively.

Library Budget from the Year 2011-12 to 2015-16.

The data in relation to the budgetary provision made for the agricultural university libraries from the year 2011-12 to 2015-16 for the purchase of books, journals, e-database, e-journals, e-books, computer accessories, library software and networking, back volumes, and other items by the state, ICAR and World Bank funds is presented in Table 1.6. Grant provided by State Government and ICAR to the Agricultural University Libraries in Karnataka.

Table 1.6: Year Wise Grants Sanctioned to the Agricultural University Libraries out of the State Government and ICAR Funds during 2011-12 to 2015-16

S. No.	Year	University Libraries					
		UASLB	UASLD	KVAFSULB	UASLR	UHSLB	UAHSLS
		Part "A" Grants Provided by State Government					
1.	2011-12	66,95,000	93,00,961	15,00,000	30,00,000	7,84,000	0
2.	2012-13	70,00,000	99,82,664	12,00,000	50,00,000	2,00,000	60,512
3.	2013-14	25,00,000	70,07,227	20,00,000	62,00,000	15,00,000	32,62,300
4.	2014-15	10,00,000	76,96,890	15,00,000	60,79,000	10,00,000	26,58,500

5.	2015-16	46,15,000	61,00,000	10,00,000	45,40,900	20,00,000	30,00,600
Total (A)		**2,18,10,000**	**4,00,87,742**	**72,00,000**	**2,48,19,900**	**54,84,000**	**89,81,912**
		Part "B" Grants Provided by ICAR					
	2011-12	57,19,000	14,99,771	64,00,000	30,00,000	o	o
8.	2012-13	14,91,000	88,69,000	60,00,000	50,00,000	10,00,000	3,60,500
9.	2013-14	32,79,016	58,90,356	50,00,000	65,21,000	8,50,000	34,05,321
10.	2014-15	30,50,000	18,26,499	66,00,000	68,18,541	35,00,000	27,42,276
11.	2015-16	0	0	11,50,00,000	53,41,900	10,78,000	29,18,639
Total (B)		**1,35,39,016**	**1,80,85,406**	**13,90,00,000**	**2,41,60,441**	**64,28,000**	**94,26,736**
Grand Total A+B		**3,53,49,016**	**5,81,73,188**	**14,62,00,000**	**5,89.80,300**	**1,19,12,000**	**1,84,08,648**

Note: Budget allocation inculded the Computer accessories, Annual maintenance, Binding (Books & Journals, Hardware, Software and Networking)

Table 1.6 indicates the year-wise budget of the libraries of the universities of agricultural sciences during 2011-12 to 2015-16, from the state government funds. The UASLD and UASLR have received the highest grant whereas UHSLB received the least.

Library Expenditure for the Procurement of Different Information and ICT Resources from 2011-12 to 2015-16

The details of expenditure of the selected university libraries for the procurement of conventional and non-conventional sources is presented in Table 1.7 and similarly the expenditure on the development of ICT infrastructure and networking is presented in Table 1.8. The detailed consolided total expenditure of all the libraries on collection of different information resources and the development of ICT infrastructure during 2011-12 to 2015-16 (five years) are presented in Table 1.9 in the following sections.

Table 1.7: Actual Expenditure on Printed Books, Printed Journals, e-Books, e-Journals and e-Data Bases, in Agricultural University Libraries in Karnataka (2011-2016)

S. No.	University Library	Total Budget in Rupees	Expenditure on Collection Development													
			Print Resources						e-Resources							
			Print Books (A)		Print Journals (B)		Total (A+B)		e-Books (C)		e-Journals (D)		e-Databases (E)		Total (C+D+E)	
			Rs	%	Rs	%	Rs	%	Rs	%	Rs	%	Rs	%	Rs	%
1.	UASLB	3,53,49,000	73,59,700	20.82	93,42,000	26.43	**1,67,01,700**	**47.25**	5,33,800	01.51	12,45,900	3.52	83,44,600	23.61	**1,01,24,300**	**28.64**
2.	UASLD	5,81,73,200	2,08,03,300	35.76	2,79,69,900	48.08	**4,87,73,200**	**83.84**	15,60,000	02.68	63,00,000	10.83	0	0	**78,60,000**	**13.51**
3.	KVAFSULB	14,62,00,000	3,08,00,000	21.07	16,00,000	01.09	**3,24,00,000**	**22.16**	38,00,000	2.60	31,00,000	2.12	0	0	**69,00,000**	**4.72**
4.	UASLR	5,89,80,300	1,41,81,885	24.04	71,50,000	12.12	**2,13,31,885**	**36.16**	3,88,900	0.66	9,95,800	1.69	1,68,000	0.28	**15,52,700**	**2.63**
5.	UHSLB	1,19,12,000	51,41,000	43.16	9,12,000	7.65	**60,53,000**	**50.81**	13,70,000	11.50	2,60,000	2.18	0	0	**16,30,000**	**13.68**
6.	UAHSLS	1,84,08,600	34,50,000	18.74	10,00,000	5.43	**44,50,000**	**24.17**	12,86,000	6.98	4,87,000	2.65	0	0	**17,73,000**	**9.63**

