USE OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN AGRICULTURAL UNIVERSITY LIBRARIES OF WESTERN INDIA: A SURVEY

A thesis submitted to the
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For the Degree of Vidyavachaspati (Ph.D.)

Doctor of Philosophy
In
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Faculty of Moral and Social Sciences

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December 2012

FORM 'B'

I hereby declare that the thesis entitled **"Use of Information and Communication Technology (ICT) in Agricultural University Libraries of Western India : A survey"** completed and written by me has not previously formed the basis for the award of any degree or other similar title of this or any other university or examining body.

Place: Pune (Kishor N.Patil)
Date: **26.12.2012** **Research Student**

FORM 'C'

C E R T I F I C A T E

This is to certify that the thesis entitled **"Use of Information and Communication Technology (ICT) in Agricultural University Libraries of Western India : A survey"** which is being submitted herewith for the award of the Degree of Vidyavachaspati (Ph.D.) in Library and Information Science of Tilak Maharashtra Vidyapeeth, Pune is the result of original research work completed by **Shri Kishor Namdeorao Patil** under my supervision and guidance. To the best of my knowledge and belief the work incorporated in this thesis has not formed the basis for the award of any degree or similar title of this or any other University or examining body.

Place : Pune (Dr. M. B. Konnur)
Date : 26.12.2012 **Research Guide**

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Table of Content

List of Abbreviations Used

AALDI	:	Association of Agricultural Librarians and Documentalists of India
aAQUA	:	Almost All Questions Answered
AAU	:	Anand Agricultural University
ABM	:	Agriculture Business Management
AGMARKET	:	Agricultural Marketing Information System Network
AGORA	:	Access to Global Online Research in Agriculture
AGP	:	Academic Grade Pay
AGRICOLA	:	Agriculture Online Access
AGRIS	:	International Systems for Agricultural Science and Technology
AGRISNET	:	Agricultural Research Information Systems and Networking
AI	:	Artificial Intelligence
AICRP	:	All India Coordinated Research Project
ANGRAU	:	Acharya N. G. Ranga Agricultural University
APIB	:	Agro-Climate Planning and Information Bank
ARPANET	:	Advanced Research Projects Agency Network
ATIC	:	Agricultural Technology Information Center
BINAC	:	Binary Automatic Computer
BIOSIS	:	Bioscience Information System
BSNL	:	Bharat Sanchar Nigam Limited
CAB	:	Commonwealth Agricultural Bueraux
CALIBER	:	Convention of Academic Libraries Education and Research
CARIS	:	Current Agricultural Research Information System
CAS	:	Current Awareness Service
CAU	:	Central Agricultural University
CCSHAU	:	Chaudhary Charan Singh Haryana Agricultural University
CCTV	:	Closed Circuit Television
CD	:	Compact Disk
CD-I	:	Compact Disk Interactive
CD-RW	:	Compact Disk Rewritable
CeRA	:	Consortium for electronic Resources in Agriculture
CGI	:	Common Gateway Interface

CGIAR	:	Consultative Group on International Agricultural Research
CSAU	:	Council of State Agricultural Universities
CIAE	:	Central Institute of Agricultural Engineering
CICs	:	Community Information Centers
CIFE	:	Central Institute of Fisheries Education
CIFOR	:	Center for International Forestry Research
CIMMYT	:	International Center for the Improvement of Maize and Wheat
CMS	:	Content Management System
CRS	:	Community Radio Station
CSC	:	Common Service Center
CSIRO	:	Commonwealth Scientific and Industrial Research Organization
CT	:	Communication Technology
CTLC	:	Community Technology Learning Center
DACNET	:	Department of Agricultural and Cooperation Network
DARE	:	Department of Agricultural Research and Education
DBMS	:	Database Management System
DDG	:	Deputy Director General
DEAL	:	Digital Ecosystem for Agriculture and Livelihood
DG	:	Director General
DIPA	:	Directorate of Information and Publications in Agriculture
DKMA	:	Directorate of Knowledge Management in Agriculture
DTP	:	Desktop Publishing
DUs	:	Deemed Universities
EDVAC	:	Electronic Discrete Variable Automatic Computer
EIR	:	Electronic Information Resource
ENIAC	:	Electronic Numerical Integrator And Computer
EP	:	Electronic Publishing
ERNET	:	Education and Research Network
ESS	:	Electronic Surveillance System
ETAD	:	Electronic Thesis Abstracts Database
FAO	:	Food and Agriculture Organization of United Nations
FID	:	The International Federation for Information and Documentation
FSTA	:	Food Science and Technology Abstracts

FTP	:	File Transfer Protocol
GBPUAT	:	Govind Ballabh Pant University of Agriculture and Technology
GDP	:	Gross Domestic Product
GIS	:	Geographic Information System
GPRS	:	General Pocket Radio Service
GPS	:	Global Positioning System
GSWAN	:	Gujarat State Wide Area Network
HTTP	:	Hypertext Transfer Protocol
HW	:	Hardware
IAALD	:	International Association of Agricultural Librarians and Documentalists
IADR	:	Indian Agricultural Dissertations Repository
IARI	:	Indian Agricultural Research Institute
IBM	:	International Business Machines Corp
ICANN	:	Internet Corporation for Assigned Names and Numbers
ICAR	:	Indian Council of Agricultural Research
ICARDA	:	International Center for Agricultural Research in the Dry Areas
ICLARM	:	International Center for Living Aquatic Resources Management
ICRAF	:	International Centre for Research in Agro Forestry
ICRISAT	:	International Crops Research Institute for the Semi-Arid Tropics
ICT	:	Information and Communication Technology
IFAP	:	Information for All Programs of United Nations
IFFCO	:	Indian Farmers Fertilizer Cooperative
IFPRI	:	International Food Policy Research Institute
IITA	:	International Institute of Tropical Agriculture
ILRI	:	International Livestock Research Institute
INDSL	:	Indian National Dairy Science Library
INVSL	:	Indian National Veterinary Science Library
IPM	:	Integrated Pest Management
IR	:	Institutional Repository
IRRI	:	International Rice Research Institute
ISAP	:	Indian Society of Agribusiness Professionals
ISPs	:	Internet Service Providers
ISRO	:	Indian Space Research Organization

IVLP	:	Institution -Village Linkage Program
IVRI	:	Indian Veterinary Research Institute
IWMI	:	International Water Management Institute
JAU	:	Junagadh Agricultural University
JCCC	:	J-Gate Custom Content For Consortia
KAULIS	:	Kerala Agricultural University Library and Information Systems
KCC	:	Kisan Call Center
KDL	:	Kenneth Dike Library
KIIT	:	Kalinga Institute of Industrial Technology
KISSAN	:	Karshaka Information Systems Services and Networking
KMS	:	Knowledge Management System
KVK	:	Krishi Vigyan Kendra
MCAER	:	Maharashtra Council of Agricultural Education and Research
MKV	:	Marathwada Krishi Vidyapeeth
MPKV	:	Mahatma Phule Krishi Vidyapeeth
MSSRF	:	M. S. Swaminathan Research Foundation
NAARM	:	National Academy of Agricultural Research Management
NAIP	:	National Agricultural Innovation Project
NAL	:	National Agricultural Library of the United States
NARD	:	National Agricultural Research Database
NARP	:	National Agricultural Research Project
NARS	:	National Agricultural Research System
NATP	:	National Agricultural Technology Project
NAU	:	Navsari Agricultural University
NDRI	:	National Dairy Research Institute
NGO	:	Non-Government Organization
NIC	:	National Informatics Centre
OCR	:	Optical Character Recognition
OSS	:	Open Space Software
OWSA	:	One World South Asia
PDKV	:	Dr. Panjabrao Deshmukh Krishi Vidyapeeth
QRS	:	Query Redress Service
SAUs	:	State Agricultural Universities

SCI	:	Science Citation Index
SDAU	:	Sardarkrushinagar Dantiwada Agricultural University
SDI	:	Selective Dissemination of Information
SNAL	:	Sokoine National Library
TRAI	:	Telecom Regulatory Authority of India
TEEAL	:	The Essential Electronic Agricultural Library
TLSS	:	Total Library Software System
TNUVAS	:	Tamil Nadu University of Veterinary and Animal Sciences
UAS	:	University of Agricultural Sciences
UEP	:	User Education Program
UNDP	:	United Nations Development Program
URL	:	Uniform Resource Locator
USA	:	United States of America
USC	:	University of Southern California
USDA	:	United States Department of Agriculture
VASAT	:	Virtual Academy for the Semi-Arid Tropics
VKC	:	Village Knowledge Centre
VRC	:	Village Research Center
VSAT	:	Very Small Aperture Terminal
W3C	:	World Wide Web Consortium
WTO	:	World Trade Organization

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ABSTRACT

India, being a largest democratic nation in the world, an agrarian country, the importance of agricultural education is vital and significant in the present context. The aim of the agricultural education is to accelerate the agricultural products and productivity to cater the needs of farmers and its stakeholders. The mission is marching towards hunger free and fearless nation. Moreover, the organizations like FAO, ICAR, various agricultural universities, deemed universities, central universities having faculty of agriculture imparting agricultural education, research and extension activities in different fields. The moving force of university libraries are to support the information needs of users. In this respect, the status of agricultural universities is changing due to the dramatic development in the information and communication technology.

The LIS is service organization, which provides various services, facilities and avenues. It was felt the need of study the agricultural university libraries and their present status. The researcher with the span of more than two decades of wide experience in agricultural university library systems, his field visit to different libraries gave encouragement to conduct the research entitled "*Use of Information and Communication Technology (ICT) in Agricultural University Libraries of Western India: A survey."*

The main objectives of the study are to analyze the usage of ICT in agricultural university libraries, status of ICT infrastructure, library automation, library management software, information services provided, facilities made available to users, development towards modernization and suggesting a model for agricultural university libraries. Using questionnaires technique, interviews and field visits were immensely useful to go ahead in this study. The response rate of 100 % of librarians and 83.25 % of user respondents were analyzed and interpreted.

The entire study has been organized in seven chapters. The chapter-wise coverage in brief is as under:

Chapter I deals with introduction of importance of agriculture, agricultural education and research in India, role of libraries and information centers, importance of ICT in libraries, ICT general view, agricultural universities in western India, need of the

present study, statement of the problem, limitations of study, objectives of study, hypotheses, research methodology and organization of the study.

Chapter II provides brief accounts of review of literature at global as well as at national level.

Chapter III describes the growth and development of agricultural education-world scenario, as well as Indian scenario, Department of Agricultural Research and Education, role of ICAR in agricultural education and research, role of agricultural libraries, agricultural education in western India, objectives of agricultural university libraries.

Chapter IV gives detailed accounts of concept and significance of information, communication and technology applications, ICT, computer, storage, networking technology, internet tools and search engine, use and applications of ICT in agricultural university libraries, consortia projects and use of ICT in agricultural extension programs.

Chapter V covers the data analysis and interpretation, general information about the library resources and services in university libraries, courses offered by the universities, library committee, library building, library collection, classification scheme, financial resources, human resources, ICT training, problems faced by the librarian, library clientele, library services, user education program, reprographic facilities, access to e-resources, library computerization, ICT infrastructure, telecommunication services, network / internet connectivity digital library and creation of Institutional Repository.

Chapter VI contains library user's data analysis and interpretation, general information of users, library hours, reading room facilities, mode of information, utilization of library resources, library collection, user education program, frequency of use of ICT tools, library services, utilization of databases, assessment of library facilities and performance.

Chapter VII deals with findings, suggestions and conclusion followed by further scope of research.

The major findings are:

i. The first agricultural university in India was established in 1960 at Pantnagar (UP) and latest one was established in 2011 at Bharsar, Uttarakhand. In western India, during 1973-2003, no agricultural university was established.

ii. All the agricultural universities are supported with libraries by ICAR and State Governments to suit the requirement of users. Commonwealth Agricultural Bureaux (CAB) Abstracts, AGRIS, AGRICOLA and CARIS Database are the main sources of providing access to agricultural library services and use by the users.

iii. Financial resources are provided by ICAR, during the year 2005-10 NAU had received highest grant of Rs. 393.94 lacs, whereas BSKKV library had received lowest grant of Rs. 25.92 lacs.

iv. Adequate manpower is not reflected in all eight agricultural university libraries.

v. The element of computer literacy, hands on experience, training, computer related hardware and software training and network related training is yet to be developed properly.

vi. Twenty five percent of agricultural universities have achieved 100 % library automation while fifty percent and twenty five percent have achieved automation 75 % and 50 % respectively.

vii. Fifty percent libraries have used and operated LIBSYS library software, about thirty seven percent libraries have used SLIM++ library software and one library used TLSS library software.

viii. Eighty eight per cent librarians (respondents) have initiated creation of digital library in their respective organizations.

ix. Seventy four per cent users (respondents) always use the internet, forty nine per cent e-mails, thirty two per cent telephones, twenty four per cent televisions and two per cent video conferencing.

The suggestions of the study are as under:

i. Although the states in western India have agrarian economy and prominence for development, establishment of new agricultural university need consideration the ICAR, an apex body at national level to plan and support for agricultural

education / research in these states ICAR and state Government may consider for establishing agriculture university.

ii. Qualified university librarian should appoint in the all the universities to cater the needs of teaching and research.

iii. For electronic journals and online full-text databases and to make available to their users for browsing and searching. The ICAR should provide more funds for subscribing these international databases.

iv. Networking with other agricultural universities in India is to be introduced.

v. Taking into account the existing status and infrastructure of libraries, sufficient grants should be provided by the ICAR for development of libraries.

vi. Upgrading the skills and technology, training plan for each library professional through workshop, short-term courses, and long-term courses may be considered.

vii. For use of ICT application / Computer literacy, user education program is to be introduced, formulated and implemented in order to improve the proficiency, skills and knowledge.

viii. RFID security system should be procured and installed in all the universities to protect and safeguard the library documents.

ix. A consortia movement for the wide publicity of the R and D activities is to be accelerated and developed among the agricultural university libraries.

x. The activities of use of video conferencing as a library facility could be accelerated and effectively used. The ICT based services can be contributed towards knowledge sharing.

xi. The international databases such as CAB Abstracts, AGRIS, AGRICOLA and CARIS could be made available 'online' and 'offline' and sufficient funds should be made available to the libraries.

xii. A model for consortia based subscription to electronic resources in agricultural university libraries in western India is devised for application.

The scope for future research studies is also suggested.

Chapter I

INTRODUCTION

1.1 Introduction:

India primarily is an agrarian country and provides livelihood to about three-fourth of the population and contributes half of the national income. The food gain production has reached to 250 million tones in 2011-12 from 50.8 million tones in 1950-51 during the last sixty years **[1].** India's agriculture production has been growing at the rate of 3 percent per annum **[2].** India is the fourth largest food grain producer country in the world and offer vast potential for future increase in production.

Agriculture contributes about 17 per cent national GDP. It is expected that growth of 4 per cent per annum is required to maintain the GDP rate of 9 per cent. Population of the country may reach to 1.4 billion by 2025 and 1.6 billion by 2050 and require annually 380 and 450 million tones of food grains respectively against the current production of 250 million tones **[3].**

Indian agriculture is continuously evolved to remain responsive to meet the growing and diversified needs of stakeholders in the entire production area. Low productivity in high potential region needs holistic management of land, water, crops, biomass, horticultural, livestock, fisheries and human resources. India has developed a comprehensive agricultural program **[4].** Similarly, special programs have also been undertaken to improve food and cash crops. Grow More Special Food Campaign (1940s) and Integrated Production Program (1950s) focused on food and cash crops supply respectively. The many production revolutions initiated from 1960s onward includes Green resolution in India, Yellow revolution (Oilseed: 1986-1990), White revolution (Dairy: 1970-1996) and Blue revolution (Fishing: 1973-2002) etc. India is the world largest producer of milk, fruits, cashew nut, coconut, ginger, termic, banana, sapota, pulses and black pepper **[5].**

1.2 Agricultural Education and Research in India:

Indian Agricultural Education and Research is progressing in the right direction. The important factors of like soil, water, land utilization, field and forage crops, environment, agro-biodiversity, resource conservation technologies, integrated

pest management, pesticide residues, seed production technologies, energy in agriculture, bio-technology, intellectual property rights, agricultural marketing and trading and indigenous technical knowledge have relevance in present agricultural education, research and extension. ICAR which is the flagship of the Indian National Agricultural System (NARS) provides significant research contribution in the production of rice and wheat.

Government of India has recognized the need for the sound system of scientific education in agriculture. The Indian Council of Agricultural Research, apex scientific organization at national level is established to plan, promote, execute and coordinate agricultural education, research and extension activities in the country through a network of 49 ICAR Research Institutes, 4 Deemed Universities, 6 National Bureaus, 25 Project Directorates, 8 Zonal Project Directorates, 17 National Research Centers, 138 Substations of ICAR, 79 All India Coordinated Research Projects, 10 Other Projects, 17 Network Projects, 630 Krishi Vigyan Kendras (KVKs), 52 State Agricultural Universities (SAUs), one Central Agricultural University and 4 Central Universities having faculty of Agriculture **[6].**

The effectiveness of research and development programs depend upon the quality and quantum of work done by its researchers, who, have to be helped by technical, administrative supporting agencies. One of such is Library and Information Centers (LICs) which plays a vital role in information communication and in keeping the scientist abreast with latest development in their field of study.

Agricultural University's Research and Development (R & D) in agricultural sectors was encouraged. Various Committees and Commissions viz. University Education Commission chaired by Dr. S. Radhakrishnan (1948), the first Joint Indo-American Team on Agricultural Research and Education under Dr. Ralph R. Shaw and Dr. D. K. Krishna, Librarian of Indian Council of Agricultural Research library (1954), Second Joint Indo-American Team on Agricultural Education, Research and Extension under the chairmanship of Dr. M. S. Randhawa (1959), High Level Agricultural Research Review Team (1963), University Education Commission under the Chairmanship of Dr. D. S. Kothari (1964); National Commission on Agriculture (1970) and National Commission on Farmers under the chairmanship of Dr. M. S. Swaminathan (2007) were constituted to make recommendations for improvement of agricultural research and education.

1.3 Role of Libraries and Information Centers:

These Committees and Commissions have advocated the Library and Information Centers as a central point to facilitate the scientists and technologists in using the development in the field of agriculture. The prime aim of the LICs is to develop an agricultural society i.e. able to lead a cultured, prosperous life, laying emphasis on certain basic values in the life and adhering to them. Due to the new technologies, tremendous development has been taken up in the services, facilities and avenues of LICs. The library is able to impart knowledge, skills, inculcation of values; and vocation skills. The knowledge and information are vital for all-round human development and libraries that make available knowledge and information are indeed valuable.

The provision of information services through agricultural libraries was made only after the independence. Developing documentation and information services as a necessary activity of the library is recognized by various Committees and Commissions. The role of ICAR for the development of agricultural libraries and information services is commendable. The Standing Advisory Committee of ICAR advises about the matters and parenting to libraries and their services. A central information service has been initiated in the ICAR Headquarters library through its various projects and through Agricultural Research Information Centers (ARIC). These centers provide SDI using CD-ROM from International Information System for the Agricultural Sciences and Technology (AGRIS) database and has brought out Indian National Agricultural Bibliography (1974-84). It is a national importance for AGRIS and Current Agricultural Research Information System (CARIS) projects of Food and Agriculture Organization of the United Nations (FAO) and focal point for South Asian Association for Regional Cooperation (SAARC) and Agricultural Information Centre.

The technology laid greater emphasis on the transfer of scientific and technological information. Several organizations and institutions which are engaged in education, research and extension have consumed and generated the information which is applied by researchers, professors and students. The rapid development in Information Technology has facilitated the emergence of new electronic devices, media and formats.

There is a paradigm shift from hard print to digital, ownership of documents to access of information, physical to virtual libraries. Though the electronic resource cannot fully replace the printed collections, it can definitely augment the print collection to a large extent. Electronic resources are available on CD-ROM, DVDs, Floppies, Online databases, Repositories, Digital Archives and Electronic information resources contain originally published information, in electronic form or information originally published in print form and then made available electronically. Some information is available both in print and electronic form as well.

Now, Information Society is emerged where the creation, distribution, diffusion, use, integration and manipulation of information is a significant economic, political and cultural activity. The information society is seen as the successor to industrial society. Closely related concepts are the post-industrial society, mass production era, post modern society, knowledge society, telematic society, information revolution, liquid modernity and network society.

1.4 ICT-General View:

ICT has become a medium of communication and a resource for R & D activities in the field of agriculture. Now a day's, scientific literature had a tremendous growth in the form of articles, periodicals and the books. ICT products especially library management software, operating system, telecommunication products, DBMS, DTP, etc. are used for managing in general information processing, search and retrieval in particular. Therefore, it is possible to mention the standard definition of ICT for closer understanding. There is no universally accepted definition of ICT, due to the constant evolving changes in concepts, methods, processes, systems and applications in the ICT. It is an extended synonym for Information Technology (IT), but is usually a more general term that stresses the role of unified communication and integration of telecommunications (Telephone lines and wireless signals), computers as well as necessary enterprise software, middleware, storage, and audio-visual systems, which enable users to create, access, store, transmit and manipulate information. In other words, ICT consists of IT as well as telecommunication broadcast media, all types of audio and video processing and transmission and network based control and monitoring functions **[10].** The term ICT is a convergence of audio-visual and telephone networks with computer network through a single cabling or link system. Recently UNESCO's Information for All

Program (IFAP) provides a platform for discussion of and action on ethical, legal and societal consequences of ICT developments.

United Nations Development Program (UNDP) has defined ICT (Mishra **[11]**) as under:

> "The ICT can be described as a varied set of goods, applications and services used to produce, store, process, distribute and exchange information. They include the most familiar technologies of television, radio and telephone (now called older or traditional ICTs) and the relatively newer ones-personal computers, mobile phones, satellite and wireless technologies and the internet. Increasingly, the demarcations between these media or delivery channels are blurring as the world becomes more networked, as evidenced by interconnected telephone services, standardized computer hardware and seamless data transmutation".

ICT covers any product that stores, retrieves, manipulates, transmits or receives information electronically in a digital form like personal computers, digital television, email, and robots.

With this view, the ICT has a great role while delivering Library and Information Services. The computer based services are generally called as Information Services in LIS profession. Therefore, the application of ICT in agricultural research system is increasingly important. E-agriculture is an emerging field focused on enhancement of agricultural as well as rural development through improved information and communication process. More specifically e-agriculture involves the conceptualization, design, development and evaluation and application of innovative ways to use information and communication technology in the rural domain with a primary focus on agriculture. More importantly, agricultural industries encompassed the areas such as crop cultivation, water management, fertilizer application, fertigation, pest management, harvesting, post harvest handling, transporting of food, food products, packaging, food preservation, food processing/value addition, food quality management, food safety, food storage and food marketing.

In this field University Libraries and Information Centre caters to the needs of their research staff and stake holders. Generally, these libraries are called knowledge

information centers. These centers use to deliver accurate, complete and precise information in the right time for the right user. These services are user friendly, easy to access, cost-effective and well protected unauthorized accesses. Further, University Libraries helps to bring innovative ideas, concepts, theories and projects as a part of Research, Development and Extension activities in the field of agriculture. The ICTs and its associated tools such as telephone, television, internet, email, video conferencing online databases and internet based services are increased in the university libraries.

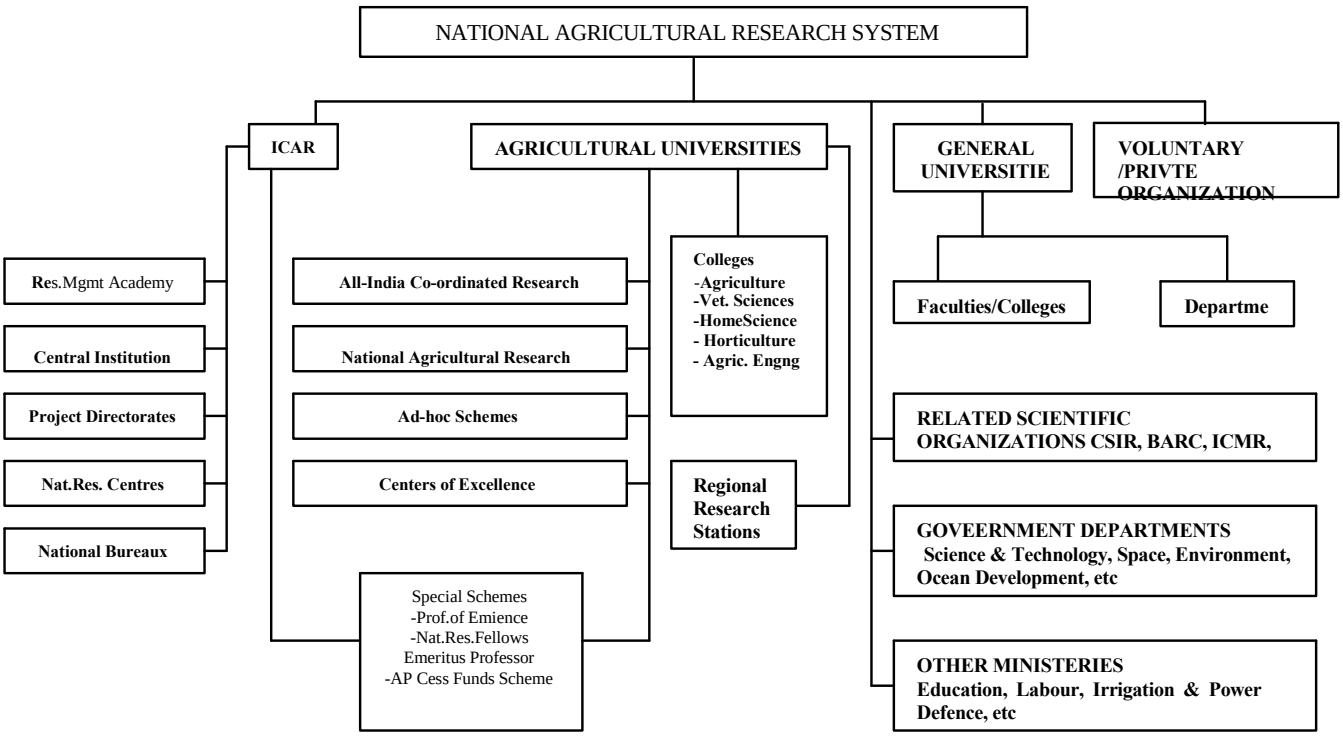
1.5 Importance of ICT in Libraries:

The LIS professionals are positively influenced by the challenges of Information and Communication Technology and its peripheral areas. The information fields have witnessed growth such as artificial intelligence, numerical networking, robotic science, security system, storage method, multimedia, animation technique etc. Acquisition, circulation, maintenance and dissemination of the documents and information are handled by the university libraries. The information services play a key role to the development of agricultural education, research, extension education, farm and farming, agro-based industries, agricultural policies and agro-business in India. These services are rendered by the agricultural universities and research institutes of ICAR.

In the changing scenario of ICT, the University Libraries not only works as a Document Delivery Centre (DDC) but also a Knowledge Repository Centers (KRC). The information can be accessed digitally with World Wide Web. The knowledge repositories in the form of Gateways can be accessed journal articles, dissertations and theses, bulletin, minutes, proceedings, books, technical reports, magazine articles, preprint and reprints, teaching material, data, software and others and are varied and different in each institute. The user categories like agricultural students, academic staff, research scholars, faculty members, scientists, extension specialists and agricultural staff engaged in performing policy decisions and implementation. These knowledge repository centres are necessary to increase and develop the use of agriculture knowledge bank through capacity building among the users. Further, the present economic environment where India is getting integrated with the world economy, it is imperative to develop techniques, methods, processes and products

which are competitive in the terms of cost and quality at local, regional and even global level. Therefore, it needs to devise and develop a strong, vibrant, effective and dedicated National Agricultural Research System [NARS] **[8].** Organizational set up of NARS in the country is given below

Figure 1.1: Organizational Set up of NARS.



NARS is one of the largest national agricultural systems in the world deals with research and also the production oriented activities including empirical research. About 25,000 scientists are actively engaged in agricultural R and D activities for the overall development of agricultural sectors.

"ICAR Vision 2030 Document" **[9]** narrates key challenges and opportunities in agricultural sector in the next two decades for developing and appropriate strategy and a roadmap to articulate role of the ICAR in shaping the future of the Indian agricultural research for growth, development and equity. Libraries are considered important for providing information to fulfill the aims and objectives of institute. The ICAR is therefore, supporting by providing funds for the establishment of knowledge bank and networks to improve Knowledge Management System (KMS) for the better development of libraries and users. KMS attempt to achieve the objectives such as i) World Class Customer Intimacy and satisfaction ii) Value added customer service iii)

Improve decision making; and iv) Solutions. KMS is a broad discipline which promote and integrated approach to the creation, capture, organize, access and use of an enterprises intellectual capital on customer and market, products, services and internal process. In this KMS, ICT is a driving force to achieve the objectives of the KMS.

ICT is emerged in various basic electronic devices such as television, telephone, internet, email, video conferencing**,** satellite, tele-text, videotext, audio text, computers, print media and wide range of projection devices. Now, advanced devices and materials are available as a result of modification or combination of these devices. Like interactive video, tele conferencing, close circuit TV, multimedia packages, high speed video, fax, computer assisted instructions, computer managed instructions, etc. These technologies minimize the resources and maximize the services for the benefit of the user community of library. Therefore, it is appropriate here to define the Information and Communication Technology.

1.6 Agricultural Universities in Western India:

The Western part of India consist the states of Maharashtra, Gujarat and Goa have significantly contributed in agriculture development. This region is highly developed in terms of history, industrialization, education, infrastructure, demographics, culture, and economy. Agricultural Universities in India are formed by Special Acts and Statutes of the Government of India or the State Governments. There are 53 Agricultural Universities in India are imparting knowledge in the prime domain of agriculture and allied subjects. In western India, 9 universities are set up in two States viz. Maharashtra and Gujarat as under:

Table 1.1: Agricultural Universities of Western India.

Name of the University	Acronym	Year of Establishment	Address for Correspondence	Phone No.	Fax No.	Website / URL
Anand Agricultural University	AAU	2004	Anand - 388110. (Gujarat)	(02692) 261571	(02692) 261520	www.aau.in
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth	BSKKV	1972	Dapoli, Dist. Ratnagiri - 415712 (MS)	(02358) 282064	(02358) 282074	www.dbskkv.org
Junagadh Agricultural University	JAU	2004	Motibagh, Junagadh - 362001. (Gujarat)	(0285) 2670270	(0285) 2672004	www.jau.in

Marathwada Krishi Vidyapeeth	MKV	1972	Parbhani-431402.(MS)	(02452) 223801	(02452) 229755	www.mkv2.mah.nic.in
Mahatma Phule Krishi Vidyapeeth	MPKV	1968	Rahuri, Dist. Ahmednagar - 413722, (MS)	(02426) 243208	(02426) 243302	www.mpkv.mah.nic.in
Navsari Agriculral University	NAU	2004	Char Rashta, Dandi Road, Navsari- 396450. (Gujarat)	(02637) 283234	(02637) 283234	www.nau.in
Dr. Panjabrao Deshmukh Krishi Vidyapeeth	PDKV	1969	Krishinagar, Akola - 444104. (MS)	(0724) 2253409	(0724) 2258219	www.pdkv.ac.in
Sardar krushinagar Dantiwada Agricultural University	SDAU	1972	Sardarkrushinagar Dist. Banaskantha, - 385506. (Gujarat)	(02748) 278439	(02748) 278439	www.sdau.edu.in

The profile of each university is given below**.**

1.6.1 Anand Agricultural University (AAU), Anand:

The Anand Agricultural University (AAU) came into existence with effect from 1st May, 2004 by an Act the Gujarat Agricultural University Act 2004. Its mandate is to impart Education to the student in agriculture and allied fields, conduct research in order to improve the productivity of agric crops, undertake basic research to break through newer areas of knowledge, provide opportunities to observe and understand the life of rural people and to enable the students to inculcate the attitudes and developed skills relevant for grass-root work. The mission of the university is to "search for new frontiers of Agricultural Sciences, development of excellent human resources and innovative technological services to farming community". The Government of Gujarat has inculcated the agricultural education with broad vision to make Gujarat agriculturally prosperous state. The University has jurisdictions of six Districts namely: Anand, Ahmedabad, Vadodara, Dahod, Panchmahals and Kheda. Seven colleges offer courses on education, research and extension to under-graduates and post-graduates of B.Sc./M.Sc.(Agriculture), B.Tech (Agricultural Engineering), M.Sc. (Horticulture), B.V.Sc & A.H. / M.V.Sc. (Veterinary), MBA (Agriculture) and PhD.

AAU has a separate building for library having 1395 square feet area. The University Library has a collection of 73259 Books, 176 National Journals, 44

Foreign Journals, 9463 Government Reports, 132 Rare Books, 700 CDs/DVDs, 8 CD-ROM Databases and 3091 M.Sc. / PhD Theses. The Library procured 229 foreign and Indian journals and providing retrieval services in eight major CD-ROM International Databases such as AGRIS, AGRICOLA, J-GATE, Indian Harvest, AgECON, Biological Abstracts, Annual Reviews and CAB Abstracts. Science Direct and J-Gate are e-journals full-text package for AAU users. AAU library has become partner of Consortium for e-Resources in Agriculture (CeRA) using the LIBSYS Library management software for maintaining and disseminating information. The library became and in extricable part of a nation-wide consortium, towards digitalization, automation and establishment of modern Cyberary with its 27 work-stations is an excellent facility as a part of e-Library. 8 CD-ROM Databases are being monitored online on LINUX server with the help of 2 mbps (BSNL) and 2 mbps of Gujarat State Wide Area Network (GSWAN) internet connectivity. (http://www.aau.ac.in).

1.6.2 Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli:

Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth (BSKKV), Dapoli, District Ratnagiri was established on May 18, 1972 by Act No. XVIII of 1972 of Maharashtra for the development of Konkan region of Maharashtra. The University has jurisdictions of six districts namely: Thane, Mumbai Sub-urban, Mumbai City, Raigad, Ratnagiri and Sindhudurg. The objectives of the university are agricultural education, research and extension to attain the sustainable agriculture development of Konkan region. Besides agricultural education and research activities, the university has successful extension education programs for the transfer of technology comprising farmers training, farmers meets, agricultural exhibitions, for extension workers. The courses offered by the University are B.Sc. / M.Sc. (Agriculture), M.Sc. (Horticulture), B.Tech. / M.Tech. (Agricultural Engineering), B.Tech / M.Tech (Food Technology), M.F.Sc. (Fisheries) and PhD. Five constituents and eleven non-granted colleges are working under the university.

The BSKKV University Library has separate building having space area of 11567 Square feet. The Library has a collection of 40651 books, 7885 bound volumes of journals, 76 Indian journals, 398 CDs/DVDs including Databases and 3306 Theses. The services and facilities are available i.e. computer based services and online services using Internet facility. The prospective and retrospective searches were

offered by using CD-ROM Databases as an when required. Online database searching provided to their clientele round the clock (http://www.dbskkv.org).

1.6.3 Junagadh Agricultural University (JAU), Junagadh:

The Junagadh Agricultural University (JAU) was established on May 1, 2004 by State Act No. 5 of 2004 passed of the Gujarat Government for imparting education in agriculture and allied sciences in the state. The University covers seven districts viz., Amreli, Bhavnagar, Jamnagar, Junagadh, Porbandar, Rajkot and Surendranagar historically known as Saurashtra. The University offers education to under-graduate and post-graduate program for B.Sc. / M.Sc. (Agriculture), M.Sc.(Horticulture.), M.F.Sc. (Fisheries), M.Sc. (Agriculture Biotechnology), B.Tech / M.Tech (Agricultural Engineering), B.V.Sc.&A.H./M.V.Sc. (Veterinary) , ABM (Agriculture) and PhD. The teaching in the university consists of four faculties: i) Agriculture ii) Agricultural Engineering iii) Fisheries and iv) Postgraduate studies. The significant event was made by the scientist of this university were developed the first hybrid bajra and hybrid castor. Five colleges, seven multidisciplinary research stations on various crops and eleven substations are also working with it.

The JAU University having a separate library building with total space area of 42885 sq.ft. The library a collection of 42500 books, 20000 bound volumes of journals, 250 National journals, 105 Foreign journals, 525 CDs/DVDs including databases and 2500 theses. JAU enjoying the privileges of having online access of journals using Consortium for e-Resources in Agriculture (CeRA).(http://cera.jccc.in). The library equipped with the modern systems of library management and services. Thirty workstations are connected with 100 mbps LAN facilities. The major international databases are CAB, AGRIS, and AGRICOLA being used by the clientele. These databases are available on CD-ROM version. The Indian Harvest Database can be browsed online. The library provides their services and facilities to their users for about 12 hours a day. (http://www.jau.in)

1.6.4 Marathwada Krishi Vidyapeeth (MKV), Parbhani:

The Marathwada Krishi Vidyapeeth (MKV), Parbhani was established by an Ordinance VI of 1972 of Maharashtra Government on May 18, 1972, to provide education in agriculture and allied sciences and undertake research and extension to

facilitate technology transfer in Marathwada region of Maharashtra. The university is having jurisdiction of eight districts namely Parbhani, Nanded, Latur, Osmanabad, Beed, Jalna, Aurangabad and Hingoli. The university offers the under-graduate and post-graduate courses such as B.Sc. / M.Sc. (Agriculture), M.Sc. (Home Science), B.Sc. (Agriculture Biotechnology), B.Tech. / M.Tech. (Agriculture Engineering), M.Tech (Food Science) and PhD. The university has ten constituent colleges and 18 non-granted colleges.

The MKV University Library has separate building with area of 44449 sq.ft. and accommodating a collection of 72743 books, 25186 bound volumes of journals, 290 Indian journals, 950 CDs / DVDs including Databases and 7346 Theses. The MKV library plays a pivotal role in providing Library and Information services. The users using the facilities and give output in the form of publications of journal articles, conference proceedings, books etc. The library not only working as knowledge Resource Center but a agency of teaching and extension activity. Library provides information as basic resource to the overall development and enhancement of the country. Therefore, besides the funds, faculty and researchers are considered as prime input to the research and development activities. The MKV library has participating in the consortia movement among the agricultural universities and research centers. (http://www.mkv2.mah.nic.in)

1.6.5 Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri:

The Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri, District. Ahmednagar was established on 29th March 1968. The mandates assigned to this university are advancement in teaching, research and extension. Agriculture education is aimed at creation of scientific and technical work force for obtaining the highest production and productivity in each farm system to achieve goal of self-sufficiency and export of agricultural products. The facilities of library, laboratory and higher training for academic staff members are available in the university.

The jurisdiction of the Mahatma Phule Krishi Vidyapeeth covers as western Maharashtra in ten districts viz. Ahmednagar, Pune, Dhule, Jalgaon, Nashik, Nandurbar, Kolhapur, Satara, Sangali and Solapur. The university having 6constituent colleges, 35 Non-grant colleges, 93 Agricultural technical schools, 69 Research

Stations, 10 University Krishi Vidhyan Kendras and four zonal agricultural research stations. The courses in agriculture and allied subjects such as B.Sc./M.Sc. (Agriculture), B.Sc./M.Sc.(Horticulture), B.Tech./M.Tech.(Agricultural Engineering), B.Tech.(Food Science), B.Sc. (Agro-Biotechnology), MBA (Agriculture) and PhD were offer to under graduate and post graduate students. The university also imparts training to Gardeners and Livestock Supervisors.

MPKV library plays a major role in disseminating the knowledge and information to their users in the fields of education, research and extension activities. A separate building was constructed in 1980 with 3300 sq.mtr. area having collection size 72005 books, 26374 bound volumes of journals, 6901 theses, 100 Indian journals, 25 foreign journals, 78 CD/DVDs including databases,115 Video cassettes and 5500 annual reports of various organizations.