Table 1.8: Actual Expenditure on Hardware, Software, Computer Accessories and Other Maintenance by the Agricultural University Libraries in Karnataka (2011-2016)

S. No.	University Library	Total Budget in Rupees	Expenditure on ICT Infrastructure							
			Hardware, Software and Networking (A)		Computer Accessories (B)		Annual Maintenances (C)		Total (A+B+C)	
			Rs	%	Rs	%	Rs	%	Rs	%
1.	UASLB	3,53,49,000	74,36,900	**21.04**	4,00,500	**1.13**	6,85,600	**1.94**	**85,23,000**	**24.11**
2.	UASLD	5,81,73,200	11,10,000	**1.91**	1,80,000	**0.31**	2,49,900	**0.43**	**15,39,900**	**2.65**
3.	KVAFSULB	14,62,00,000	32,20,000	**2.20**	11,30,000	**0.77**	1,85,000	**0.13**	**45,35,000**	**3.10**
4.	UASLR	5,89,80,300	1,00,000	**0.17**	9,05,000	**1.53**	62,000	**0.11**	**10,67,000**	**1.81**
5.	UHSLB	1,19,12,000	6,75,000	**5.67**	1,00,000	**0.83**	**0**	**0**	**7,75,000**	**6.51**
6.	UAHSLS	1,84,08,600	25,00,000	**13.58**	5,10,000	**2.77**	**0**	**0**	**30,10,000**	**16.35**

Table 1.8 depicts the library expenditure on ICT infrastructure development during 2011-12 to 2015-16. It can be observed from the Table that the UASLB (24.11%) spent its major share of budget for hardware, software and networking while at UAHSLS (16.35%) the major share of library budget has been spent for procurement of hardware, software and networking. Further, at UHSLB (6.51%), KVAFSULB (3.10%), UASLD (2.65%) and UASLR (1.81%) of the library budget has been spent to procure hardware, software, and networking.

Table 1.9: The Consolidated Actual Expenditure of the University Libraries on Different Information Sources and ICT Infrastracture during 2011-16.

S. No.	Library Resources	University Libraries Expenditure					
		UASLB	**UASLD**	**KVAFSULB**	**UASLR**	**UHSLB**	**UAHSLS**
1.	**Printed Books and Print Journals**	1,67,01,700 (47.25%)	4,87,73,200 (83.84%)	3, 24, 00,000 (22.16%)	2,13,31,885 (36.16%)	60,53,000 (50.81%)	45,00,000 (24.17%)
2.	**e-Books and e-Journals**	1,01,24,300 (28.64%)	78,60,000 (13.51%)	69,00,000 (4.72%)	15,52,700 (2.33%)	16,30,000 (13.68%)	17,73,000 (9.63%)
3.	**Hardware, Software, Computer Accessories and Others**	85,23,000 (24.11%)	15,39,900 (2.65%)	45,35,000 (3.10)	15,67,000 (6.41)	8,20,000 (9.64)	30,10,000 (32.60)
Grand Total		**3,53,49,000**	**5,81,73,200**	**14,62,00,000**	**5,89,80,300**	**1,19,12,000**	**1,84,08,600**

Table 1.9 with even number depicts that the library expenditure for the procurement of different information resources and ICT infrastructure development during 2011-12 to 2015-16. It can be observed from the Table that the UASLB spent its major share of budget for printed journals, hardware, software and networking and e-databases while at UASLD the major share of library budget has been spent for procurement of print journals, print books and e-journals. Further, at KAVFSULB, the major share of library budget has been spent on to procure print books, e-books and hardware, software, and networking whereas in UHSLB, the major share of library budget has been allocated to procure printed books, e-books, and printed journals followed by UASLR's expenditure which shows that the major share of its library budget has been allocated to procure printed books, printed journals and e-journals and at UAHSLS, the major share of library budget has been spent on procuring print books, e-books and hardware, software and networking.

Collection of Information Resources

The following table gives the details of the different forms of print and digital collection in the six agricultural university libraries.

Table 1.10: Total Library Collection of six Agricultural University Libraries as on 30-12-2016

S. No.	Library Collection	University Libraries					
		UASLB	**UASLD**	**KVAFSULB**	**UASLR**	**UHSLB**	**UAHSLS**
Print Collection							
1.	Books	**1,34,653**	**1,13,144**	**12,565**	**54,707**	**8,829**	**20,533**
2.	Gift books	13,215	6,255	--	4,520	1205	1,010
3.	General Text Book(TBB) bank	805	281	1,240	--	--	---
4.	SC/ST Book Bank	1,722	1,318	2,350	2,432	--	2,807
5.	ST Book Bank	1,192	--	--	--	--	--
6.	Pamphlets	11,302	8,309	712	--	--	-
7.	Reference sources (Encyclopedia Dictionary, Directory, Yearbooks, Almanacs)	--	--	1,852	--	38	68
8.	Print Indian Journals ……	200	103	35	110	53	58
9.	Print Foreign Journals ……	50	277	05	65	03	08
10.	Journals (Bound Volumes)	---	----	3,369	9,256	2,513	214
11.	Theses/Dissertations	11,016	11,479	1,350	2,108	209	195
12.	Reports	18,789	5,219	1,500	239	1,000	57
13.	Standards	---	---	---	1,500	--	---
14.	Maps/Atlases	78	75	140	15	15	10
Total		**1,93,022**	**1,46,460**	**25,118**	**74,952**	**13,865**	**24,960**
Digital Collection							
15.	Audio/Video Cassettes	235	--	25	--	25	--
16.	CD-ROMs/ DVD	319	1	2	150	215	91
17.	Micro films & Microfiches	167	--	--	--	--	--
18.	E-Journals (on line Journals)	512	----	450	30	03	---
19.	E-Books,	1,809	49	1,050	96	1,159	452

20.	e-data bases (on line Databases)	05	2	--	03	--	--
21.	Any other (Please specify)	--	--	--	--	--	--
Total		**3,047**	**52**	**1,527**	**279**	**1,402**	**543**
Grand Total		**1,96,069**	**1,46,512**	**26,645**	**75,231**	**15,267**	**25,503**

Table 1.10 depicts the type of information sources available at the libraries of universities of agricultural sciences in Karnataka. The total library collection, both in print and digital formats as can be seen in the Table, the UASLB leads in the total print collection followed by UASLD and UASLR, which occupies the second and third position respectively. However, in case of digital collection UASLB is in first position followed by KVAFSULB, UHSLB and UAHSLS respectively. It is very surprising UASLD occupies the last position with only 52 digital collections.

Hardware Infrastructure Available in the Libraries

The below Table 1.11 shows the IT related infrastructure (Hardware available) in all the six agricultural university libraries under study.

Table 1.11: The Hardware Infrastructure Available in Agricultural University Libraries in Karnataka

S. No	Hardware accessories	University libraries					
		UASLB	**UASLD**	**KAVFSULB**	**UHSLB**	**UASLR**	**UAHSLS**
1.	**Computers**	52	40	40	25	85	34
	Laptops	02	04	02	0	02	0
2.	**Servers: -**						
	i) Web Server	02	01	01	01	0	01
	ii)Application Server	0	02	01	0	0	0
	ii) Database Server	01	01	01	01	0	0
	iii) Backup Server	01	01	01	0	01	0
	iv) Proxy Server	0	01	0	01	0	0
	v) RFID server	01	0	0	0	0	0
3.	Modems	07	02	01	0	04	02
4.	Bar Code Scanner	01	03	02	01	03	01
5.	Barcode Reader	01	0	01	01	02	01
6.	UPS	05	03	03	01	02	03
7.	Scanners	03	03	02	01	02	03
8.	Multimedia Kit	0	0	01	01	0	0
9.	Printers	02	06	04	03	05	05
10.	Web cameras	01	01	02	06	01	0
11.	CD/DVD Writer	03	02	01	01	0	01
12.	Router bridge for data backup	01	01	01	0	01	0
13.	Fire Wall	0	01	0	0	0	0

In order to give effective Information Technology related services to users all the six university libraries are making every effort to add all the required hardware gadgets and equipments in a phased manner to achieve the goal of becoming fully automated and networked library system.