CD-ROM database is the prime source of information available in the library. These are AGRICOLA, Agricultural Economics Database, AGRIS, AgEcon CDs, Animal Production Database, Beast CD, Biological Abstracts, Biotechnology Abstracts, CAB Abstracts, Crop CD, Current Contents, Food Science and Technology Abstracts, Horticulture CD, Indian Science Abstract, Pest CD, Plant Protection Database, Soil CD, Soil Science Database, Tree CD and the like. Also the ICT based services are being provided by the university. These are Internet facility, CD-ROM Databases/Online Databases, E-Journals/Online e-Journals, E-books, Online ETAD (Electronic Thesis Abstracts Database), CAS (Current Awareness Service), CeRA (Consortium for electronics Resources in Agriculture) and Knowledge Portal. The Internet Facility Centre provides CD-ROM online database subscribed through DELNET, E-journals, E-books and Electronic Thesis Abstracts Database. (http://www.mpkv.mah.nic.in)

1.6.6 Navsari Agricultural University (NAU), Navsari:

The Navsari Agricultural University (NAU) was established on May 1, 2004 under State Act No. 5 of 2004 of Gujarat Government to provide agriculture education, research and extension for six districts of namely: Navsari, Bharuch, Dang, Narmada, Surat and Valsad. The NAU as a Information Centre connected with the activities of research in eleven colleges, nineteen research centers and fifteen

extension centers. The University offering courses for under-graduate and post-graduate especially on B.Sc ./ M.Sc. (Agriculture), M.Sc. (Horticulture), M.Sc. (Forestry), B.V.Sc & A.H ./ M.V.Sc (Veterinary), MBA (Agriculture) and PhD.

The NAU Library is the principal resource and knowledge centre in information technology. The main function of the library is to provide all kinds of scientific and technical inputs, agriculture, horticulture, forestry, veterinary, biotechnology, agribusiness management, agricultural engineering to the students, scientist, teachers, researcher and extension works and readers of all types to throw the light on past, ongoing and future activities of the library. The library has separate building with space of 6000 sq.ft. The library has a collection of 32322 books, 9178 Back Volumes of Journals, 78 National Journals, 63 foreign journals, 325 CDs/DVDs including Databases, 5 Audio Visuals, 18 Video Cassettes and 1287 theses. The university library as hub of knowledge having specialized collection on agriculture, veterinary science, animal husbandry, home science, fisheries, basic sciences, humanities, technology and allied subjects. AGRICOLA and CAB major international databases are available for the use for research purposes. The library has university intranet through fiber optic line also 128 kbps connectivity of internet through V-SAT and leased line. Library is using e-mail and internet for information acquisition and dissemination.

1.6.7 Dr. Panjabrao Deshmukh Krishi Vidyapeeth (PDKV), Akola:

Dr. Panjabrao Deshmukh Krishi Vidypeeth (PDKV) started functioning at Akola from October 20, 1969, with an objectives of providing education in agriculture and allied subjects for the Vidarbha region consisting the eleven districts namely Akola, Nagpur, Amravati, Wardha, Buldhana, Yavatmal, Chandrapur, Gadchiroli, Bhandara, Gondia and Washim. These districts leads to the cultivation of different food, pulses, oilseeds, vegetables and plantation crops. Considering the different Agro-climatic condition suits for education and research activities in the Parbhani campus. The MCAER was established at Pune to coordinate the activities of all four agricultural universities of the state. Education at under-graduate and post-graduate levels are imparting to the degree holder of B.Sc./ M.Sc.(Agriculture), M.Sc. (Horticulture), M.Sc.(Forestry), M.Sc.(Agricultural Biotechnology), B.Tech / M.Tech (Agricultural Engineering), MBA (Agriculture) and PhD. The education programs of

university carry out the courses through eight constituent colleges and ten private nongrant colleges.

The PDKV University Library has a separate Library building having total space area of 52435 sq.ft. and declared as depository library of FAO publications and it has established reciprocal relations with the International Agriculture Research Institutes and Centers and valuable books, research reports, technical bulletins are received as donations from these institutes. The library has a good collection of 115290 books, 28633 bound Volumes of journals, 46 Indian journals, 37 foreign journals, 20 CDs / DVDs including Databases and 6608 theses. The library caters the information needs through services such as Internet, Xerox and Online Database access facilities.

1.6.8 Sardarkrushinagar Dantiwada Agricultural University (SDAU), Sardarkrushinagar:

The Sardarkrishinagar Dantiwada Agricultural University (SDAU) was established in 1972 for promotion of Agricultural productivity and improving the economic conditions through education, research and extension for six districts namely: Gandhinagar, Mehsana, Patan, Sabarkantha, Banaskantha and Kutch of North Gujarat. The University offer courses for under-graduates and post-graduates for the subject of B.Sc / M.Sc. (Agriculture), M.Sc. (Horticulture), M.Sc. (Home Science), B.Tech. / M.Tech. (Agricultural Engineering), B.V.Sc & A.H. / M.V.Sc.(Veterinary), MBA (Agriculture) and PhD.

The SDAU Library has separate building with total area of 10975 sq.ft. The library has a collection of 45600 books, 4150 bound volume of journals, 136 national journals, 171 CDs/DVDs including databases and 5650 theses. Library has OPAC service and complete computerization of all its operations. GSWAN network ensures better connectivity to all its users. AGRICOLA, CAB Abstracts, Indian Harvest databases are subscribed by the library with having facility of full text of articles via EBSCO consortia provides seamless access to the abstracts of millions of journal articles available online.

The researcher attempted to find out the extent of use of ICT based equipments as well as services utilized by their clientele. However, it is worth while

to study the area on utilization of ICT in agricultural universities with special reference to western India as selected. The justification of the study is put forth here under.

1.7 Need of the Present Study:

The researcher is a agricultural library professional closely associated with the library management and services having experiences of more than two decades. While catering needs of users with growing demand of services are dealt by the researcher.

In view of the foregoing discussion, information is considered as vital intellectual national resource which needs to be utilizing properly. A university library extends its support for social, economic, cultural, political, technological and industrial development of a country. The ICT provides the information to all types of its patrons. The application of ICT has brought revolutionary changes in the activities of agriculture. The professional needs to use ICT development for effective and efficient use of related data for planning, decision making and production. Therefore, ICT has become a vibrant, responsive, sustainable and productive agricultural activity. Now increasing use of computer, communication, storage, multimedia and security system. The association of these technologies in university libraries are planning, designing and delivering their services. Nevertheless, there is a huge demand of sophisticated services from these libraries are increased. These services are internet browsing, online database and journals, emails, video conferencing, institutional repositories on intranet etc. As the ICAR is providing more funds generously to promote the ICT services now a days, the services like weather forecasting, marketing, information, broadcasting, seasonal lecture series about the crops.

The use of ICT has enhanced the sustainable agricultural development and food security. The community such as practioners, policy makers, representative of farmer organizations, researchers, information and communication specialist involved in agricultural & rural development. Information resources indicate the implications on teaching, research and extension. However, no attempt has ever been made in western part of India to enquire into the needs of the users relating to university libraries and information activities so far as the use of ICT and its tools, techniques, processes, theories and extent of use are concerned.

Keeping this in background, it was considered worthwhile to assess the use of ICT in Agricultural University Libraries attached to the western part of India.

1.8 Statement of the Problem of Present Research:

Despite the initiatives taken to establish the libraries in agricultural universities and apex level institution is established to plan and coordinate the education and research in agricultural field and setting up of libraries, the use of ICT is not up to the expected level in agricultural universities in general and agricultural universities in western India in particular. Infrastructure required for development and use of ICT is also lacking. The problem of the research study is therefore considered ***"Use of Information and Communication Technology (ICT) in Agricultural University Libraries of Western India: A survey"*** for research.

1.9 Scope and Limitations of the Study:

The study is confined to eight Agricultural University Libraries of Western India, in the states of Goa, Gujarat and Maharashtra. The use is limited to eight agricultural universities and also excluded the Veterinary and Fisheries University, agricultural schools, colleges and ICAR institute libraries for the study.

1.10 Objectives of the Study:

The general objective of this study is to assess the use of ICT in agricultural universities in western India. The specific objectives are:

- **i.** To know the extent usage of ICT in agricultural university libraries in Western India.
- **ii.** To find out the level of automation, library management software, its modules, related services and constraints of automation in the library.
- **iii.** To examine the status of ICT infrastructure in respect of hardware and software, network connectivity use for library services.
- **iv.** To find out the various aspects of library and information services offered by the agricultural university libraries while using ICT.
- **v.** To evaluate the digital library initiation program adopted in the agricultural university libraries.

vi. To know the training and orientation needs of library staff to cope-up with new technologies, e-resources, problems if any faced in adopting them and

vii. To develop a conceptual model for library and information networking among agricultural university libraries of western India.

1.11 Hypotheses:

The following hypotheses formulated and considered for research:

i. The present Agricultural University Libraries are facing problems while delivering library services in respect of Infrastructure.

ii. Networking of libraries in agricultural universities at Indian level is not visualized.

iii. The Training and Orientation for staff both librarians and users in relation to use of ICT are poor or insufficient.

1.12 Research Methodology:

The present study has considered the librarians and users of eight agricultural universities in western India.

Research is a structured inquiry that utilizes acceptable scientific methodology to solve problems and create new knowledge that is generally applicable. The scientific methods consist of systematic observation, classification and interpolation of data. Research is a process of collecting, analyzing and interpreting information to answer solution. But to qualify as research the process must have certain characteristics: it must be controlled, rigorous, systematic, valid and variable, empirical and critical [**12**]. The contents of questionnaire covered were:

1. What is the use of ICT application while catering to the needs of respondents in the agricultural university libraries?
2. Whether adequate infrastructure facilities relating to the ICT based services are available in eight agricultural university libraries?
3. Whether the library professionals are fully acquainted with use of ICT applications while rendering the services?

4. What are the respondents feeling, attitude, opinion, perception satisfaction and evaluation, etc. while utilizing collection, services and operation of the ICT applications?
5. Whether the agricultural university libraries are automated, use of library management software, the internet, network connectivity and other peripheral circumstances?

The scheme of research design which help in achieving optimum objectivity, efficiency and reliability. However, any research design is only tentative in the sense that as the study progresses new ideas, theories, models and techniques emerges. **[13]**

The present researcher has followed major steps such as: Formulating the research problem, Survey and review of literature, Developing hypotheses and clarifying the concepts, Deciding on the research design, Defining the population and selecting the sample, Collecting data with the help of tools and techniques already available and/or specially designed for the purpose, Analysis and interpretation of data, Testing the hypotheses followed by Conclusion, implication, recommendations.

Busha and **Harter [14]** defined the survey research is characterized by the selection of random samples from large and small populations to obtain empirical knowledge of a contemporary nature. This knowledge allows generalizations to be made about characteristics, opinions, beliefs, attitudes and so on, of the entire population being studied. The methods of survey research allow investigator to gather information about target populations without undertaking a complete enumeration. Thus, survey research techniques can save time and money, without sacrificing efficiency, accuracy and information adequacy in the research process. Survey research methods are used to obtain three broad classes of data:
a) information about incidents and developments (data about events in a given period); b) information about distributions and frequencies (data concerning the possessions or characteristics of each member of a subject groups); and c) information about generally know rules and statuses (data about institutional norms and conditions).

The present study also sought the opinions about the ICT applications which are put in operation and delivery of services in the university libraries. The information about factual, opinions, attitudes, perceptions, feelings, preferences and

the standard of actions have been collected. The factual questions normally pertain to respondent as well as library professional age, educational qualifications, library experiences, membership of organization were designed. The purpose of the present research is to obtain the information about respondent beliefs, feelings, values and related concepts, opinion, attitude and questions have been designed. Eight librarians and a total of 400 users were randomly selected and the attitudes, behavior and action were noted through questionnaire.

On the basis of above research questions, the main instrument for data collection used in this study is questionnaire, which was devolved in the light of objectives of the study. The present research had proceeded for future direction to conclude the study. Two questionnaires were designed, one is addressed to library professionals and second one for library user respondents. Twenty-four question where addressed to library professionals and twenty one questions were asked to library user respondents. The opinion about the ICT and its applications has sought and data were systematically analyzed and interpreted. These data were illustrated and tabulated for the closer understanding of the subject. The totals of 82 Tables as well as 29 Figures are self explanatory to explain the problem of study. The researcher made efforts to get the data in the form of interviews, discussions and field visits.

1.13 Organization of the Study:

The study thus conducted, has been organized and presented in the following pattern:

Chapter I provides background of Agricultural Research and Education in India, Role of Information and Communication Technology and General view of the state of the art of the ICT and the brief profile of eight agricultural university libraries of western part of India, statement of problem, limitation of the study, objectives of the study, hypotheses, research methodology and organization of the study.

Chapter II dealt with available Literature provides at the national and globally.

Chapter III dealt growth and development of agricultural education.

Chapter IV deals with Use and Applications of ICT in agricultural university libraries. The analysis and interpretation of data, findings of present study, suggestions and recommendations and scope for future research are dealt in chapter V, VI and VII.

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Chapter II

REVIEW OF LITERATURE

Introduction

The present chapter provides the comprehensive review of literature of survey based research on *'Use of Information and Communication Technology (ICT) in Agricultural University Libraries of Western India : A survey'* which enumerate the utility, usage and its perception, satisfaction, feeling and general opinion about the ICT applications.

Today's Library and Information Science (LIS) profession has been influenced by the challenges of Computer, Communication, and Information Technology. There is an enormous growth in the information fields such as artificial intelligence**,** robotic science, security systems, storage techniques, digital techniques, multimedia methods and data process management information system etc**.** The software systems include cognitive theory, fuzzy logic, neural network, nano technologies and the like. Information has become an indispensable factor for promoting the development of society just like the basic needs of human beings ranking after air, food, water and shelter. Drastic changes have been taking place in various directions in the LIS profession. All these have a dynamic impact on LIS, its organization and service. From industry ownership to the information ownership, industry-based to information-based, from collection management to information management, ownership to access, quantity to quality, process oriented to user oriented, related information to specific information, reactive to proactive, custodian to reference based knowledge worker, information gatherer to information analyst. Even the nature, status and boundaries of information have got lot of changes adopted. These call for a change in the information fields and services.

The present review of literature is presented in two major parts. First one global bird's eye view and the second one is national review of sources of literature scanned and studied by the researcher. While reviewing and evaluating the literature some major keywords are identified for the sake of convenience and organization of the material. The selected keywords are: information and communication technology, computer technology, usage of communication media, information technology,

computer technology, ICT infrastructure, storage technology, digital technology, web based services, library automation, library networking, agricultural databases online / offline services, CD- ROM technology, institutional repository [a) library software, b) operating system, c) consortium, d) ICT skills, f) web technology], agricultural education system, library collection, library organization, library budget, library users, and the like.

One of the methods used for review of literature is referring various kinds of bibliographies of research on the subjects. Various kinds of Indexing and Abstracting journals were also scanned for this purpose. The bibliography of doctoral theses submitted and accepted by the various Indian Universities published in the weekly issues of University News scanned carefully since 1990 to 2010.

However, it is a fact that there is hardly any study on use of ICT in the Agricultural University Libraries of Western India. The databases provided by **Vidyanidhi [1]** (www.vidyanidhi.org), **UGC-INFONET [2]** www.inflibnet. ac.in/infonet/) and **DELNET [3]** (www.delnet.nic.in/resources.htm) were also studied, searched, and browsed carefully for the present research topic. But no research has ever been carried out on the use of ICT in agricultural university libraries of Western India.

With this view, library sources of literature such as monographs, books, encyclopedias, conference proceedings, dictionaries and directories, handbooks and manuals, yearbooks, almanacs, bibliographies, glossaries, patents and standards, scientific periodical articles, guide to subject literature; indexing and abstracting journals, treatises, reviews, government reports, research outputs, etc. were reviewed critically and studied for determining the course of the present study.

In the twenty-first century, agricultural world experiences new challenges concerning food, population and environment. Further, globalization of the agriculture world calls for improved efficiency, greater competitiveness and larger share in the export. Thus, the agriculture sector continues to be the backbone of Indian economy. In this area, the reference sources viz. Agriculture, Veterinary and Animal Sciences, Food Science and Technology, Fisheries Sciences, Forestry and Home Science were reviewed and studied precisely by the investigator.

The intension of the study is to enquire each and every meaning and use of various concepts, methods, procedures, theories, techniques, tools, approaches, types and processes of social research especially in LIS fields. The work at hand deals with research as to find out the extent use of ICT tools, gadgets, equipments, systems, progress, and standards. Hence, the selected area is agricultural universities in India on which the improvement and welfare of the society is totally dependent. It is also generally observed that the rapid development of ICT, the internet and digital technologies have tremendous impact on various sections of Agriculture. In the knowledge area of agriculture, where knowledge is power, the use of network technology is to design, deliver, monitor, administer and extend the learning concepts as we passing through knowledge revolution in the form of Information Explosion. In the field of agriculture, the broad areas have been identified, selected, and studied. The major branches of Agricultural Science devotes to Agriculture and allied subjects, Veterinary and Animal Sciences, Food Sciences & Technology, Fisheries Sciences, Forestry, Home Science and the like. These fields are positively affected by the Information and Communication Technology (ICT). Therefore, attempts were made to review the related literature.

Keeping these in view, attempts were made to highlight the important findings of the research on the present topic. The researcher had reviewed some of the pertinent literature available on traditional university libraries with a view to use of ICT in respect of collection, services, users and library professionals. The specific views on the above aspects were considered as peripheral studies for the present work.

'*Handbook of Agriculture'* **[4]** published by the Indian Council of Agricultural Research (ICAR), which is a blue print of agriculture sector consists of ongoing research efforts at the national level and some ideas on the shape of future agriculture. The topics deal with soil and water, land utilization, field and forge crops have been updated with the latest development, in addition to this many new topics such as environment, agro biodiversity, resource conservation technologies, integrated pest management, seed production and technologies, energy in agriculture, informatics, biotechnology, intellectual property right, agricultural marketing and trading and indigenous technical knowledge have also been addressed. The handbook is useful to students, researchers, planner, farmers and other stakeholders. However, the handbook provides a separate chapter on 'Informatics in Agriculture' which is a

direction for executing present piece of research. The handbook is a basic source of library literature for any researchers in the field of agriculture and agriculture related subjects. Therefore, this is considered as a pertinent review for the study.

2.1 Literature Search Global Scenario:

Ajegbomogun and Busayo [5] highlighted a comparative study of ICT literacy among the staff of the Kenneth Dike and Nimbe Adedipe Universities in Nigeria. Data of 138 respondents were gathered, selected, categorized, analyzed and presented in the form of tables and graphs. The major findings of the study are as under:

i) Staff members of KDL and NAL libraries found high level of ICT literacy skills. The staff had undergone ICT training in the area of services. All the staff members are well aware of the ICT use and its applications. ii) The level of ICT use in KDL and NAL libraries appears to be adequate. iii) The constraints of utilizing ICTs are: power failure, inadequate technical staff, malfunctioning of equipment and machines, and iv) The study indicate that a high level of usefulness **o**f ICT application in the daily activities of the staff in the two libraries. It is followed by several recommendations in order to have optimum utilizations of ICT facilities by staff members.

Etebu [6] undertook a study on the importance of information and communication technology (ICT) to the students' community and general user. The specific purpose of the study was to investigate the availability of ICT facilities in the Niger Delta University Libraries and lastly to highlight the implication of the available ICT facilities in respect for library service to clientele. The survey methods were used and questionnaire technique was administered. The data were collected from the University faculties of 38 departments. All the facilities were made available in order to provide the information their users in university. These facilities were: computers, scanners, printers, proxy semi, satellite dish, and internet facility using LAN, MAN, WAN, Email, CD-ROM, slide projector, telephone network and the like. With this view in above, the study was concluded with certain observations a) Niger Delta University; Amassoa is a place without connection to any form of electricity a NDU main campus runs their power generating plant 24 hours a day, 7 days a week.
b) The libraries used in this study indicated that they have slides, audio tapes, and video tapes. c) The internet is the gateway for libraries and information centers to

enter the electronic information era and provides information generated by different organization, institutes, research centers, and individuals all over the world and d) Awareness of ICT in the libraries, although the available facilities are very poor .

Temel and **Maru** **[7]** conducted study in state of Georgia in USA, while evaluating ICT infrastructure and use in agriculture, agricultural policy, research and educational organizations. The objective of the study was to assess the needs of national agricultural research institutions and their relevant partners for innovative**,** appropriate and efficient information and communication systems and linkages in Georgia. The questionnaire method based on interviews were used to gather information and assess ICT infrastructure and application in nine organizations which were part of or one connected to the National Agricultural Research System (NARS).The data was collected from five public sectors, one private sector and one NGO sector. The study observed couple of key elements of policies and capacities for knowledge transfer. Finally, three major recommendations were given: i) Partnership of coalitions of public organizations, private firms, NGOs etc., who currently work on rural development and improved food security. ii) Exploiting the inter dependency and ICT infrastructure in rural areas where traditional infrastructure is poor, therefore making ICT investment costlier than it would otherwise be. This could be remedied by broad-based rural development projects, which would have a direct impact on raising ICT efficiency and reducing the cost of ICT investment; and iii) Promoting investment in human resource development; without qualified human resources, no investment in the ICT area would improve and the existing arrangements with international companies for modernizing the telecommunication infrastructure are likely to fail. Therefore, there should be trained workforce to implement any ICT hardware on the ground.

Vrana [8] emphasized the current organizational structures of information and communication services in 27 universities in the Czech Republic. The study was expected impact of ICT to university activities and also changes in various directions in organizations. The major problems were identified such as historical tradition, duration of the process with respect to the academic term, eligibility of typical styles of control, relationship to mission critical activities, lack of resources, inertia, resistance to changes, fear from order, self development versus external suppliers, security and privacy of data, education is not just a charging of knowledge,

motivation of professionals , lack of national ICT policy and vision and the vision basic preparation of student and teachers. The study concluded with a special attention to cooperation within the universities and among universities and to the role of Ennis-CZ**.** The 'opportunities and threats' of partnership and the ways to benefit or the issues in the partnership with vendors and collaborator universities have also been discussed.

Kalusopa [9] discussed the challenges of utilizing information communication technologies (ICTs) for the small scale farmers in Zambia. The main objective of survey was to assess the use of information communication technology (ICTs) as a tool that would provide effective communication and information services to intermediaries that serve small scale farmers in the agricultural sector in Zambia. A survey of information needs of small scale farmers in two selected provinces was carried out to establish and prioritize their information needs. Lastly, the study concluded that agricultural development activities were based on the utilization of information. However, for information to be effective, it has to be systematically collected, organized and repackaged to supply the consumer as and when needed. Information must be current and easily accessible. ICTs can thus enhance this process. ICT can bring about new information resources and open up new communication avenues for the rural farming communities.

In order to improve agriculture, there is a need to have well organized and functional integrated information delivery system, supported by efficient national collaboration programs. Therefore, there is a need to redesign the information support system for agricultural development. Result from this study is a typical example of the basis for the modification of the existing in information system if it has to be strengthened and to be of value so that it can provide information that is timely, relevant, accurate, and reliable and in desired usable forms.

Aregu et al. [10] conducted a user survey investigating the level and extent of use of ICT based information by Ugandan agricultural and development community. The specific objectives of the survey were: i) to determine and assess the extent of use the content access the efficacy of agricultural information systems made available to the user community. Ii) To review the content creation mandates, system, access and

utilization of policies among agricultural research systems. Iii) To assess the policy on the economic development to the access of digital information.

The preliminary findings indicated a need for research in this area given its infancy. Research will guide policy, technological design and anticipated changes among others. The study was considered as a pilot research method and instruments.

Yacob [11] the study investigated the level of availability and use of ICTs in academic libraries in southwestern Nigeria and the relationship of this to job performance in the selected academic libraries. 25 Academic libraries including University of Agriculture, Abeokula was selected for the study. The study made use of descriptive research design. It is revealed that lack of commitment by institute management, lack of ICT strategy, and lack of qualified staff to manage the ICT and low skill level of the academic librarians dominated the reasons for the poor use of ICT and other factors that contributed to lack of adequate budget and erratic power supply. The study made a specific recommendations like adequate fund for the acquisition of appropriate ICT, adequate training in the use of ICT is given to academic librarian, the management must part ICT strategy and stand by Generator to ensure the continuity of work in case of power outage.

Osagie [12] the study examined the perception and use of ICT resources in Kenneth Dike Library of postgraduate students of the University of Ibadan. The survey research design was adopted. Data collected were analyzed using SPSS. Study revealed that the use of ICT facilities to support learning and research in Kenneth Dike library by PG students is low, irregular and ineffective as majority of users lack of adequate ICT awareness, training and support to use ICT facilities available in the library.

Adekunle, et al. [13] conducted a study on "attitudes of librarian in selected Nigerian Universities towards the use of ICT". While implementing ICT in the library depends largely on librarian's attitude towards it. The specific study highlighted the application of ICT has caused significant changes in the library sections such as automated cataloguing, circulation, information retrieval, electronic document delivery and CD-ROM databases. Using a descriptive method study concluded that training and knowledge are sine non of a positive attitude towards ICT. It is essential for librarians to keep up with the ICT development.

Krubu and **Osawaru [14]** carried out a survey research while on the impact of Information and Communication Technology in Nigerian University Libraries. The study elicits the impact of the use of ICT resources for the information and storage retrieval, CD-ROM, online databases and the internet. The purpose of the survey was to ascertain the level of automation; to determine the ICT usefulness of resources; the effectiveness of ICT resources; the required skills in using ICT resources and the factors militating against the effective use of ICT. The data was collected through questionnaire technique. After deriving tables and percentage were used to analyze the data collected. Finally, the study revealed that ICT has an enormous impact based on its effectiveness. Inadequate training and retraining of staff by management; inadequate funding epileptic power supply and lack of search skills are the major powerful factors against the effective use of ICT in Nigerian University Libraries. Amongst others, inadequate funding, capacity building, regular power supply were recommended.

Dulle et al. [15] conducted a study on application of Information Technology for research in Tanzania: feedback from Agricultural Research. The study intended to evaluate agricultural researcher's access to information technology facilities and extent of use of such facilities. Using questionnaire method from 13 Research Centers throughout Tanzania selected randomly and data collected accordingly. The researcher concluded that along with a low level of IT Development in the country, the available IT facilities were been fully developed to facilitate agricultural researcher's access to information some measures to promote IT infrastructure and its use for improvements of research productivity were recommended.

Aderibigbe and Emmanuel [16] conducted a survey on use of library information technology resources by graduate students of university of Agriculture in Abeokuta, Nigeria. Based on six research questions have translated into the objectives of the study and attempted to provide answers to these questions. 32 departments in the eight colleges of the institutions were covered from the University of Agriculture, Abeokuta in Ogun state of Nigeria. A total of 918 population of student's category were selected randomly for the study. The study was confined on the use and awareness of IT resources in the library, frequency and usefulness of IT resources. Finally, the study concluded that the majority of the respondent are quite aware of the

availability of the IT resources in the university library and understand the potentials of each and that they consider the resources useful to their academic activities.

Oduwole [17] conducted an excellent research study on 'Impact of Internet use on Agricultural Research Outputs in Nigerian Universities of Agriculture'. Research were carried out to examine the utilization of internet facilities and its impact on the research outputs of agricultural scientist at the University of Agriculture, Abeokuta, Nigeria during academic session of the year 2001- 2002. The survey methods were used. The response rate was 70 %. Lastly, the study was concluded with certain observations. These observations are a) the 54 % of the agricultural researchers at the university use the 'yahoo' search engine and they spend an average one hour per day browsing the Internet. b) Respondents use the internet to find research material such as journals and conference proceedings, followed by sending and receiving of 'electronic mails' and c) The use of the internet for academic research by Agricultural scientist has improved their research output. The author recommended the training of scientist in information searching and retrieval skills.

Oduwole and Sowole [18] examined the 'utilization and impact of the Essential Electronic Agricultural Database (TEEAL)' at Nigeria University of Agricultural Library, Abeokuta, Nigeria. The objectives were fulfilled while concluding the study. The specific objectives were formulated as: a) to determine the accessibility of TEEAL at UNAAB b) to ascertain the categories of users of TAAAL at UNAAD c) to find out the effect of TEEAL on library services d) benefit for users of TEEAL and e) to identify the problems encountered while utilizing TEEAL in UNAB. Finally, the study was concluded with a couple of major findings. These findings are: Postgraduate and final year undergraduates are the major users of the TEEAL database. The study also revealed that though most of the users are computer literate, they still seek the help of library staff for the database searching. The major constraints to the use of the TEEAL database include the high cost of printing of selected papers and the limited number of computers.

Angello and **Wema [19]** conducted a research to investigate the accessibility and use of e-resources in Tanzania. The methodology adopted for the study was survey in which questionnaires, interviews and observations were used in the

collection of the data. A total of 50 respondents participated in the study. Finally, the study revealed that Livestock Research Institutes in Tanzania had very few e-resources for their researchers. The most of livestock researchers were not aware of the most of the e-resources available in their research work area.

Oyewusi and oyeboade [20] conducted an empirical study on accessibility and use of library resources by scholars and users in a Nigerian state university of technology**.** However, one of the faculties of agricultural sciences has been identified among other departments. The objectives of the study were to investigate the accessibility and use of library resources, perceptions, satisfaction and source of information by the user. The survey method was adopted to operate the research. In a particular year, daily and monthly statistics were collected. The daily 286 students used to visit**,** and 1430 uses the library per week during the off pick period. The questionnaire were randomly distributed and obtained the reaction, opinion and analyzed. The study was concluded followed by certain recommendations. Significantly the use of electronic resources like internet is gaining wide recognition among Nigerian University users whereas printed library resources occupy an important position in the academic environment

Sani and Tiamiyu [21] evaluated the status of automated information services in selected Nigerian Universities. The identification of the progress, prospects and constraints to the technological transformation of Nigerian Universities as the basis of strategic recommendations to the different stakeholder in university education. The survey method was used and supported by three complementary methods such as questionnaire, interview and direct observation. The major conclusions were:
i) Individual Nigerian universities need to develop efficient intranet and local databases for pooling and sharing their local information services. ii) They need to promote the widespread and effective use of the automated systems and services by their teachers and students in teaching, learning and research. iii) They must provide the adequate fund for operational strategies for sustainable development of automated systems and services.

Toffler [22] predicted the violence, wealth, knowledge and its roles in the human life. Author had field visits, interviews followed by his comment in the study on IT. The present power shift gives road map of "info-wars" of tomorrow and outlines a

new system of wealth creation based on individualism, innovation and information. Toffler identified the world division will arise not between East and West or North and South, but between the 'fast' and the 'slow' in the information fields. In the ICT environment, it is a fine prediction about the information and communication technology. Definitely this monograph has directed the survey how information the in society is shifting from one to another in every walk of life. The dominant role of information in the process of knowledge has been placed significantly.

Moran [23] highlighted panoramic view on National Agricultural Library comprising three U.S. National Libraries i.e. National Agricultural Library, National Library of Medicine and Library of Congress. The objectives were to provide better dissemination of information, more cohesiveness of cooperative efforts and a sharing of resources. Finally, the author has concluded the theoretical article that the future growth of the National Agricultural Library is oriented towards close cooperation with the entire agricultural community both on the national and international scene. Communication of agricultural information will utilize sophisticated automated programs, as well as traditional means. Therefore, this review article provides proper directions to the present study.

French [24] provided the study on the user needs and library services in agricultural sciences and suggested roles of librarians and information professionals while catering their information needs. The study examined the users of information in terms of their response seeking habits, their information needs and their response to library services. The term 'user' is employed to mean an agriculturist i.e. a scientist, a farmer, an extension agent, or any individual involved in agriculture or its product. Every information professional in the agricultural sciences should be concerned with the user who is responsible for the application of information to the practice of agriculture or science. This review focuses into three sections. These sections are: a) complete interconnection b) independence and c) intercom which is between user and information professionals. First, the profile of users of agricultural information: about them, their habits of library usage, and the issues and challenges involved. The second review deals with the trends in agriculture and information delivery. This review of research are confined to Ph. D students, postgraduate, research scholars, faculty members, extension specialists, agricultural staff and other research scholars in the field of agriculture and allied subjects.

Russell and Pisa [25] contributed in the special issue of 'Library Trend' on agricultural libraries and information. The area on acquisition, management and dissemination of agricultural information, and infrastructure used while discharging the same. The author had published the following outputs of the study. These are: i) provided an overview of what we know today, how we came to know it, and where that knowledge is documented in the literature or on human resources. ii) Identify established and emerging trends, resources as well as the convergence of trends and highlighted some of the basics **t**hat are on solutions to library and information problems.

Talab and **Tajafari [26]** conducted survey to identify and compares the impact of ICT on training of library human resources in two university libraries from in India and Iran. Study concluded that ICT training program for library staff in Indian and Iranian university libraries is inadequate. Regular ICT training program must be initiated for library human resources to keep up with ICT rapid development on-the-job training and workshop / seminar are most preferred modes of training. ICT training for library staff needs strong support from policy makers / managers.

Sife and Chilimo, **[27]** provided the effectiveness of Sokoine National Library (SNAL) while disseminating veterinary information. Improving the quality of library and information service has been preoccupation of information professionals and librarians for long time. Library assessment is one of the techniques that help to understand existing strengths and weaknesses, services and activities to effectively meet the information needs of the Patron. The conclusions were: i) Variety of electronic information resources that found at SNAL. These resources have a wide converge of veterinary related information that generally matches with the information needs of veterinary scientist of SUA. ii) Most of the resources are not used to their full potential due to a lack of awareness of the available resources, lack of information search skills, unreliable internet connection, and inadequate guidance from librarians, inadequate computers, and frequent power cuts.iii) Most of e-resources at SNAL are not used either not updated periodically or not sustainable mainly due to lack of funds and iv) Libraries devised effective methods to ensure that the available e-resources are fully utilized by patrons**.** They also overcome the challenge of donor dependence to ensure the sustainability of e-resources in libraries and universities in general.

2.2 Literature Search National Scenario:

Sinha [28] conducted user survey on ICT literacy and awareness amongst university and college teachers of North Eastern Region of India. The ICT literacy and awareness was evaluated of the participants of Refresher Course on Humanities conducted by Assam University, Silchar and other teacher of Assam University, Silchar. A self designed questionnaire comprising 23 questions was distributed amongst the randomly selected samples and was analyzed using SPSS software. For data analysis percentage techniques was adopted. A total 60 questionnaires were distributed and 45 respondents responded. The objectives of study were: i) to examine the status, awareness, period of use of ICT, skills of teacher, and ii) to evaluate the facilities of ICT, availability of computers and to examine the various suggestions for the improvement.

A single hypothesis was formulated viz: 'all the participants may not be well aware of using ICT'. The several suggestions and recommendations were made for improvement of ICT training to college, university teachers and scholars as well. The study concluded that it was observed that the college and university teachers had keen interest and positive attitudes towards learning ICT and applying it for classroom teaching-learning process.

There is a need for imparting appropriate training and awareness programmes for the faculty members by the respective library and information centers for the effective utilization of e-resources available under UGC-INFONET Digital library Consortium of INFLIBNET. Now the facilities of access to e-resources (e-journals and databases) are available to over 6000 colleges of India for the advancement of academics and research amongst the college and university teachers. Therefore, the role of LIS professional is crucial and challenging for optimum utilization of the resources under UGC-INFONET programs. The ICT is a boon for us if it is used properly for the benefit of the professionals, in particular and for the society in general.

Tiwari and **Sahoo [29]** Survey attempted to find out the real scenario of university libraries of MP as regards to its infrastructure, use of problems to develop and maintain the ICT in libraries, communication facilities, collection, hardware, software, networking infrastructure, house keeping operations, user services, training

and problem areas of university libraries. Survey method has been used in this study and concluded that university library of MP are in developing stage in its infrastructure and use of ICT. Lack of planning and supervision and frequent change in ICT are the basic hurdles in successful development of ICT.

Agrawal and Singh [30] carried out a study on application of ICT in academic libraries of Banaras Hindu University Library Systems. Detailed discussion made on library automation, digitization, e-resources and electronic resources services. The study examines the impact of Information and Communication Technology. The primary data has used from personal experience, observation, examination of visitors; record of circulation, websites and discussion with colleagues etc. The theoretical discussion dealt with computerized holdings, network activities, library services, internet facilities, online journals and databases, electronic services for visually impaired, digitization of manuscript and rare books, and problems encountered while using ICT application in academic environment. The study proposed a plan for the improvement the library networking for better access of the digital records.

The study concluded that significant development in the use of ICT in the BHU library system has been seen but a lot of things needed to be done in order to match the library of its stature. Implementation of ICT in library operations is very complex, stressful and continuous process. Most of the libraries are not following a systematic plan in using ICT. It requires and imaginative, intelligent planning and huge investment of fund including the skilled human resources.

Gopal [31] provided the detailed account of technology oriented topics such as impact of ICT in libraries, role of libraries in digital age, analysis of digital information services; digital archiving digital preservation, digital electronic libraries trends and copyright issues followed by comprehensive bibliography and indices definitely this monograph is helpful to enhance the quality of present study for cost effectiveness while participating in the network oriented world. It enables users to understand the process of electronic dissemination of information, impact of internet, changing responsibilities of library professionals, new paradigm for evaluating information and characteristics and functions of library.

Vishakhi [32] provided an overview of agricultural information, management, information and communication role in libraries, emerging technologies for library automation and analysis and impact studies in a nutshell. A total of 30 research articles / papers gives insight of the electronic media as well as covering area of ICT in the field of agriculture libraries under the title of 'Knowledge Management: Issues and Strategies'.

Biradar, Kumar and Mahesh. **[33]** provided a case study to know the extent of usage of agricultural information sources and ICT tools, and services in Agricultural Science College at Shimoga. The specific objectives of the study were to examine and identify the information sources, purpose and frequencies and to assess the usefulness of agriculture sciences periodicals and services provided by university libraries.

The study concluded that the frequency of use of library literature sources is very low, the lack of awareness while use of these resources and e-consortia approach. The need of establishing e-consortia models among the agriculture libraries in India and also information literacy programs were highlighted.

Pathania [34], conducted research on user studies, in Dr. Y.S. Parmer University of Horticulture and Forestry, Nauni, Solan (Himachal Pradesh) and Association of Agricultural Librarians and Documentalists of India (AALDI). The application of ICT in libraries has provided great opportunities for e-resources distributed them the way user preferred. Modern libraries are now adopting various e-resources for its collection development in a better way and the users are accessing these resources in this digital environment. The overview of the literature sources presented above, clearly takes a step into the direction for the execution of the present survey. The user community are selected, identified and evaluated their information preferences, habits, their information needs and their opinion about the usage of ICT in agricultural university libraries in Western part of the country. However, it is the emergence of two concepts that is use of ICT, Agricultural University directed by the proactive library professionals and information centers that will result in the growth and success of usage of ICT. There is no doubt that ICT will be a vital link in these effects.

Thus, the above review is fairly comprehensive. The review has adequately provided a strong sense of foundation, structure, direction and support to the investigator while undertaking the present research survey. The objectives are to some extent identical with those of the present research survey.

Kameswari, Kishore and Gupta[35] provides descriptive study on the availability, use and information seeking behavior of a farming community with specific reference to ICTs. The objective was public extension services in the area are limited by harsh climatic conditions; disperse habitation and high male migration. Therefore, study was concluded to examine the relevance of ICTs to the farming community and to explore ways of integrity ICTs with the existing public extension system. The new ICTs, mobile phones were widely available in the study area but were mostly being used for post sale inquiry rather than price negotiation, accessing market or price information or increasing production efficiency.