Table 1.12: Sample Selected from the Selected Categories of the Users of Agricultural University Libraries

S. No	University Libraries	Faculty Members				Research scholars				Post Graduate Students				Universe of population, total sample and total response Rate %			
		T	**A**	**B**	**PR %**	**T**	**A**	**B**	**PR %**	**T**	**A**	**B**	**PR %**	**U P**	**T S**	**T R**	**TP R%**
1.	UASLB	616	125	119	**95.52**	283	59	54	**91.53**	475	98	84	**85.71**	1374	282	257	**91.13**
2.	UASLD	345	72	66	**91.67**	204	43	39	**90.70**	459	94	81	**86.17**	1008	209	186	**88.99**
3.	KVAFSULB	45	20	18	**90.00**	15	13	11	**84.61**	60	20	19	**95.00**	120	53	48	**90.57**
4.	UASLR	202	42	33	**78.57**	102	23	19	**82.61**	261	55	48	**87.73**	565	120	100	**83.33**
5.	UHSLB	54	14	12	**85.71**	45	16	13	**81.25**	128	35	29	**82.86**	227	65	54	**83.08**
6.	UAHSLS	97	23	20	**82.61**	45	14	12	**85.71**	92	40	33	**82.25**	234	77	65	**84.42**
Total		**1359**	**296**	**268**	**90.54**	**694**	**168**	**148**	**88.10**	**1475**	**342**	**294**	**85.96**	**3528**	**806**	**710**	**88.08**

Note: T- Total, **A-** Questionnaire Distribute, **B-** Response Received, **PR-** % Percentage of Response, **UP-** Universe of population, **TS-** Total Sample, **TR-** Total Response, **TPR-** % Total Percentage of Response

Table 1.12 shows that in total there are 1359 Faculty Members, 694 Research Scholars and 1475 Post-graduate students in six agricultural universities of Karnataka. For the present survey;

1. About 21% out of the teaching Faculty population from each university was selected randomly (296 teaching faculty members) to whom the questionnaires were distributed and 268 have responded i.e. 90.54%, which is a very good feedback for the purpose of this research survey; and
2. About 24% out of the Research Scholars' population from each university was selected randomly (168 Research Scholars) to whom the questionnaires were distributed and 148 responded i.e. 88%; which is a good feedback for the purpose of this survey; and also
3. About 23% out of the Post-graduate students population from each university were selected randomly (342 Post-graduate students) to whom the questionnaires were distributed and 294 responded i.e. 85.96%. This is a very good response for the purpose of this research survey.

Thus the data collected through questionnaires from the 20% (710) of the total users' population of 3528 which includes Faculty Members, Research Scholars and Post Graduate Students of six agricultural universities of Karnataka to seek the users' opinion regarding the automation, networking and e-library facilities in their respective university libraries are analyzed and interpretation of the data is presented in the subsequent sections.

Skills to Use Computers and Internet

The respondents were asked to indicate whether they possess the required skills to use the computers and internet. The responses received are presented in Table-1.13.

Table 1.13: Knowledge of Computers and Internet among the Respondents

S. No	Skills	Yes	No
1.	Computers	710 (100%)	---
2.	Internet	710 (100%)	---

The Table 1.13 depicts that the Cent Percent of the respondents from all the categories of university library users considered for this study are found to have the required skills to use computers and internet.

Usage of Search Engines by the Users of Agricultural University Libraries in Karnataka

Search engines are now an integral part of digital information environment, which facilitate information discovery form the Web. It is important to know the use patterns of search engines among the respondents. A question was raised in this context and the responses received are tabulated and presented in Table 1.14 for analysis.