Sharma and Gupta [36] executed a survey on information seeking behavior of faculty members of Sher-e-Kashmir University of Agricultural Science and Technology, Jammu, India in the Internet era. The authors highlighted the advancement of information and communication technologies and the fullness of extent of use of the same. The data was collected by using a questionnaire technique from 83 faculty member in faculty of agriculture and veterinary sciences. Based on three research questions, six objectives were formulated to derive the conclusion. The study was develop to help to design an outline of effectively exploit the usage of online information resources effectively. The distribution of respondent according to faculty, gender, status, age and experience was analyzed using T - test grouping for co-relations of library analysis. Finally, study was concluded with several suggestions. All the faculty members have availability of computers with internet connections in there departments. The e-mail is the most often used service of internet at home. Internet is used almost on daily basis of most of them. Faculty members use internet primarily for having latest information of the subject and then for their own research purpose.

Alha [37] carried out a study on 'automation of the Central Institute of Agricultural Engineering (CIAE), Library an account of practical experience'. The study attempted to describe the activities of the CIAE library as a modernized information center using information technology. All the resources available in the

library namely: books, technical reports, conference proceedings, bound volumes, standards; annual reports, etc. have been computerized using library automation software. The study concluded that the automation has resulted in added efficiency and effectiveness of library services.

Ansari and Ansari [38] conducted study of use of Internet by faculty members of Aligarh Muslim University in India. The aim of the study was to find out the utilization of Internet Services by the above mentioned users groups of university. The objectives of the study were: i) to ascertain and to know the purpose of Using Internet and Internet Services. ii) To find out the most frequently used search engines used by the faculty members and to determine the different search facilities used by the faculty members, and iii) To examine the problem faced by the faculty members at the time of using various Internet Services and to study how many faculty members have attended training program.

In order to achieve these above objectives, using questionnaire method, data were tabulated and illustrated while presenting the information obtained. The study concluded that faculty members to produce quality papers particularly in internationally reputed journals. Now, if the present data is viewed against this backdrop, much is still needed to be done to develop IT infrastructure to enhance the usage of internet for more productive purpose. Undoubtedly, the university has been making improvements in IT infrastructure. As a result, very recently the bandwidth used for campus wide Network has been increased with the present infrastructure and facilities.

Chatterjee and Gupta [39] carried out a study on use of Internet by the Agricultural Research in Bidhan Chandra Krishi Vishwavidyalaya. The base of case study was information seeking behavior, Internet use and Search engines used by the user community. The need of the study was to find out trend of use of internet by the researchers in BCKV and frequency of use. The problem faced by researchers for assessing required information different information seeking confederation associated with web resources. The objectives of the study were: to know the researcher's awareness, frequency, reasons, and mode of action while using internet. The study was concluded that the nation to boost of agricultural production with proper linkages of communication of research findings to the targeted user to maximize their output.

Scientists and Scholars were capable of generating knowledge and transmitting the research output. Use of internet will be assessed for proper planning and policy making of agricultural libraries while rendering effective and efficient services. It is essential to implement technologies which provide opportunities to build knowledge centre.

Rajput and Ansari [40] conducted study on Internet use pattern among undergraduate agriculture students of Pantnagar. The study covered the following specific objectives: a) To find out the accessibility of internet to students, b) To find out the extent of internet use by the students and c) To study the purpose of Internet use. The data was collected through self administered structured questionnaire specifically developed for the study. A sample of 100 Undergraduates agriculture students, 25 students from each year was drawn. The data collected was tabulated and analyzed using appropriate statistical measures. Furthermore, the study concluded that the existing scenario regarding student's access, ability and pattern of internet use in a premier state agricultural university which has been awarded " Best Agriculture Institution Award " by the ICAR twice in a span of ten years.

However, there is no satisfaction. There may be several reasons for this situation: lack of ICT infrastructure, poor perceptions of ICT's potential among the academics and lack of motivation on part of teachers. There is an urgent need for appropriate ICT infrastructure which will motivate the students as well as teachers to make use of it for educational purpose. Besides the teachers also need to be trained in the use of ICTs so that they can combine it with the pedagogy of institution needs to be increased on priority basis to realize the true potential of ICTs and meet the increasing demand for educational services.

Further, there is a need to undertake such studies across other agricultural universities to know the existing situations. Besides, a similar study among university teachers needs to be undertaken. Such studies would help the university administration to plan and organize the ICT facilities to improve the academic environment in the university and enhance the quality of education being provided. This will ultimately lead to upscale the quality of university students and prepare them for better employment opportunities.

Das and **Basu [41]** surveyed a use of Internet by the student of Bidhan Chandra Krishi Vishwavidyalaya, Kolkota, West Bengal. Using a standard questionnaire method authors collected data from 104 students consisting of 34 under graduate, 39 post graduate and 31 PhD level students were selected randomly. The data have been analyzed by using probability proportional to size sampling technique. Using SPSS software data has been presented and interpreted accordingly. Finally, study concluded that the internet has a wide range of users for the students and researchers in the field of agriculture. However, from Chi-quare analysis no significant difference regarding library exposure has been observed among the students with different levels of educational qualification.

Kumar and Shukla [42] highlighted a study using questionnaire method on use of internet among the research scholars of the faculty of science, university of Allahabad. The study considered as a specific case study of 60 questionnaires distributed among the research scholars selected conveniently from the faculty of science. Data were thus collected, tabulated and analyzed by using statistical technique, findings and conclusions were drawn. The use of computers in information storage, retrieval and dissemination need to be popularized by university to facilitate access to the global information.

Kannappanavar and **Swamy [43]** provide important study on user education program in agricultural science university libraries in India with special reference to South India. The objectives of the study were to know the user perception and opinion and evaluate the user education in agricultural university libraries. The significant result of the study was presented. Agricultural university libraries under the study are in the initial stage of development. Modern technologies in the libraries are now being utilized to satisfy the information need of the users. The staff working in these libraries needs training and exposure to new technologies available at national and international levels.

Ongus and **Kemparaju [44]** provided an overview on the techno stress and technophobia in agricultural libraries of developing countries, especially experiences of Kenya and Karnataka state in India was assessed. The techno-stress while using computer and technophobia such as fear, dislike or resistance were considered for study. The study was concluded with following remarks:

i) The library management should formulate and implement comprehensive policies in which the training of library staff and users features prominently and gets the seriousness it deserves. Well structured training programs in IT should be provided, not only to professional staff but to paraprofessional staff and other users as well. It is imperative to extend the training opportunities to distinctive batches of stakeholders so that everyone gets an equitable chance to improve their knowledge and skills incrementally.

ii) Knowledgeable resource persons should be engaged to conduct the training programs. They should be comfortable in handling the IT facilities. They should be patient, calm, clear, compassionate, reassuring and very open to questions.

iii) Plenty of hands-on experience should be encouraged. It is important to learn technology by playing with it. Initially, simple computer games could come in handy to build the required level of confidence. Novices should be allowed ample time to commit mistakes repeatedly while practically handling the technology in order to learn from errors and get rid of existing fears in non evaluative environment.

iv) The learning modules should be kept short and precise, particularly when prepared with technophobes in mind. Not too much technical expertise should be required to the users to navigate through or learn. Small sessions are more appealing and take less time to complete.

v) The training programs should culminate in the solution of simulated information seeking problems that are as closed to real life as possible. This way the library staff and users would be able to easily concretize the concepts taught and appreciate IT facilities as helpful tools design for their own benefit.

vi) In the long term, the libraries concerned should consider hiring suitably qualified Systems librarians to manage IT facilities, design ergonomic work flows, install efficient computer - based information systems and develop effective IT strategies thereby reducing stress level in the staff and users alike.

vii) The libraries should engage the services of qualified Web Development Librarians in order to develop websites and maintain web content that appeal to their respective clientele. They ought to be able to adhere to international

standards as stipulated by the World Wide Web Consortium (W3C). In addition, they should be able to incorporate internationally acclaimed standards when developing web- based applications for their respective libraries, and

viii) The libraries should join up with other libraries having similar interest and form consortia in order to ease resource sharing and cooperative acquisition of information resources in electronic form.

Kannappanvar and **Vijay Kumar [45]** conducted and studied the use of IT in University of Agricultural Science Libraries of Karnataka, namely University of Agricultural Sciences Library, Dharwad and University of Agricultural Sciences Library, Bangalore. The collection, computer facilities, hardware and software facilities, library services, databases, IT applications were analyzed. The survey concluded that though the program was meant for serving the information needs of academicians, the output have not reached the academic community due to non -access of the INFLIBNET programs apart from this there are many network facilities available at national and international levels, which are not accessed by the libraries. This is mainly due to the lack of adequate training and financial assistance. To overcome this, the librarians should approach the university authorities and train the library personnel on IT application. The university librarians should also approach the funding agencies like INFLIBNET and ICAR for their library automation and provide IT-based information services to their clients.

Dorothy [46] submitted a report on ICAR Institutes and Agricultural Universities. The specific terms of reference of the report were to survey and investigate 24 ICAR Institutions and eight Agricultural Universities in India. Developments in the new agricultural research institutions and universities in India during 1960s created new pressures for the improvement of libraries serving the needs of agricultural research, education and extension. At the request of the Directors of different institutions of ICAR, it was agreed in May 1967, to sponsor a review of existing library facilities then existing. To do this, a group of American and Indian Librarians was invited to conduct a survey and make recommendations for the improvement of 24 libraries of ICAR Institutes and eight agricultural universities. Finally, the team submitted its report and offered 69 recommendations with regards to different aspects of agricultural library services, such as ICAR library and

Documentation program, Indian National Agricultural Library, etc., to give leadership and direction to agricultural libraries in India.

The significant recommendations are as under.

i. The ICAR create a new Directorate to administer and direct an integrated program for the libraries, Deputy Director General (DDG) (Library and Documentation Services) be created and that the appointee possesses the highest qualifications of leadership, administrative ability, prestige as a scientist and research worker, pleasing personality, dynamism, tact, imagination, vision and persuasion. His salary should be at least equal to that of the other ICAR DDGs. ii.

The DDG (Library and Documentation Services) also should serve as the Director of the new Indian National Agricultural Library. The ICAR should prepare a written statement of its library including its policies, objectives, functions and administration and that this be disseminated to agricultural institute and university administrators and Librarians under the direction of the library advisor. The library extension service should include the circulation of a small group of titles of interest to the clientele including recent advances in a agriculture as well as general reading materials, also clippings, pamphlets and other ephemeral materials on subjects of current interest.

iii. A foreign, experienced, librarian be made advisor to the ICAR who will serve as a consultant and coordinator of library affairs for at least eighteen months until the future ICAR DDG (Library and Documentation Services). Director of the Indian National Agricultural Library can assume the position. The foreign advisor would function as a liaison officer between the ICAR, its institutes and agricultural universities in order to put into effect as quickly as possible ICAR's projects for library development. The libraries of Indian veterinary Research Institute (NRI), Izatnagar and Mukteswar, and the National Dairy Research Institute (NDRI), Karnal, be officially designed as the Indian National Veterinary Science Library (INVSL) and Indian National Dairy Science Library (INDSL), respectively as affiliates as, and under the guidance and direction of the Director of the INAL. The three units (INAL, INVSL and INDSL) of the Indian National Agricultural Library are designated as a national repository to acquire and maintain the less commonly used materials which will be available to all through photo copies or inter library loans.

iv. The position of Director of the Indian National Agricultural Library should be created.

v. Each library should have a Librarian as the director who is as highly qualified and competent in his field and an adequate number of highly competent professional Librarians and their assistants.

vi. Each library be given the status of a department equal to that of any other department of the institution to which it belongs and each agricultural library be considered as a special library dedicated to the service of agricultural education, research and extension.

vii. Each library has a clear, written statement of its purpose, function and policies within the frame work of the objectives of the institutions and the ICAR assist the Institute libraries in the acquisition of basic collections of agriculture that are needed for each institute.

viii. Each library collection be carefully selected to serve the needs of its clientele that a plan for shaping the collection and standards for the collection be based mainly upon the needs of the users and the ICAR take initiative in establishing uniform procedures for; acquisition of necessary foreign books and journals; book dealers rates; foreign exchange, and rapid delivery of acquisitions. The ICAR assist in providing incentives and stimulate library employees to greater achievement and advancement wherever possible and essential, longer opening hours (up to twelve hours) and holiday opening be encouraged and adequate staff provided.

This report is considered as vision document of ICAR Institutions and Agricultural University Libraries.

Kannappanvar and Swamy [47] evaluated user perception of LIS in Agricultural Sciences Universities in South India. The hypotheses were formulated and tested that there were significant relationship among the opinions of the post graduate students, research scholars, and faculty members towards the purpose of using the library. For this, the survey method was adopted. The study was based on theoretical as well as experimental data. The study concluded that the information needs to be enlightened and rational and to make quick and correct decisions to improve rural life. The nature of information services provided by the agricultural

university libraries vary from one to another, owing to the range of interest of the user community. Modern technologies in the libraries are now being used to satisfy the information need of users. The people working in these libraries need training and exposure to new technologies. There is a need to develop the culture of interlibrary loan services and electronic transmission of documents. Database of theses, journal articles, and library catalogues must be made available to users.

Gopinath and **Nair [48]** evaluated the effectiveness of Kerala Agricultural University Library and Information Systems (KAULIS) in meeting the growing demands for Information Services. The Agricultural Libraries play a crucial role in ensuring the effective flow of information and data to researchers and agriculturists. The objectives of the study were to know the effectiveness of library collection and services as well as satisfaction about the user education program, and to know the understanding of the user's satisfaction regarding library equipment and physical facilities. Using survey method, data were collected with the questionnaire, interview supported with observation. The major conclusions were: i) Information needs and expectations of library users is continuously changing information scenario. Library should reorient its collection, services and facilities to keep pace with this advancement. A shift to a user oriented approach is quite evident from the recent library evaluation studies and ii) User's feedback is considered as more reliable factor while measuring utility and effectiveness of any library. The factors that influence the perceptions of library effectiveness are closely interdependent with user's satisfaction. The concentration on or putting too much emphasis on a particular type of collection service or facilities may not lead to improve the library effectiveness.

Singh [49] attempted a survey of graduate student's knowledge on use of various library and learning resources and their retrieval skills, attitude as to how they informed themselves of the latest development in their subjects of G.B. Pant university of Agriculture and Technology, Pantnagar. Survey was made before the commencement of one credit course on user education and information literacy. Data were collected with the help of brief questionnaire circulated to graduate students. The study revealed that there were notable gaps and digital divide among students and suggested that teaching of credit bearing information literacy courses should be made compulsory to enhance graduate students knowledge and information retrieval skills.

Kumar and Hussain [50] conducted user survey on identification of qualitative services provided by Sardar Vallabh Bhai Patel University of Agriculture and Technology. The objectives of the study were: i) to identify the category of users and nature of use of information at the Sardar Vallabh Bhai Patel University of Agriculture and Technology, Meerut Central Library. ii) To identify the levels of use of the various services provided. iii) To evaluate the accessibility usefulness and retrieval of information by users. iv) To identify the problem associated with such services and v) To access the strengths and weakness of the existing library, recommend a mechanism to improve information dissemination to researchers.

In order to achieve these above objectives, questionnaire and interview method of research were adopted. The major conclusions were: i) Library professionals should be familiar with the concerned subject, current trends of research and development activities in the domain of agricultural services. ii) Users should be trained in seeking agriculture sciences information and introduced with new aspects of information. Most of the users suggested that library should be computerized and local area network (LAN), software, hardware and networking technique should be established at an early date by the library.

Perumalsamy [51] described the role of Agricultural University Library with a view to developing a Network of Agricultural Universities Libraries. The main objectives were: i) To promote and sharing of resources among the Agricultural University Libraries in India by developing a network of Libraries by collecting, sharing & disseminating information. ii) To offer and establish guidance to the member libraries and coordinate efforts for suitable collection development and referral centre while using E- mail. iii) To coordinate the national and international networks for exchange of information and documents and brought out publication for sharing information.

Finally, the author concluded the study with the following recommendations.
i) The library authorities should formulate their requirements for computerization of their libraries. ICAR should render financial support to each such library service, who has not got introduced to computer facilities with National Agricultural Library and Information Network are essential. ii) The National Agricultural Library is a must for

our nation and should be established at the earliest possible time. The IARI library must be recognized as the National Agricultural Library.

Kannappanavar and Kumar [52] evaluated the training programs pertaining to library and information science professionals and their effectiveness in selected Agricultural Science Libraries in India. Agricultural libraries have been partially computerized and information stored in digital format. Study revealed that workshops organized were generally designed to provide practical training on IT applications, but they are not assessing the training needs of library professionals.

Sharma [53] had provided the detailed account of 'Information Generation and its use by Agricultural Scientists: A Critical Study'. It closely examined the agricultural information, its nature, generation and use by agricultural scientists. It also shows the different important factors, etc**.** position, age, sex, educational qualifications, professional training working environment, experiences and area of interest and research and the membership of professional bodies to which they are attached. The whole book is organized in five chapters specifically the summary and conclusions are very much related to the present work in hand.

Mathew and **Baby [54]** conducted a research on developing technology skills for academic librarians in the university in Kerala. The purpose of the study was to analyze the skills and awareness of library professionals in an electronic environment and offered suggestions to improve the knowledge and skills of library professionals. Using questionnaire method data was obtained from library professionals employed in the central and departmental libraries of the seven major universities in Kerala. The data were analyzed using excel package. The professionals were asked to specify their awareness or skills in the use of various technological devices including computer hardware, mobile technology, digital camera, leaser printer, scanner and the like. Suggestions were given for updating knowledge and skills of library professionals. The study ended with the conclusion summarized as library professionals are moderately skilled in various technologies and applications, but the awareness level was low in the case of emerging web tools and services and to organize training program and workshops to equip the professionals with the required skills in modern technologies.

Singh [55] conducted a study on information seeking behavior of agricultural scientist working in the ICAR Institutions of Delhi and Punjab Agricultural University, Ludhiana. The information use, satisfaction and difficulties of the scientists were analyzed. The survey result indicates that the lack of time is a common problem faced by the majority of the agricultural scientists followed by the scattering of information in diversified sources and inadequacy of resources in libraries.

Sharma et al. [56] examined the use of Electronic information resources by Research Scholars and P.G. Students at Punjab University, Chandigarh. The questionnaire method was adopted and elaborated the various aspects of Electronic Information Resources (EIR) use, impact and frequency. The objectives formulated for the study were to study the use of Electronic Information Resources, preferences and the Impact of electronic information resources on science research scholars and post graduate students as well as to find out the problem in accessing electronic information resources. The major findings were: most of the researchers and Post Graduate students under the age group 22-27 years. The gender group of users of 61.33% of males and 38.67% of females utilizing electronic resources while using electronic information resources.100% researchers of science and PG students they 90% said use of electronic information resources. It has a positive and 6.83% negative impact on their study.

Kumar and Sharma [57] evaluated the use of Electronic Resources at Punjab Agricultural University Library. The objectives of the study were: a) to find out the most used e-resources b) to identify the use, acceptance and impact of e- resources in teaching, research and educational activities. c) to know the satisfaction derived by users while using e-resources. d) To know the problems faced by users in accessing electronic information. e) To ascertain the training needs of users in accessing e-resources

f) to suggest the ways and means for improvement in effective use of e-resources. While achieving the objectives, a representative sample of 5 % size out of a population of 1300 was studied by using questionnaire method data were collected. 68 questionnaires obtained out of 80 respondents which come out to be 85 % response rate. The study concluded that e-resources have changed the information seeking and dissemination patterns. The r-resources are capable of providing most recent, relevant

and authentic information. These are widely accepted by all the category of users for one purpose or another like teaching, publishing, research and information.