Table 1.14: Use of Search Engines by the University Library Users

S. No.	Search Engines	Categories of Users			Total (N-710)
		Faculty Members (N-268)	Research Scholars (N-148)	Post Graduate Students (N-294)	
1.	Google	162 (60.45)	116 (78.38)	227 (77.21)	**505 (71.13)**
2.	Google Scholar	169 (63.06)	136 (91.89)	280 (95.24)	**582 (81.97)**
3	Rediff	173 (64.55)	119 (80.41)	222 (75.51)	**514 (72.39)**
4.	Hot bot	158 (58.95)	121 (81.76)	255 (86.73)	**534 (75.21)**
5.	Alta Vista	98 (36.57)	89 (60.13)	96 (32.65)	**283 (39.85)**
6.	Lycos	69 (25.75)	62 (41.89)	131 (44.56)	**262 (36.90)**
7.	Info seek	71 (26.49)	64 (43.24)	128 (43.54)	**263(37.04)**

The Table 1.14 shows the pattern of usage of search engines by the users comprising of Faculty Members, Research Scholars and Post Graduate Students of agricultural university libraries for literature search to meet their teaching, research and learning activities. The Table shows that users are making use of more than five search engines for the literature search.

Table1.15: Search Options Used to Access the Web Based e-Resources

S. No.	Search Option	Categories of Users			Total (N-710)
		Faculty Members (N-268)	Research Scholars (N-148)	Post Graduate Students (N-294)	
1.	Simple Search	112(41.79)	67(45.27)	117(39.80)	**296(41.69)**
2.	Advanced Search	156(58.21)	81(54.73)	177(60.20)	**414(58.31)**

The Table 1.15 shows that 58.31% of the users use advanced search option to access Web based e-resources while 41.69% of the users use simple search option.

Table 1.16: Access of e-Resources at University Library

S. No	Frequency of Visit	Categories of Users			Total (N-710)
		Faculty Members (N-268)	Research Scholars (N-148)	Post Graduate Students (N-294)	
1.	Daily	129 (48.13)	83 (56.08)	167 (56.80)	**379(53.38)**
2.	2-3 times a week	67 (25.00)	31 (20.94)	52 (17.69)	**150(21.13)**
3.	2-3 times a month	28 (10.45)	14 (09.46)	36 (12.24)	**78(10.98)**
4.	Once in month	23 (08.58)	11 (07.43)	22 (07.48)	**56(07.89)**
5.	Occasionally	21 (07.83)	9 (06.08)	17 (05.78)	**47(06.62)**

It is very clear from the Table 1.16 that about 379 users (53.38%) out of 710 users access e-resources daily. Because all the three categories of users namely Faculty Members, Research Scholars and Postgraduate Students. Who are engaged in teaching, research and learning actives are eager to access e-resources on daily basis to keep them updated with latest developments in their respective subject areas of interest.

About 150 (21.13%) users claim that they access e-resources 2 to 3 times a week. May be they are happy with the print documents or they have access to e-resources at their residences itself. Further, 78 users' (10.98%), 56 users (07.89%) and 47 users (6.62%) have expressed they visit e-resources section, 2-3 times a month, once in a month or occasionally. This may be due to these users are not comfortable with e-resources usage or the faculty members may be busy with other administrative assignments of the university in addition to teaching and research work.

Table 1.17: Access Pattern of e-Bibliographical Databases at Agricultural University Library

S. No	Name of Bibliographical Databases	Categories of Users			Total (N-710)
		Faculty Members (268)	Research Scholars (148)	Post Graduate Students (294)	
1.	CAB I	87 (32.46)	96 (64.86)	158 (53.74)	**341 (48.03)**
2.	BA	59 (22.01)	63 (42.57)	101 (34.35)	**223 (31.41)**
3.	FSTA	42 (15.67)	51 (34.46)	66 (22.45)	**159 (22.39)**
4.	HA	39 (14.55)	76 (51.35)	103 (35.03)	**218 (30.70)**
5.	AGRIS	92 (34.33)	103 (69.59)	219 (74.49)	**414 (58.31)**
6.	VSD	33 (12.31)	39 (26.35)	53 (18.02)	**125 (17.60)**

The Table 1.17 shows that the AGRIS (Agricultural Information System) is the most heavily accessed database by 414 users (58.31%) out of 710 users interviewed as AGRIS provides access to agricultural research data exploiting open data on the Web. It is an international system for Agricultural Science and Technology. It is supported by a large community of data providers, partners and users. It is a global public domain database with more than 8-10 million structured bibliographical records on Agricultural Sciences and Technology. It meets most of the information needs of the agricultural university library users for their academic activities.