Pattanaik and Parida [58] carried out study on information needs and seeking pattern of users of Orissa University of Agriculture and Technology, Bhubaneswar. The objectives of the study were: i) to identify the purpose of seeking information nature, pattern of information, information needs and resources utilized by the agricultural university libraries. ii) To assess the extent of their awareness and to examine the limitations of the existing library facilities and services. iii) To study the methodology adopted by them for locating information sources and types of publications and time spent for various activities. iv) To find out the usefulness of collection and evaluate the user behaviors patterns as well as to minimize the cost involved in acquiring, using by them.

The study revealed that the faculty members are motivated for seeking information by multiple motives, though the degree of motivation varies from motive to motive in terms relative importance of these motives, lecture preparation made the highest contribution followed by the professional need, career development etc. The use of formal sources of information, journals are optimally utilized followed by books, hand books, conference literature etc., whereas face to face discussions occupy the prime position succeeded by personal experience, seminar, or conference in terms of relative degree of use, as far as informal sources are concerned.

Singh and Satya [59] conducted research study on information seeking behavior of agricultural scientist with particular reference to their information seeking strategies. The ICAR institutions of Delhi and Punjab Agricultural University, Ludhiana were selected for the study. The specific objectives were: to identify and examine the different sources of information, strategies and the effectiveness of information resources used by the agricultural scientists. The study concluded that the working culture of the individual needing information, the importance placed on getting it, the facilities, the available for seeking it, the knowledge about these facilities, the judgment of their value, and the probability of getting what is wanted are the factors that may affect information seeking behavior. ICT is generally considered the buzz word of today's IT word. It has changed the society into information society and our way of life. ICT's convergence of computer and

communication technology makes processing, storage and its retrieval very faster instant and effective.

Online **user survey** was carried out by **The Indira Gandhi Agricultural University [60]** at the Nehru Library to assess the impact of NATP support. The area of survey was categorized in five different heads. These heads are: i) Foreign Journals ii) CD-ROM iii) Internet facility iv) Modernization of library and v) Suggestions. The study concluded that journals helped them in updating their knowledge base and gives them a new direction for their future research. With an increase international journals almost six times, scientists are able to consult the latest information and it reduced their dependency on other libraries. The new arrivals saved the valuable time of scientists as most of the materials are locally made available in the university library.

The project facilitated in improving the electronic information sources on agriculture, which made it possible to consult the abstracts locally in the library. This has saved the time and economy of scientists and researchers. Regular training at frequent intervals was organized to scientists, research associates and students to train them to access the electronic information on CD-ROM. Three technical person of library had taken training organized at INFLIBNET, Ahmadabad; the whole library is centrally automated and connected through LAN and Internet. This centre is highly useful as it provides the information in quickest possible time. Facilities have significantly improved by the receiving / procuring latest model fast photocopier machine.

Nath [61] Attempted to describe a survey of the use of information resources by the research scholars as the users of Punjab Agriculture University Library, Ludhiana. Using a questionnaire method author has identified the impression of research scholars towards the awareness of library services, adequacy of library resources and their views on library services. Finally, the study examined the satisfaction level of users about Internet, CD-ROM databases, online databases, e-resources and services provided by the library.

Ram [62] conducted a study on problems and the needs of the users of University Libraries of Agra and also the Dr. Babasaheb Bhimrao Ramji Ambedkar University and Dayalbagh Educational Institute (DEI), University Libraries. Using questionnaire method 200 users of concerned libraries were surveyed. The users view

on libraries information products and services and their attitudes towards the services offered by these University Libraries, which they are using their information needs. Finally, the recommendations and suggestions were given to the concern university libraries to improve the services.

Dabas et al. [63] had provided a review an audit of the present scenario of library automation in nine University libraries in Punjab, Haryana and Chandigarh. The study highlighted the meaning, need, main considerations, rational, main components and domain of the library automation in the context of university libraries. The study throws light on the availability of hardware and software in respective libraries and examines types and forms of library collection. It also focuses on home keeping operations i.e. acquisition, technical processing, circulation, serial management, financial management services, library administration, CD-ROM and networking infrastructure. Finally, study concluded that networking of university libraries will logically be extended to digitization of printed material in future.

Prodhani and **Gautam [64]** executed a study on Library Services in the Universities in North East India. The study deals with various services rendered by ten university libraries of North East India. These universities are Arunachal University (ARU), Itanagar, Assam Agricultural University, Jorhat, Assam University, Silchar, Central Agricultural University, Imphal, Manipur University, Imphal, Tezpur University, Tezpur and Tripura University, Agartala. The study shows that these university libraries provide many services based on traditional methods. Using a computer and e-mail facilities under the Inflibnet Project should help them to automate services for better user satisfaction.

Nair [65] executed a research on establishment of digital library to support agriculture education and extension in India. The study examines the problem of information / knowledge transfer in agricultural sector and how the already implemented technologically advances in hardware and data compressions procedure software implementation are utilized to pool information resources and to develop a national level digital library on agriculture. The study also stresses the role of digital librarian in massive digitization, storage, indexing, access search, coordination of management of universal information. How far an electronic library can help to attain efficient operation of fully integrated management of agricultural system is examined. The study concluded that digital library for agricultural research can enable access to

agricultural information not easily obtainable previously and an ability to record knowledge from agricultural sector.

Sharma, Singh and Singh. [66] Highlighted a specific study on digital library planning and designing a study with specific reference to Indian Institute of Soil Sciences. A digital library can disseminate its information across a network and facilitate quicker handling of information provided the user interface is easy to use. As such digital libraries are as important for communication and collaboration as it is for information seeking activities. The study concluded that the information technology field, the scenario of information science is changing at a very fast pace. Information nascent today may become absolute tomorrow. The access to right information at the right time is very essential and a new scenario also. Digital libraries are strictly following the five laws of Ranganathan.

Rathinasabapathy et al. [67] provided comprehensive study on the existing R & D information resource base and e-access culture of ICAR institutes / universities, etc., comparable to that existing in world leading institutions / organizations. ii) To develop and assess a Science Citation Index (SCI) faculty and impact of CeRA at Indian Agricultural Research Institute, New Delhi for evaluation of scientific publications. With this objective the study concluded that proper planning and implementation is absolutely necessary to ensure sustainable development of CeRA since all the library consortia were not successful. In the present study a couple of questions were asked and elicited information regarding the consortia.

Deshmukh [68] highlighted that research and communications are very closely linked. The Information and Communication needs in agricultural research have been dealt with the edited book of the author. The book devotes to the Information Systems for the Agricultural Sciences and Technology. This was the first Summer Institute of its kind in the history of Agricultural Universities in India. The main objectives of the Summer Institute were to communicate the latest information technology techniques and to update the professional competence of librarians and information scientists working in the Agricultural University Libraries and ICAR Institute Libraries in the country. Eminent scientists have contributed in this book on various topics of agricultural research.

Rokade [69] provided quite a useful book to the users of all faculties, agricultural library and information science and to state and central competitive examinitation entitled "Agricultural education and libraries in India". The entire book is divided into three major parts: a) Agriculture education in India; b) Agricultural University libraries in India, and c) Agricultural information system. The author has emphasized the importance of information services which are keys to the development of agriculture, agricultural education, research, extension education and agribusiness. The services are provided by the agricultural libraries for the better development of the users and country. However, the agricultural university libraries are catering to the needs of users.

Rokade and Rajyalaxmi [70] examined the evolution of electronic information services which clarify and enhance the understanding by the professionals by using survey method with the objectives to find out the various types of electronic information services and user information needs, electronic information services and INFLIBNET services provided by the agricultural university libraries in Maharashtra with special reference to university library of Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola. The data were obtained and presented in tabular formats while indicating the present status of infrastructure, human and financial resources, database in CD ROM form, information services, status of the use of information services, and users need. Lastly, the study concluded that electronic information services are preferred by the users to other types of services. But INFLIBNET, DELNET, ARISNET services are not available in three agricultural university libraries in Maharashtra except the MKV library, Parbhani. It is, therefore, recommended that the INFLIBNET should also include the Indian Council of Agricultural Research under its coverage and tries to provide electronic information services to all the agricultural university library users in India in collaboration with ICAR likewise**.**

Rokade and Rajyalaxmi [71] carried out a study on Integrated Information Systems in Agricultural University Libraries in Maharashtra in the context of digitization. Four universities were selected for the study namely, i) Mahatma Phule Krishi Vidyapeeth, Rahuri ii) Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola iii) Marathwada Krishi Vidyapeeth, Parbhani and iv) Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli.

The study concluded that nowadays the work and responsibility of the librarians have increased; every library has to modernize their operation to the newer challenges. The situation has changed where libraries cannot remain isolated. They can keep in touch with other libraries and therefore the development of integrated information systems in agricultural university libraries and other libraries will be useful in services to their users.

This comprehensive review of literature is pertinent and useful to the researcher for planning and right direction to carry out the present research study.

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Chapter III

GROWTH AND DEVELOPMENT OF AGRICULTURAL EDUCATION

3.1 Introduction:

The present chapter provides an in-depth understanding of the origin, growth and development of agricultural education in its historical perspectives. The global status of the agricultural education especially in United Kingdom (UK) and United States of America (USA) is presented in brief. The Indian scenario is also depicted with a landscape of ICAR, NARS, Department of Agricultural Research and Education (DARE), Government of India, and Agricultural Universities with special reference to western part of India.

Agriculture is the main occupation for livelihood of the people and raw material for industries. Agriculture has grown up gradually and helped the human being to enjoy the settled life from nomadic life. At the beginning, human being has developed the method of hunting the animals in search of food and further to collecting grass, seeds, fruits, roots and nuts from places where they grew in abundance. Thus, human being started to cultivate useful plants for his needs. Later explosion of population and the increased need for food and goods created an urge to increase the food production from land. Several scientific studies have been reported in the agriculture literature which can be considered as major studies in the agriculture field. The **table 3.1** is self explanatory to prove the point.

Table 3.1: Development of Agricultural Sciences since 1644 [1]

Sr. No.	Year	Name of the Scientist	Brief Achievements in Agriculture
1.	1644	Van Helmont	Water was the principal ingredient for plant growth in his famous experiment with tree in pot.
2.	1656	Glabuber	Found that salt-peter extracted from the cattle manure enhanced plant growth.
3.	1731	Jethro Tull	Conducted that plant food consists of fine soil particles.
4.	1761	Wallerius	Developed the theory that humus was the source of plant food and many people accepted it.
5.	1804	Theodore de Saussure	Established the phenomenon of respiration and photosynthesis.
6.	1834	J. B. Boussingault	Introduced the system of field study of grain and loss of nutrients.
7.	1840	Liebig	Established the mineral nutrition theory, first introduced super phosphate as manure.
8.	1843	Lawes and Bilbert	Established that legumes require a little nitrogen fertilizer
9.	1858	Lachmann	Found living micro-organisms in legume roots.
10.	1893	Beijerinck	Established the relationship between micro-organisms and nitrogen fixation
11.	1925	Sewall Wright	Founded Plant Genetics and Breeding
12	1928	Robert Backwell	Introduced Selective Breeding of livestock.
13	1968	Norman Borlaug	Father of Green Revolution High yield varieties of wheat
14	1971	G. Rangaswami	Pioneer work on Environmental Biology
15	1972	M.S. Swaminathan	Father of Green Revolution of India. (Developed first hybrid high yielding wheat and other crops)
16	1980	Datta S.K.	Founded Semi-drarf IR 36 Cross breeding
17	2010	Prabhu K.V.	Developed high yielding basmati rice variety

The significant contribution made by the scientists in the development of agricultural sciences has been juxtaposed in the above table. Nineteenth century was the period of major scientific development in the agriculture in most of the countries. It is emerged that agriculture is the oldest and the largest occupation in the world. It is evident from the available literature on the history of agriculture produced by eminent agricultural scientists Gras **[2]**, Randhawa **[3]**, Naik **[4],** Swaminathan **[5]** and

others. Therefore, agriculture has consistently playing a vital role in the economic and social development of the people. The pioneering institutes in the field of agricultural sciences are engaged in imparting education, training, research and extension activities. There are model farms established at Saidapet (Channai), Agricultural Research Institute at Pusa, Bihar, College of Agriculture, Pune, Allahabad Agricultural Institute, Allahabad, Agricultural College and Research Institute at Coimbatore and College of Agriculture, Nagpur.

3.2 Agricultural Education Global Scenario:

In the United Kingdom (UK), agricultural research and education was coordinated by the number of firms and statutory bodies engaged in the agricultural research. The chief among these was Rothamsted Experimental station which was founded in 1843 at Harpendent in Hertfordshire. This institute is the first pioneer institute which had made several landmarks in the development of agricultural research in the UK. In order to carry out agricultural research, the first agricultural college was established in England at Cinensceta in 1845.

In the United States of America (USA), some institutions had shown their interest in agricultural education. Those were the American Philosophical Society (1743), Philadelphia Society for Promotion of Agriculture (1785), and State Agricultural College (1853). The Act of the Congress (Morrill Act) signed by Abraham Lincoln on July 2, 1862 was a historic document in the evolution of agricultural education. It contained a provision for grants of land in the public domain to all the States and the union for the establishment of colleges to teach agriculture, mechanic arts and military training without excluding humanities or classics. The Land Grant College known as first college later became the Federal State Extension System. The first Director General of FAO of United Nations Norris E.Dodd formulated and designed agricultural education in the world. Presently, 15 international organizations imparting research under the umbrella of FAO. These institutions are provide training and research in the field of agriculture and allied subjects like tropical agriculture, cereals, food policy, improvement of maize and wheat, biodiversity, dry land, water management, forestry research, agro-forestry, fisheries and crop research (rice, potato) followed by the livestock research. The spread of agricultural education was furthered by the establishment of agricultural

schools in the early twentieth century. The **table 3.2** highlights the major international organizations working with the Consultative Group on International Agricultural Research (CGIAR).

Table 3.2: Research and Education Institutes / Centers in the World [6]

Sr. No.	Country	Est. Year	International Institutes	Website
1	Philippines	1960	International Rice Research Institute (IRRI)	www.irri.org
2	Mexico	1966	International Center for the Improvement of Maize and Wheat (CIMMYT)	www.simiyt.org
3	Columbia	1967	International Center for Tropical Agriculture. (CIAT)	www.ciat.cgiar.org
4	Nigeria	1967	International Institute of Tropical Agriculture (IITA)	www.iita.org
5	Kenya	1970	World Agro Forestry Centre (International Centre for Research in Agro Forestry) ICRAF	www.worldagroforestrycentre.org
6	Benin	1971	Africa Rice Center	www.africarice.org
7	Peru	1971	International Potato Center	www.cippotato.org
8	Malaysia	1971	World Fish Centre (International Center for Living Aquatic Resources Management) ICLARM	www.worldfishcentre.org
9	Syria	1972	International Center for Agricultural Research in the Dry Areas (ICARDA)	www.icarda.org
10	India	1972	International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	www.icrisat.org
11	Italy	1974	Biodiversity International	www.biodoversityinternational.org
12	USA	1975	International Food Policy Research Institute (IFPRI)	www.ifpri.org
13	Sri Lanka	1984	International Water Management Institute (IWMI)	www.iwmi.cgiari.org
14	Kenya	1985	International Livestock Research Institute (ILRI)	www.ilri.org
15	Indonesia	1992	Center for International Forestry Research (CIFOR)	www.cifor.cgiari.org

3.3 Agricultural Education Indian Scenario:

Importance of scientific education of farming and training the persons in agriculture was realized in India dates back 3000 BC. The literary source is the Rig-Veda in which numerous prayers for agriculture are found. The land was used for ploughing and the 'womb' was ready and seeds were sown. When the corus were ripe, they were cut, threshed, winnowed and garnered. Therefore, agriculture was the chief occupation and the various aspects of agriculture such as selection of land, tillage,

seeds and sowing, irrigation, manuring, agriculture seasons, prediction of weather, management of labour, wages, harvesting, marketing of produce, etc. were described in the various Vedas. At the end of nineteenth century, as a result of the findings of Famine Commission, agricultural departments in the provinces were established. It was, however, soon realized that these departments, were not the proper authorities to advance the cause of agriculture in India, but a policy of scientific research had to be vigorously pursued. Based on the report of J.A.Voeleker (1892), a consulting chemist to the Royal Agricultural Society and agricultural chemist was appointed to look into the matter. Later on an Imperial Mycologist (1901) and Imperial Entomologist (1903) were appointed. In 1901 the Famine Commission had recommended the strengthening of the Department of Agriculture in all the provinces which was implemented by Lord Curzon's Government and the imperial and the provincial department of agriculture. It was the fore sight of Lord Karzon that helped forward policy and inspiration.

The scientific research has taken a back seat in India. The school was under the control of Director of Public Instructions during 1884-1905 and transferred to the Department of Agriculture. The government has shifted agricultural school to Coimbatore. 1903 Government of India approved a scheme for the establishment of Agricultural Research Institute under Research Station, Pusa in Bihar with financial assistance of Henry Philip of Chicago. The five colleges were established during 1884 to 1910 at Pune, Nagpur, Kanpur, Coimbatore and Lalyapur. This was initiated by the moving force of Arthur Lowley and Lord Curzon. In 1920, the colleges were affiliated to the available universities viz. Madras, Bombay and Calcutta. As a result of Montague-Chelmsford Reform in 1921, the need of Agricultural Institute was felt which laid to the establishment of Indian (Imperial) Council of Agricultural Research (ICAR) in 1929, for promoting, guiding and coordinating agriculture and animal husbandry in the country. The ICAR has a great importance relating to the agriculture and animal husbandry has emerged.

The rapid growth of agricultural education of research in India began after the post-independence period. The agricultural sciences and education, research and extension expanded after 1948 in response to a need for more technical knowledge and skill. This development leads to the use of modern farming method that required fewer farm workers. These developments increased the need for more agricultural

research and education gradually. The **table 3.3** below gives the development on agricultural education / research in India.

Table 3.3: Development of Agricultural Education and Research in India

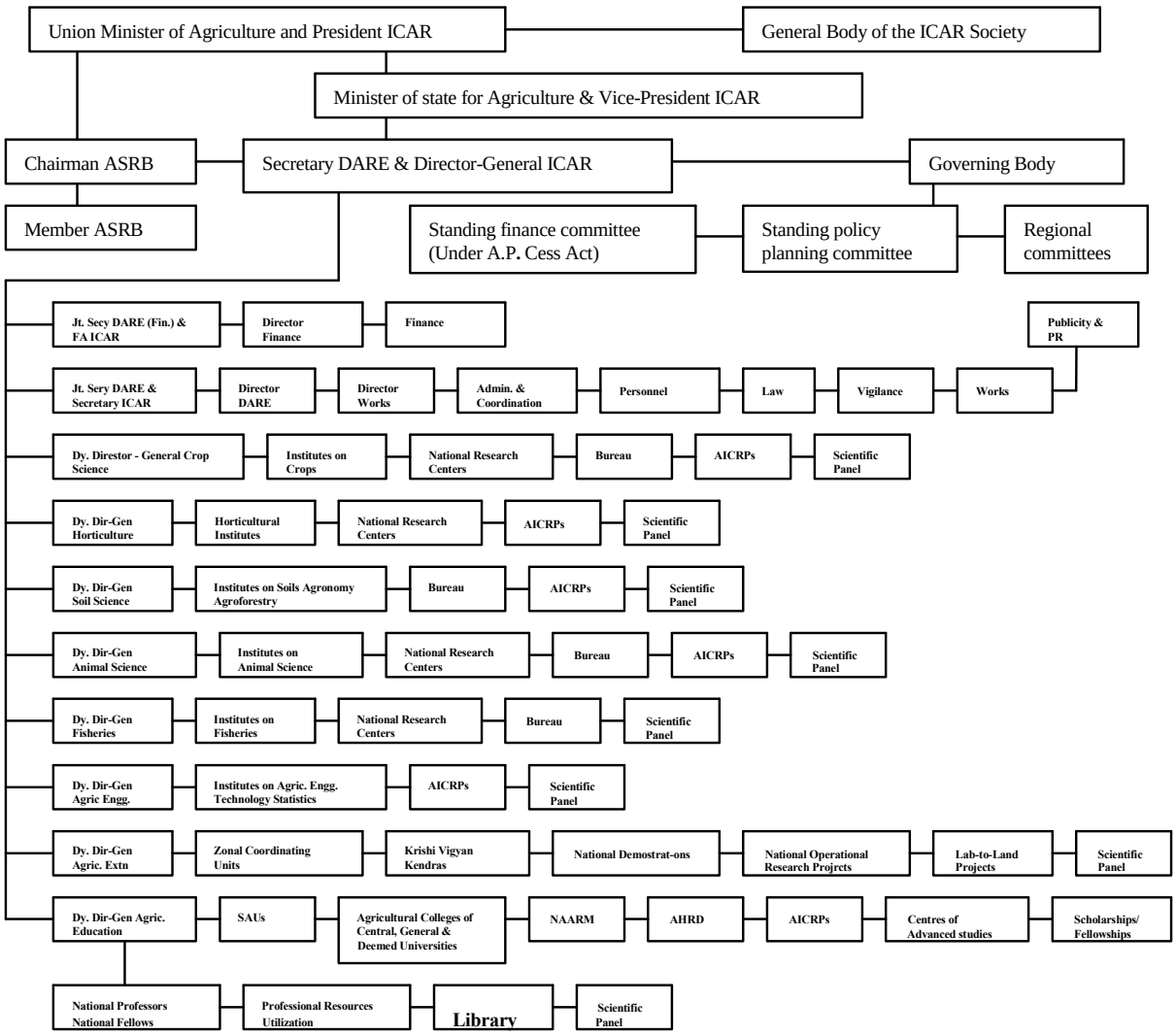
Sr. No.	Milestone	Year
1.	First University Education Commission (Dr. Radhakrishanan)	1949
2.	First Indo-American Team on Agricultural Education (Damale Committee)	1955
3.	Second Indo-American Team on Agricultural Education (Randhawa Committee)	1959
4.	First Agricultural University	1960
5.	Ralph W. Cummings Committee	1960
6.	University Education Commission (Dr. D.S. Kothari)	1966
7.	Dr. Gajendragadkar Committee	1972
8.	High Power ICAR Review Committee	1987
9.	Model Act for SAUs	1994
10.	Dr. R.A.Mashelkar Committee	2004
11.	Task Group on Revamping and Refocusing of NARS	2004

3.3.1 Department of Agricultural Research and Education (DARE):

Department of Agricultural Education and Research undertakes planning, development, coordination and quality assurance in higher agricultural education in the country and strives for mentioning and upgrading quality and relevance of higher agricultural education through partnership and efforts of the components of the ICAR-Agricultural Universities (AUs) System comprising State Agricultural Universities (SAUs), Deemed to be universities (DUs), Central Agricultural University (CAU) and Central Universities (CUs) with Agriculture Faculty. The Division has a National Academy of Agricultural Research Management (NAARM) at Hyderabad for facilitating capacity building of the National Agricultural Research System (NARS) in research and education policy, planning and management and a National Centre for

Agricultural Economics and Policy Research **[7].** The organizational flow chart of DARE and ICAR is given below.

Figure 3.1: Organizational Set-up of DARE and ICAR [8]



Thus, the organizations like ICAR and DARE not only play a role while imparting research and education but also agricultural universities in executing the curricula in the fields. The role of universities is unique and significant in this sector.

3.3.2 Role of ICAR in Agricultural Education and Research:

The ICAR is an autonomous body under the Department of Agricultural Research and Education, Ministry of Agriculture, Government of India formerly known as Imperial Council of Agricultural Research. It was established on 16th July,

1929 as a registered society, in the pursuance of the Report of the Royal Commission of Agriculture. The ICAR has its headquarters at New Delhi. The Council is the apex body for coordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country. With over 90 ICAR Institutes and 53 Agricultural Universities spread across the country and recognized as one of the largest national agricultural systems in the world **[9].**

The mandate of the ICAR is as under:

- To plan, undertake, aid, promote and co-ordinate education, research and its application in agriculture, agro forestry, animal husbandry, fisheries, home science and allied sciences.
- To act as clearing house of research and general information relating to agriculture, animal husbandry, home science and fisheries through its publications and information system, and instituting and promoting transfer to technology programs.
- To provide, undertake and promote consultancy services in the fields of education, research, training and dissemination of information in agriculture, agro-forestry, animal husbandry, fisheries, home science and allied sciences.
- To look into problems relating to border areas of rural development concerning agriculture, including post-harvest technology, by developing co-operative programs with other organizations such as the Indian Council of Social Sciences Research, Council of Scientific and Industrial Research, Bhabha Atomic Research Centre, and universities.
- To do other things considered necessary to attain objectives of the Society.

In this respect, the **table 3.4** given below highlights the major landmarks in the development of ICAR chronologically. This chronology was developed on the basis of websites uploaded on the internet resources.

Table 3.4: Major Landmarks in the Development of ICAR [10]

Sr. No.	Year	Achievements
1	1957	Initiation of the first All-India Coordinated Research Project on Maize.
2	1958	Indian Agricultural Research Institute (IARI) has awarded status of deemed university.
3	1960	First SAU has emerged at Pantnagar.

4	1966	Placement of different research institutes under the purview of ICAR.
5	1973	Creation of Department of Agricultural Research and Education (DARE) in Ministry of Agriculture.
6	1974	First Krishi Vigyan Kendra (KVK) at Pondichery.
7	1975	Established Agricultural Scientist Recruitment Board and Agricultural Research Service.
8	1979	Launched National Agricultural Research Project.
9	1995	Initiated of Institution -Village Linkage Program (IVLP).
10	1996	Established National Gene Bank.
11	1998	Launched National Agricultural Technology Project (NATP).
12	2005	Launched National Agricultural Innovation Project (NAIP).
13	2006	Developed a Vaccine against Bird Flu.
14	2009	Policy to provide for Open Access to its research.

The ICAR has a pivotal role while coordinating and managing 25 Project Directorates, 4 Deemed to be Universities, 6 National Bureaux, 17 National Research Centers, 17 Network Projects, 8 Zonal Project Directorates and 630 Krishi Vigyan Kendras (KVKs) from (Zone I- 67, Zone II -80, Zone III-74, Zone IV- 81, Zone V-78, Zone VI -70, Zone VII-100 and Zone VIII- 80) followed by 52 State Agricultural Universities (SAUs) and One Central Agricultural University **[11]**.

3.4 Role of Agricultural Universities in India:

The fifty two State Agricultural Universities, one Central Agricultural University, four Deemed Universities and Central Universities having faculty of agriculture are imparting education, research and extension activities. These universities are divided in four regions viz. nine are in East, nine in West, thirteen in South and twenty two in North. The agricultural universities that have been established during 1960-67 made an impact on agricultural production, the early years of the green revolution. The State Governments were also convinced that this innovation in research, teaching and extension was definitely an improvement and hence, they approach the Government of India for setting up of such universities in their states. From 1968-78, fourteen agricultural universities were established. Out of

them, four are in Maharashtra and others in Assam, Haryana, Tamil Nadu, Bihar, Kerala, Gujarat, West Bengal, Uttar Pradesh and Himachal Pradesh.

In so far as the objectives of the agricultural university programs are concerned, the following objectives are being achieved by the universities **[12]**:

- To develop need based knowledge, skills and competencies among teachers for agricultural education.
- To systematically apply the principles of instructional design and development to the planning and preparation of teaching aids and
- To learn and improve teaching effectiveness for UG and PG courses.

The concerned issues are discussed for the in-depth understanding. Agriculture Education is confined to agricultural research, extension and agribusiness and an obligation with full social responsibility. There is a widespread consensus that the quality of education is declining and the quality of graduates is far short of expectations in terms of competency and self-employment. Some of the major problems facing the SAUs are inbreeding, internal grading, lowering of qualifying standards and decline in teaching abilities. In addition, there are problems associated with lack of uniformity in curriculum content and quality among SAUs, ill-equipped laboratories and library facilities, neglect of basic science subjects in the curriculum, lack of computer labs and network facilities, lack of aesthetically designed classrooms at postgraduate level, the problems are mainly associated with duplication of all disciplines in every university without identifying centers of excellence for specific disciplines thereby reducing the standards of the qualified postgraduates.

Agricultural Education System in India has to cope-up with the several challenges as follows **[13].**

- Ecological imbalance.
- Increase use of chemical fertilizer and water along with pesticides for increasing agricultural yield has brought about a steady level due to depletion of micronutrients from the soil, lower water table, erosion of top soil, spread salinity and water logging etc.
- Pressure on natural resources.
- Evolving requirement of stakeholders.

Sustainable agriculture.

- Value addition to agricultural produce.
- WTO and trade related policy issues.
- Concern about GM crops.
- Poverty, unemployment, malnutrition; and
- Need for integrating agricultural education with job creation.

With this background, the main purpose of agricultural universities is to produce human resources for the development of agriculture and allied sectors with continuous up gradation of human resource with required skills and expertise is a pre-requisite. Improvement of competence of scientists, teachers and extension workers is more important in upcoming areas of basic and applied sciences relevant to agriculture and enterprise like biotechnology, information technology, GIS, crop modeling, environment sciences, agri-business management, market intelligence, post harvest management of farm produce, small entrepreneur development for livelihood security etc **[14].**

Keeping several of the above issues in view, it is worthwhile to give a brief account on western region of the country relating to agricultural education and research. The focus is now on quality of agricultural education. Quality education is defined as the development of human potential through continuous support and process to acquire the individual knowledge, values, skills and understanding required through out the life time. To apply this knowledge with confidence, creativity and enjoyment in all roles, circumstances and environment, it constitutes the ability to think logically and analytically. Considering this, it is necessary to give the attention for the development of human resources. Thus, agricultural universities are giving attention for upgrading the quality and standards of higher agricultural education with the modification of curricula and teaching methods, physical facilities, equipment and teaching aids with proper training to the academic staff and researchers.

3.5 Status of Agricultural Education in Western India:

In the western India agricultural education are compiled by AIU 1986 **[15]** the work in hand deals with the comprising of three states viz. Goa, Gujarat, and Maharashtra. Goa state does not exist except the ICAR research complex. In state of Gujarat, four agricultural universities are conducting teaching research and extension programs in the form of under graduate and post graduate courses. The formal

education in the mode of college was providing education in agriculture and allied subjects. Several colleges were conducting agricultural courses hosted in the form of UG and PG. The leading colleges were i) B.A.College of Agriculture, Anand. ii) College of Agricultural Engineering and Technology, Junagadh iii) College of Agriculture, Sardarkrushinagar, iv) College of Agriculture, Junagadh, v) College of Veterinary Science and Animal Husbandry , Sardarkrushinagar, vi) Gujarat College of Veterinary Science and Animal Husbandry, Anand, vii) N M College of Agriculture, Navsari and viii) Sheth M C College of Dairy Science, Anand. Lastly, the state of Maharashtra is concerned, four agricultural universities, twenty eight government agricultural colleges and eighty six non- grants colleges are organizing courses in the agriculture and allied subjects. The Maharashtra state providing major input in the national educational and research activities through agricultural universities. Research and Development activities in agriculture and extension education programs are continuous process of formal education. The extension activities through various programs viz. induction, refresher, short-term and pre-seasonal training, district / zonal workshops and farm trials. Colleges in Pune and Nagpur provide educational courses since inception in the last century. These colleges not only provide a degree courses but also research facilities prominently in western India. On the basis of four Agro-Climatic Zones in Maharashtra four agricultural universities have been formulated for the purpose of higher education, research and extension.

The Maharashtra Council of Agricultural Education and Research (MCAER), Pune is the apex body involved in coordinating, planning, guiding and monitoring agricultural education and research activities in the western part of India specifically to Maharashtra State. The extension oriented activities are more or less similar in all the states in western India. The communication centers provide technology information to the farmers, extension personnel through various media viz. exhibition, charts, blowups, specimens and models. The public relation activities operate through press, radio, television by giving wide publicity to the developmental work and farm technology. The library and information centers are one of the nodal agencies to provide information relating to agriculture.

The growth of the LICs in Indian agricultural universities governs by the libraries to fulfill the aims and objectives of the agricultural education. The university libraries provide the life blood of research and academic scholarship. As such a

library can not be merely a book house but must also be a dynamic information centre in stimulating scholarship and research competence. Therefore, the LICs hold a unique position in contributing the academic excellence and research. Thus, the importance of libraries and it services to the academic communities justify priority consideration in the allocation of funds and human resources for its growth and services.

The university library is used to represent a library which is an integral part of the organization, a university in which teaching, research and extension activities are conducted in one or more of the arts and sciences and which has the power to confer the degrees, diplomas and certificates. The specific library mission statement is to provide comprehensive resources and services in support of the research, teaching and learning needs of the university communities. To fulfill this mission, the university library commits to:

- Understand the research, teaching, and learning needs of its users.
- Build collections and create tools to support research, teaching, and learning.
- Provide access to and promote the discovery and use of local and external information resources.
- Ensure the preservation and long-lasting availability of library collections and Resources.
- Create hospitable physical and virtual environments for study, teaching, and research.
- Collaborate with other members of the university to enrich the research and learning community.
- Advance local, national, and international library and information initiatives, and
- Develop, encourage, and sustain expertise, skill, commitment and an innovative spirit in its staff **[16].**

3.6 Objectives of Agricultural University Libraries:

The agricultural university library fulfils the certain objectives to their user community such as students, facility and administrative staff with the help of resources input, demands, operations and program output. The various objectives of the agricultural university library are **[17].**

i) To increase the image of university library as a centre for excellence,

especially in respect of information sources.

ii) Increase the quantity of information available for users. Increase the value of information and help in its maximum use through support service.

iii) To provide information to research scholars through effective provision of information resources and the support services.

iv) Increase the cooperation in the use of information resources and help in the development of networking.

v) Increase the level of cooperation with other institution, industries etc with respect of information resources.

vi) Increase the effective use of expenditure throughout the university library in acquiring, producing and using information resources.

vii) To collect, process and disseminate the much-needed agricultural information to the users.

viii) To fulfill the aims and object of university i.e. agricultural education, research and extension by rendering efficient and effective information services to the users.

ix) The library provides resources to encourage cultivation of curiosity, intuitive thinking, intellectual energy and lifelong learning for the education community. The library activities involve the collection, storage, retrieval and dissemination of information. Library help people to inform themselves create their own path, and establish their own understanding.

Nevertheless, university libraries are acting as a dynamic centre for idea interaction. It provides to their user for developing the ability to decipher, translate and teach information. It becomes about bringing information forward to make it relevant, understandable and useable. As such the importance of the university libraries as an architect remains in users ability to design a space i.e. socially, intellectually and emotionally conducive to sense making for the research community. Thus, the created knowledge today is more widely disseminated than ever before and that it has become an instrument of socio-economic development and empowerment of the masses as never before. Therefore, the libraries are operating as a heart of the organization. The next chapter provides an in-depth view on the role of ICT in the university libraries in the western India.

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Chapter IV

Use of Information and Communication Technology in Agricultural University Libraries

4.1 Introduction:

The library and information science is positively affected by the challenges of Information and Communication Technology (ICT) i.e. computer technology, communication technology, storage technology and network technology. The field of information has been growing with the fields such as artificial neural networks, robotic technology, artificial intelligence (IR), digital technique, multimedia systems, security system, electronic publishing and the like. The ICT has a tremendous impact on libraries and information centers across the world. The ICT has not only on great impression on human life but also all the walk of knowledge domain. 21st century is expected to change the entire scenario of library and information science. It is possible to communicate with the help of ICT over long distances in seconds. The LICs are going to face more challenges due to the rapid technological advancement which will create new opportunities of use and application of ICT in all human activities in daily life.

In respect of ICTs, presently the industrial society entering into the new era "global village," "technocratic era", "post-industrial society", "information society" or "information age" and "knowledge society" are a few terms that have been coined in an attempt to identify and understand the extent of these technological changes.

Now-a-days, information is contained in books and reading materials but also in non-book material such as micro-film, micro-graphs, pictures, floppies, CDs, DVD-ROM, magnetic tapes, pen drives, etc. which can act as information depositories in case of library and information system. Therefore, it is worthwhile to give a brief account of the concept of dissemination of information to the users efficiently and effectively.

Information concepts and technologies are changing rapidly. These changes are characterized by spectacular advances in information technology; a great increase in information needs of demands, a direct consequence of its recognition as a basic

input in socio-economic development; emergence of new institutions for handling information needs and demands; emergence of a new information profession.

4.2 Concept of Information:

Information is nothing but a systematize body of a language. Presently information is considered as a national resource like food, air, shelter, cloth, water and power as basic needs of human commodities. Information considers as commodity in a commercial activities. In the LIS field, 'information' was used for the first time in 1958 in place of 'document'. It was a wide term in comparison with document **[1].** In today's context, the change has accepted on its merit on the basis of economics, simplicity, utility, efficiency in performance and other criteria. This moves toward information oriented society of the next century call for innovation in generation, collection, storage, processing and dissemination of information. Moreover, the concept of information is closely related to notions of constraint, communication, control, data, form, instruction, knowledge, meaning, understanding, mental stimuli, pattern, perception, representation and entropy. The definitions are as under:
Accordingly to the Concise Oxford Dictionary **[2]** 'information' means:

i) Facts or knowledge provided or learned as a result of research or study.

ii) What is conveyed or represented by a particular sequence of symbols, impulses, etc. genetically transmitted information and

iii) Law of change lodged with a magistrate court.

The International Encyclopedia of Information and Library Science **[3]** gives a clear statement of information:

> "Information is an assemblage of data in a comprehensible form capable of communication and use: facts to which a meaning has been attached. Within information technology or information processing, the term is used in a more general sense to encompass all the different ways of representing facts, events and concepts within computer-based systems. In this usage, it concludes data, structured text, text, images and video."

In view of the above, relating to library and information science deals with not only the organized collection of books but also science of information. The

information science (or information studies) is an interdisciplinary field primarily concerned with the analysis, collection, classification, manipulation, storage, retrieval and dissemination of information. Practitioners within the field study the application and usage of knowledge in organizations, along with the interaction between people, organizations and any existing information systems, with the aim of creating, replacing, improving or understanding information systems. Information science is often (mistakenly) considered a branch of computer science. However, it is actually a broad, interdisciplinary field, incorporating not only aspects of computer science, but often diverse fields such as archival science, cognitive science, commerce, communications, law, library science, museology, management, mathematics, philosophy, public policy, and the social sciences **[4].**

With this information science to American Society for Information Science and Technology **[5]** highlights an early of Information Science as:

> "Information science is that discipline that investigates the properties and behavior of information, the forces governing the flow of information and the means of processing information or optimum accessibility and usability. It is concerned with that body of knowledge relating to the origination, collection, organization, storage, retrieval, interpretation, transmission, transformation, and utilization of information. This includes the investigation of information representations in both natural and artificial systems, the use of codes for efficient message transmission, and the study of information processing devices and techniques such as computers and their programming systems. It is an interdisciplinary science derived from and related to such fields as mathematics, logic, linguistics, psychology, computer technology, operations research, the graphic arts, communications, library science, management, and other similar fields. It has both a pure science component, which inquires into the subject without regard to its application, and an applied science component, which develops services and products."

In view of the above, the structures and boundaries of information deals with the organizing information and are used in artificial intelligence, the semantic web, system engineering, software engineering, biomedical informatics, library science, enterprise bookmaking, and information architecture as a form of knowledge representation about the world or some part of it. The creation of domain ontology is also fundamental to the definition and use of an enterprise architecture framework.

4.3 Significance of Information:

Information plays an important role in LIS field. Information field had exponential quality improvement and cost reduction in micro-processor, storage and networking are enabling new application and expanded use of ICT. The number of internet host and servers continuously extending domestically and internationally throughout the world. It is strongly depend on the telecommunication and computer technology. Presently, mobile phones are the product of communication technology which operates internet across the globe. Therefore, ICT contributing to productivity and economic growth in the over all economy. Productivity growth is especially evident in ICT producing sector of the economy but evident of positive effects in ICT using sectors exists as well. In LIS field, scientific databases have become key resources in many areas of science and social sciences. The electronic versions of the journals are also considered as electronic resources of the researchers as a dissemination of technical information. The multi-institution project now use advanced collaborative tools, internet video conferencing, remote access to scientific instrument and shared databases. The use of ICT in both traditional university courses and distance education continuous to expand. ICT can support innovation related activities that are increasingly performed large firms with academic institutions and government agencies.