The second highest used database with 341(48.03%) users out of 710 users interviewed is CABI (Centre for Agriculture and Bioscience International), a non-profit inter-governmental organization based in the United Kingdom (UK). It focuses primarily on agricultural and environmental issues in the developing world.

The third highest accessed e-bibliographical database is Biological Abstracts, with 223 (31.41%) users out of 710 interviewed which is a collection of bibliographic references for life science and biomedical research literature covering peer-reviewed article abstracts from US and international journals. Compared to AGRIS and CABI databases BA does not meet much of the information needs of the users' of the agricultural university libraries.

Further, 4th, 5th and 6th place are occupied by HA (Horticultural Abstracts) with 218 users (30.70%), FSTA (Food Sciences and Technology Abstract) with 159 users (22.39%) and VSD (Veterinary Science Database) with 125 users (17.60%), respectively.

Since these abstracts (HA, FSTA and VSD) are dedicated to special subjects like Horticultural Sciences, Food Science Technology and Veterinary Science, the users from the university where these subjects are taught are only interested in these databases i.e. University of Horticultural Sciences Bagalakote, University of Agricultural and Horticultural Sciences Shivamogga, Karnataka Veterinary Animal and Fisheries Sciences University, Bidar.

Usage Pattern of Print Resources v/s e-Resources

The IT revolution led to the emergence of internet and World Wide Web as information super highways for exchange of knowledge generated in the form of e- documents. There is a common belief that the e-publishing almost replaced the print versions of documents and so the present generation of academics engaged in higher studies and research has totally abandoned the use of print documents. The researcher in this study tried to explore whether print resources are still popular or not among the selected users of agricultural university libraries, a query was raised in a questionnaire to them. The responses received are tabulated and presented in Table 1.18 for further analysis.

Table 1.18: Frequently Used Information Sources

S. No	Information Sources	Categories of Users			Total (N-710)
		Faculty Members (N-268)	Research Scholars (148)	Post Graduate Students (N-294)	
1.	Print Resources	38 (14.18)	21 (14.19)	46 (15.65)	**105 (14.79)**
2.	e-Resources	76 (28.36)	46 (31.08)	79 (26.87)	**201 (28.31)**
3.	Both Print Resources & e-Resources	154 (57.46)	81 (54.73)	169 (57.48)	**404 (56.90)**
Total		**268**	**148**	**446**	**710**

The arrival of electronic resources and digital libraries has a number of significant impacts on the use of print resources and traditional libraries. Reading preferences and use of print and electronic resources vary among different category of users namely Faculty Members, Research Scholars and Postgraduate Students.

The above Table 1.18 shows that the users of agricultural university libraries desire to meet their information needs through a mix of print and e-resources. Electronic resources are invaluable resource tools that complement the print-based resources in a traditional library setting.

Out of 710 users; 404 (56.90%) users prefer to consult both print and e-resources; 201 users (28.31%) prefer e-resources and 105 (14.79%) users prefer print resources; maybe they are not comfortable with e-resources and are senior faculty members. The dramatic changes in providing information through e-resources at the agricultural university libraries have made a significant impact on the use of print resources and traditional libraries.

Findings

An overview of the present study, observations of the researcher and findings are presented in this study.

1. The Karnataka state has the privilege of having the highest number of agricultural universities on par with Maharashtra state i.e. next only to Utter Pradesh.
2. All the six agricultural universities in Karnataka are offering Undergraduate, Postgraduate and Research programmes.
3. The study on budgetary provision reveals that during the five years period (2011-16) the library budget either remained stagnant or in some cases, it is dwindled and so is not in proportion to the increase in the price of both conventional and non-conventional information sources.
4. Out of six agricultural university libraries under study only one library i.e. UASLB has nearly 2 lakhs of collection and another one i.e. UASLD has nearly 1.5 lakhs of collection of information sources. In the rest of the university libraries (UHSLB, UASLS, KVAFSULB and UASLR) the volume of information sources are in the range of 15000 to 75000.
5. All the six university libraries have adopted Koha software on recommendation of the ICAR.
6. All the six agricultural university libraries under study have access to CeRA- J-gate (2800+ journals), KrishiKosh and also to e-Books and e-Journals. Except KVAFSUB, all others have access to AgriCat.
7. Except University of Agricultural Sciences, Bengaluru (UASLB) none of the other libraries under study have established access to FSTA, Veterinary Science Database, Biological Abstracts, Horticulture Abstracts, AGRIS, CABI and India stat.com. However, UASLD has access only to Biological Abstracts.
8. Except UASLR and UAHSLS (which are using their university website), all other four University Librarians have reported that they have independent library webpage. However, all the six university libraries have established hyperlinks to the ARISNET e-resources like CeRA, Krishikosh subscribed e-databases, e-books and e-journals, document delivery services, etc., from their webpage/university website.
9. Except UASLB none of the other university libraries under study have initiated to use RFID technology.
10. 81.97% of the respondents use 'Google Scholar' to meet their academic information needs from the Web.
11. 58.31% of the respondents use 'Advanced Search option' to get the required information from the Web.
12. Out of 710 respondents 520 (73.21%) have expressed that they prefer URLs with.org domain while the.net and.ac domains have attracted 71.69% and 69.44% of the respondents respectively.
13. A majority (53.38%) of the users access the e-resources from the library daily.
14. A majority 414 (58.31%) of the users use AGRIS database.
15. Out of 710 respondents: 404 (56.90%) prefer to consult both print and e-resources whereas 201 (28. 31%) and 105 (14.79%) users are in favour of e-resources and print resources respectively to fulfill their academic, research and learning information needs.

16. At present, all the six agricultural university libraries are 'hybrid libraries' but slowly moving towards becoming e-libraries.
17. All the 710 respondents are aware of the automated services and e-resources of the library. A majority of them have expressed their satisfaction about the automated services and e-resources provided by their respective university libraries, which are saving their precious time.

Suggestions

Every researcher proposes a few suggestions as follows:

1. The UHSLB is the only library that does not have an independent building. Therefore, the concerned authorities should be persuaded to see that an independent modular library building is constructed.
2. All the agricultural university libraries in Karnataka should take UASLD as a model and see that their services are made available "24X 7" for the benefit of the users and also in their own interest to survive.
3. At present all the six agricultural university libraries close their services on holidays, therefore, it is suggested that except National holidays like Republic day, Independence day and labors day the university library should be kept open for its users throughout the year.
4. All the six university libraries under study should improve the staff position in proportion to the increase in user population, volume of library collection, courses offered and new academic facilities introduced.
5. Technically well-qualified network administrator should be appointed to support university librarian to maintain computer systems, network related activities and provide Web based library services effectively.
6. All the libraries of agricultural universities in Karnataka are spending most of their budget on the procurement of conventional resources like, print books and print journals and only small percentage of the budget is being spent on the development of ICT infrastructure, e-books, e- journals, e-databases, etc., therefore it is suggested the concerned university authority should provide separate budget for the development of ICT infrastructure, e-resources and services.
7. Only UASLB has adopted RFID technology. The RFID- based systems move beyond security to become tracking systems that combine security with more efficient tracking of materials throughout the library, including easier and faster exchange. The other five university libraries should take UASLB as a model for this purpose and adopt RFID as early as possible.
8. The existing LANs and campus wide networking should be strengthened by deploying appropriate technologies by all the six university libraries in general. The UASLR and UAHSLS in particular should develop campus wide network on top priority.
9. The UHSLB, UASLR and UAHSLS should increase their internet bandwidth to at least 1 GB.
10. The UAHSLS should deploy Wi-Fi technology to extend the network to all the departments and the students' hostels.
11. Sufficient computers should be made available in the university library's internet-browsing centre for the benefit of the users.
12. At present only UASLB has established digitalization laboratory for the conversion of print material like rare books, research reports, theses, dissertations, etc., in to digital form. The other five agricultural university libraries should also establish digitalization laboratory on par with UASLB.
13. All the university libraries should establish the integrated dynamic library website.
14. It is high time for the agricultural university libraries to think of establishing 'Institutional Repository' of the in-house documents and made them available on intranet for the benefit of the entire users' community. The university libraries should initiate IR by using open source technologies, like D-SPACE, E-Print, Greenstone, etc., according to their local needs, the libraries have to take initiative and create awareness about this among all the stakeholders like, researchers, faculty members, administrators, etc., so that they contribute the knowledge that is generated and upload to 'IR' for better visibility among the academics.
15. User education programme should be conducted regularly as and when new technologies and innovative library services are introduced.
16. Library automation training should be made mandatory for all the professional library staff in a library, which will help them in utilizing all the modules in the software, functioning of the library efficiently and effectively and provide good services to their user community. Hence, it is very much essential that training and up-gradation of human resource has become vital for creating digital environment. In this direction, ICAR is taking the steps to train the manpower and reengineering the library services in agriculture sector in India.

Conclusion

Agriculture is an umbrella term that consists of crop sciences, horticulture, forestry, animal science, fisheries, etc., each of these disciplines has its own importance in the welfare of mankind and in contributing to the economic progress of the country.

The phrase 'Library automation' in the post was used to refer to the mechanization of the library's routine tasks like acquisition, cataloguing, circulation, serials management, etc., but today, it also include information organization, information storage, web harvesting, retrieval, use etc., These developments have led to the evolution of digital libraries, and the various factors like electronic sources of information; e-books, e-journals, e-databases, e-theses, e-reports, etc., Internet and World Wide Web, library automation and networking etc., have brought in several complexities to face at times of financial crunch in the

agricultural university libraries. However, within the funds made available by the ICAR and the state government the agricultural university libraries in Karnataka have made considerable progress in developing basic ICT infrastructure like computers, printers, scanners, LAN networks in their respective university campuses.

As per the directions of the ICAR all, the six agricultural university libraries in Karnataka are following KOHA library software, which has all the required facilities/modules to fully automate the university library's housekeeping operations and web based services. The Indian Council of Agricultural Research (ICAR) has sanctioned many project like e-Granth, CeRA, Krishikosh, AgriCat, etc., under NATP and NAIP programmes. This in fact brought a new wave in agricultural university libraries not only in Karnataka but in the whole of India. All the agricultural university libraries in Karnataka are well placed in terms of ICT infrastructure and have also established links to the ICAR's initiatives.

Finally, it can be concluded that the agricultural university libraries in Karnataka have to integrate as a system to address the challenges of volatile digital information environment and convert the challenges as opportunities by making use of the emerging digital technologies including cloud-computing technology for their networking and resources sharing activities. Each one of them has to serve both as server and client in the system with a purpose to fulfill the Vision, Mission and Goals of the parent organization. So that in the coming years each of the agricultural library grows as a 'Gateway' to the world of knowledge in the real sense.

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None.

References

1. Sinha, Manoj Kumar. Scenario of Automation and Networking of Library and Information Centres (LICs) of North Eastern Region of India. An evaluative study INFLIBNET Centre, Ahmedabad. 2008;12-13.
2. Ahmad, Parvez. (). "Library Automation of Al-Barkaat Institute of Management Studies, Aligarh with help Alice for Window (AFW) Library Software." *Indian J Libr Inf Sci* 2009;3(2):81-86.
3. Balaji, Babu Preedip and Krishnamurthy, M. "Library automation to resource discovery: A review of emerging challenges", *Electr Libr* 2013;31(4):433-51.
4. Francis, A.T. "Evaluation of Use of Consortium of e-Resources in Agriculture in Context of Kerala Agricultural University." *DESIDOC J Libr Inf Technol* 2012;32(1):38-44.
5. Gavali, Vandana Santosh. "Impact of library automation in the development era: A case study." *Indian Streams Res J* 2011;1(5)1-12.
6. Ghosh, Shyamal, and Hatua, Sudip Ranjan. "Library Automation and Digitization Status of Private Technical Colleges." *Global J Multidiscip Stud* 2016;5(9):27-31.
7. Hasan, Nabi. "Web-Based Agricultural Information Systems and Services under National Agricultural Research System." *DESIDOC J Libr Inf Technol* 2012;32(1):24-30.
8. Kannapanavar, B.U., and Manjunatha K.V. "Library use pattern by the faculty members of the engineering colleges in Karnataka: A study". *Int J Libr Inf Sci* 2010;2(8):155-63.
9. Singh, Yogendra. "Library Automation in Academic Libraries in India: Problems and Prospects." 2016;1-6.
10. Agrawal, Anil and Singh, D.K. (2011). "ICT Application in Academic Libraries: A Case Study of Banaras Hindu University System" In: Paradigm Shift in Technological Advancement in Librarianship.edited by Swain, N. K. et al. Jodhpur: Scientific Publishers. P-507.

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