4.4 Communication:

Communication is the transmission of information, ideas, attitudes or emotion from one person or group of another.

According to wikipedia **[6]** "communication is the activity of conveying information through the exchange of thoughts, messages, or information, as by speech, visuals, signals, writing, or behavior". The communication requires a sender,

a message, and a recipient. The communication process is complete once the receiver has understood the message of the sender.

4.4.1 Unified Communication:

Communications integrated to optimize business processes, but such integration can take many form, such as: integration of real-time communication services such as instant messaging (chat), presence information, telephony, video conferencing, data sharing including web connected electronic whiteboards or interactive whiteboard, call control and speech recognition with non-real-time communication services such as unified messaging (integrated voicemail, e-mail, SMS and fax). Unified communication is not necessarily a single product, but a set of products that provides a consistent unified user interface and user experience across multiple devices and media types.

4.4.2 Communication Technology:

The development of communication technology is, a symbol of man's efforts to communicate rapidly over great distances. The computer lies as a heart of modern communication system and new technology called communication is emerging, from the fusion of computer and communication technologies **[7].** With the advancement of telecommunications from the technological point of view, a massive shift from analog to digital modes of transmission could be seen. This shift has enormous capacity with this new transmission channel. It also involves all types of communications namely voice, facsimile, computer transmissions and television communication, which will all be affected. For example, every manufacture of semiconductor circuits has begun to produce a device called codec-short for 'coder-decoder.' This circuit takes the human voice and transmits by the standard voice-grade telephone channel, samples the signal 8,000 times per second, and encodes it into a digital bit stream. Digitized signals from hundreds of telephone conversations are then bundled together, transmitted over a high capacity communication approximation of the original voice. Moreover, the **Table 4.1** has given below highlights the chronology of the history of communication.

Table 4.1: History of Communication

Year	Key Events
1830	Electrical Telecommunication systems started.
1838	Electric Telegraph
1843	first Fax Machine
1876	Invention of the telephone.
1880	Photo phone
1887	Invented the Gramophone
1894	Wireless Telegraph
1896	Radio
1898	First telephone answering machine
1927	First Television broadcasts in England
1930	Videophone
1934	First Tape Recorder.
1951	Computers are first sold commercially
1958	Invented Xerox Machine/Photocopier
1964	Fiber Optic Telecommunication
1969	ARPANET, first Internet started, Computer Networking.
1971	The computer Floppy disc invented.
1979	First Cellular phone communication network started.
1981	Analog Cellular Mobile Phones.
1983	Internet.
1985	CD-ROMS in computers.
1994	American government released control of Internet and WWW is born making communication at light speed.
1998	Satellite Phones.
2002	Internet Research Steering Group
2003	First World Summit on the Information Society
2005	Second World Summits on the Information Society.
2006	Internet Governance Forum Established by UN, SG
2007	USC/ICANN Transition Agreement
2009	Internet Usage Becomes More Global
2010	The Global Politics of Internet Governance

Source: This table was generated from http://openbookproject.net/course/into 2ICT/ history.html (25 September, 2012).[**8]**

It has been observed from the table 4.2 mentioned above that along with the pioneering contribution, spectacular advancement in communication technology took place since 1455-1994 and more so.

4.5 Information and Communication Technology:

The ICT technologies as a diverse set of technological tools and resources use to communicate and create, disseminate, store, and manage information. ICTs

encompass a range of rapidly evolving technologies and they include telecommunication technologies (telephony, cable, satellite, tv and radio, computermediated conferencing, video conferencing) as well as digital technologies (computers, information networks (internet, world wide web, intranets and extranets) and software applications.

As the Information Technology (IT) is a recent and comprehensive term which describes the whole range of processes for the acquisition, storage, transmission, retrieval and processing of information. IT is the convergence of technologies such as computer, communication., storage and the network. It has been stated that IT is the science of Information handling, particularly by computers used to support the communication of knowledge in technical, economic social field. In other words these technologies, products and techniques have combined to provide new electronic dimensions to Information management. It encompasses Information Sciences, system theory, computing, micro-electronic, telecommunication, ergonomics, behavioral sciences, organization and method technique. Therefore, the concept of ICT is defined as under:

> "Information Technology as scientific, technological and engineering disciplines and the management techniques used in information handling and processing: their application, computers and their interaction with men and machines and associated social, economic and cultural matters" [UNESCO] **[9].** "The study design, development, application, implementation, support or management of computer-based information systems" [The Information Technology Association and America] **[10].** "The term is commonly used as a synonym for computers and computer networks, but it also encompasses other information distribution technologies such as television and telephones" **[11].**

In view of the above status of definitions, the terms of electronic equipments and systems, information technology is regarded as covering computing, micro-electronic and telecommunication. IT and micro-electronic are largely overlapping

concepts. Therefore, IT enables such different things as book, print, reprography, telephone network, broadcasting and the computers.

4.5.1 Computer Technology:

Generally, the computer works as an electronic device which is capable of receiving information (data) and performing a sequence of logical operations in accordance with pre-determined but variable set of procedural instructions (programs) to produce a result in the form of information or signals. Therefore, the necessary functions of input, output, computation and control. In the past, electronic component were expensive and hence a minimum number of them were used in a single processor that would ultimately perform the above operations. A calculator was the very first sign of an information processor. The popular model of the time was the Abacus. During the mechanical age (1450-1840) an analog computer used for multiplying and dividing were invented. Blaise Pascal invented the Pascal Line which was popular mechanical computer. Charles Babbage developed the difference engine which tabulated polynomial equations using the method of finite differences. This is followed by different machines created during this era known as computer. The Difference Engine was the devices were used for day to day calculations. During the electro-mechanical age (1840-1940) were the beginnings of telecommunication. The telegraph was created in the early 1800s. More code was created by Samuel Morse in 1835. The telephone (one of the most popular forms of communication ever) was created by Alexander Graham Bell in 1876. The first radio developed by Guglielmo Marconi in 1894. All of these were extremely crucial emerging technologies that led to big advances in the information technology field. The first-large automatic digital computer in the United States was the Mark I created by Harvard University around 1940. This computer was 8ft high, 50ft long, 2ft wide and weighed 5tons. However, the **table 4.2** given below provides the key developments of computer device chronologically.

Table 4.2: History of Computer

Year	Developments
Mechanical Computing Devices	
1900	Analytical Engine
1908	Hollerith Tabulator
1911	Monroe Calculator
1919	IBM Tabulator
1928	National Ellis 3000

Electromechanical (Relay Based)	
1939	Zuse 2
1940	Bell Calculator Model 1
1941	Zuse 3
Vacuum-Tube Computers	
1943	Colossus
1946	ENIAC
1948	IBM SSEC
1949	EDSAC , BINAC
1951	Univac I
1953	Univac 1103, IBM 70
1954	EDVAC
1955	Whirlwind, IBM 704
Discrete Transistor Computers	
1958	Datamatic 100, Univac II
1959	Mobidic, IBM 7090
1960	IBM 1620, DEC PDP-1
1962	Univac III
1964	CDC 6600
1965	IBM 1130, DEC PDP-8
1966	IBM 360 Model 75
Integrated Circuit Computers	
1968	DEC PDP-10
1973	Intellec-8, Data General Nova
1975	Altair 8800
1977	Apple II
1979	DEC VAX 11 Model 780
1980	IBM PC
1982	IBM PC, Compaq Protable
1984	Apple Macintosh
1986	Compaq Deskpro 386
1987	Apple Mac II
1993	Pentium PC
1996	Pentium I PC
1998	Pentium II PC
2000	Digital Computer
2002	Expert Systems and Dat compression
2003	SAIT
2006	Storage Tek T 10000
2007	IBM 3592
2008	IBM TS 1130

Source: *This table was generated Foster, Nick "The impact of emerging technology on Business, industry, commerce and humanity during the 21st century in Vision, Vol.10 (4), Oct-December 2006, 1-28.* **[12]**

Today's computers were not achieved in a gradual evolutionary process, but rather by a series of technological leaps, each of which was made possible by major

new developments in both hardware and software. Each generation is characterized by a certain level of technological development. Generation of computer development is given in the Table as under.

Table 4.3: The Generation of Computer Development

Generation	Period	Length of Period	Technology
1st	1946-60	About 15 years	Vacuum tubes
2nd	1960-64	About 4 years	Transistors
3rd	1965-70	About 6 years	Integrated Circuits
4th	1971-85	About 15 years	Large Scale Integrated Circuits and Very Large Scale Integrated Circuits
5th	1985 onwards	Work in progress	Artificial Intelligence

As above, the term generation is used to distinguish computers by development in hardware and to some extent software. The various generations also represents the chronological development in the history of the computer technology **[13].**

As such, now-a-days, the availability of low cost computers with increasingly smaller dimensions and with low power requirements is of great importance to scientific and technical communication. In house mini-computers are used for more sophisticated data and text processing, database management and variety of other applications.

4.5.2 Storage Technology:

In respect of storage technology it may be stated that most of the primary storage in computer is now supplied by semiconductor circuit. There has been notable development in memory technology affecting three areas of performance spectrum; the high-speed, high performance, the mid range and low speed bulk memory systems. As regards data storage device, the computers are major device for storing information, early electronic computers such as Colossus made use of punched tape, a long strip of paper on which data was represented by a series of holes, a technology now obsolete. Electronic data storage as used in modern computers dates from the Second World War, when a form of delay line memory was developed to remove the clutter from radar signals, the first practical application was the mercury delay line.

The first random-access digital storage device was the Williams tube, based on a standard cathode ray tube, but the information stored in it and delay line memory was volatile. It had to be continuously refreshed and thus was lost once power was removed. The earliest form of non-volatile computer storage was the magnetic drum, invented in 1932 and used in the Ferranti Mark 1, the world's first commercially available general-purpose electronic computer. Nevertheless, most digital data today is still stored magnetically on devices such as hard disk drives, or optically on media such as CD-ROMs. It has been estimated that the worldwide capacity to store information on electronic devices grew from less than 3 Exabyte in 1986 to 295 Exabyte in 2007, doubling roughly every 3 years **[14].**

In view of the above theoretical discussions, it is stated that ICT is important phenomena being used in all the LICs. There has been remarkable progress in the new technologies of the ideal future in respect of information transfer, systems and services. Use and applicability of the technologies in the present era is discussed below:

Table 4.4: Storage Media

Media	Capacity of Information
Floppy Disk	1.44 MB - 2.88 MB
Compact Disk, CD-I, CD-IV	700 MB
CD-ROM	700 MB - 1 GB
DVD, DVD-ROM, DVD-RW	4.7 GB - 17.08 GB
Computer Hard Disk Drive	60 GB - 4 TB
External Removable Drives	160 GB - 2 TB
Magnetic Tape	4 GB - 5 TB (2011)
Pen Drive	2 GB - 32 GB
Laptop Hard Disk	64 GB - 512 GB

It will be seen from the above that these devices are called removable / replaceable equipments as USB port device. The main purpose of using theses storage devices is to provide a large storage at lower cost. Presently, it is cost-effective and user friendly.

4.6 Networking Technology:

The computer networks are network of networks which links up a global agglomeration of computer resources for public access in particular it is distinguished by the fact that TCP/IP set up protocols within communication system. Therefore, internet is a incredible part in LIS system. The internet is the world's largest computer network, scattered all over the world. It was created nearly 25 years ago as a project for the US department of Defence and its goal was to create a method of widely separated computers to transfer data efficiently even in the event of a nuclear attack from a handful of computers and users. Today the internet has grown to thousands of regional networks that can connect millions of users. This global network is not owned by any single individual, company or country. The internet provides the following types of services **[15].**

- Access to internet
- Up-to-date news
- Electronic mail
- Computing support
- Financial and professional information
- Reference and educational resources
- Forums on special internet groups on specific topics
- Chat rooms for meeting people online

It is interesting to note the historical background of Internet as under.

Table 4.5: Historical Background of Internet [16]

Year	Historical Background
1950	Electronic Computer, the Interstate Highway System.
1965	Ted Nelson coined the word 'Hypertext'.
1966	Scientists used fiber optics to carry telephone signals.
1971	ARPANET.
1974	Telnet.
1980	USE NET.
1982	TCP / IP Internet Protocol Suite.
1983	Domain Name System.
1986	NSFNET provided Access to Super Computer.
1988	Jarkko Oikarinen written a program and introduced 'Internet Relay Chat'.
1990	World Wide Web (WWW) was invented which made graphics possible on the Internet for the first time, ISPs.
1991	World Wide Web, Gopher, Wide Area Information Server.
1992	Internet Society established.

1993	Mosaic Web Browser released.
1994	Full Text Web Search Engine
1995	Very High-speed Backbone Network Service.
1998	Government of India announced Information Technology (IT) policy thus paving the way for the entry of private Internet Service Providers (ISPs).
1999	ISCO approved the formation of the Internet Societal task Force (ISTF).
2000	Information Technology Act was enacted by the Government of India and Cyber laws were implemented. Thus, India became the 12th country in the world to have cyber laws, Dot.com.
2001	Wikipedia, New Top Level Domain Names Activated, Open Journal System.
2002	Dspace, Web (Web Browser).
2003	National Lambda Rail Founded, Linkedin, Myspace, Window Server 2003.
2004	Facebook Social Networking Site.
2005	You Tube Video Sharing, Google Earth Virtual Globe.
2006	First Meeting of the Internet Governance Forum, Twitter micro logging.
2007	WikiLeaks, Google Street View, Window Vista.
2008	Amazon Elastic Compute Gloud, Google Crome, Window Server 2008.
2009	Bing Search Engine, Internet Explorer 2008, Window 7.
2010	First Internationalized Country Code Top Level Domains, i Books.
2011	Google + Social Networking, Internet Explorer 9, HP Touch Pad.
2012	Window 8 released by Microsoft, Draw Something (Mobile application).

4.6.1 Internet Tools and Research:

Finding information on the internet and the World Wide Web (WWW) has always been some what like trying to find a needle is a haystack. Internet environment is a dynamic collection of information search tools needed to create order and provide an interface that allows users to retrieve required documents while at the same time deleting inactive sites. Search tools are served as public relations instrument for the product. The internet has certain search tools and resources such as e-mail, list serve, newsgroups, telnet, Gopher, FTP, web browser, video conferencing, chatting, etc.

4.6.2 Searching with Internet:

While retrieving information from the net requires patience and devotion as the number of sites or web pages retrieved on any particular query are immense. It so happens that within the stipulated time a proper solution to a given query may not be found, but experience shows that surfing the net leisurely retrieves an exact article / reference or what the user usually interested in. To remember these sites it is imperative that regular habit of noting down all these sites or adding them to the

bookmarks be cultivated. This helps in assessing these sites at a later date, which is very convenient, and time saving task **[17].**

4.6.3 Concept of Search Engine:

Internet provide large number of information sources and services in digital format like electronic journals, databases, community information, government resources, OPAC and commercial transactions etc. Internet has emerged as one of the most powerful tools for global communication and exchange of information. To share the right information at the right time and the right sources has become very vital. The internet has made online information easier to access but at the same time, the magnitude of online information has increased dramatically. Navigation through all these information is still a difficult task. In this respect, search engines are the mechanism that aid user to search the entire internet for relevant information. The jobs of the search engines are to index all the information floating around the net. There are a wide variety of search engines available on the internet. These are the free tools for making a search.

There are most popular search engines such as Yahoo, Google, AltaVista, Excite, Lycos, Hotbot, Infoseek. Each uses different kinds of philosophy and programming design that is the reason why the user get different results in the same search strings on various search engines.

Realizing the role and value of search engines, the following are some of the characteristics of search engines **[18].**

i. Accessibility
ii. Reliability
iii. Search language capacity
iv. Comprehensiveness
v. Speed of access
vi. User friendliness
vii. Updating facility
viii. Interfacing facility
ix. Display of search result.

Moreover, search engines can be divided into four categories as shown below:

- Robot
- Directories
- Met search engines, and
- Software tools

Nevertheless, internet gives various opportunities to the library professionals and its clientele in benefiting from its use. The internet is one of the best medium for getting timely, relevant and most useful information. The availability, complex nature of knowledge, awareness of selecting, accessing databases and evaluating resource should have been based on their authenticity. Internet has therefore, become indispensable resource for agricultural university libraries world wide to enhance and update their collection and services.

4.7 Use and Applications of ICT in Agricultural University Libraries:

Awareness of ICT is having the socio-economic relevance for income generating activities and it has to be promoted and motivated. Presently, the university libraries are the store house of recorded document oriented information and playing the role of information dissemination centers. It is also known as the Knowledge Centers. These libraries has the responsibility of identifying, collecting, processing and disseminating worthwhile information so that the researcher and users should be made aware of the availability of information services in order to promote the existing collection. The concept of information systems, general, mission and subject oriented, is now catching up and an attempts are made to create new databases, design information system at different level. In light of the above, the university libraries are catering the information services with the help of ICTs. The present high-speed networks, internet and other servers are connected. The traditional libraries and the digital libraries reside in the same building. The three main characteristics of the digital libraries are storage of information in digital form, usage of communication network to access and retrieve information in the form of copying or downloading or offline or online. Preservation, search and access, content creation and delivery are its essential components. The following are the important characteristics of digital libraries **[19].**

1. Digital libraries are the digital face of traditional libraries that include both digital collections as well as print and other (e.g. audio, video, graphics animation, etc.) materials. So they encompass both electronic (digital) and paper material.
2. A digital library owns and controls the information. It provides access to information, not just pointer to it.
    i. A digital library will also include digital materials that exist outside the physical and administrative bounds of any one digital library.
    ii. A digital library ideally provides a coherent view of all of the information contain within a library, no matter its form or format.
    iii. A digital library has a unified organizational structure with consistent points for accessing the data.
    iv. Digital libraries will serve particular communities, like traditional libraries, though those communities may be widely dispersed throughout the network.
    v. Digital libraries will require both the skills of librarians as well as those of computer scientists to be viable.
    vi. A digital library is not a single entity; it may also provide access to digital material and resources from outside the actual confines of any one digital library.
    vii. A digital library support quick and efficient access to a large number of distributed but interlinked information sources that are seamlessly integrated.
    viii. Digital libraries have collection that:
        1. Are large and persists overtime.
        2. Are well organized and managed.
        3. Contain many formats
        4. Contain objects and not just their representation
        5. Contain objects that may be otherwise unobtainable.
    ix. Digital libraries include all the processes and services offered by traditional libraries, though these processes will have to be revised and enhance to accommodate differences between new digital and traditional paper media.

As such the university libraries are centre place where knowledge is preserved for the future use. The ICT has transformed the way information is collected, generated, preserved and made accessible to the users. In this relation, digital preservation refers to various methods of keeping digital material alive in to the future. Today the ICT that is increasingly powerful and easy to use, especially like those that support the World Wide Web, have unlashed the production and distribution of digital information.

As opined by Singh **[20]** Digital technologies increasingly serve to integrate information resources. Text, numeric data, images, voice, and video have heretofore resided in print or other analog media for storage and transmission. When they are encoded digitally, either by conversion or at the point of creation, these various kinds of resources shares layers of technology a common means of storage and transmission that allows them to be brought together and used in both old and new ways.

Digitization as a preservation treatment is becoming increasingly accepted in agricultural libraries. The process of digitization has the advantage of reducing handling of original artifacts and making it accessible to more users as a surrogate. The Digital Library Federation has developed a benchmark of digital monographs and serials. It provides standards for optimally formatted digitals contents that address quality, persistent and interoperability. Digitization is often combining with conservation of the original or micro-film reformatting. Nowadays library that undertake digitization as a preservation medium must have a robust hardware and software infrastructure and the resources to carry out the projects and provide continuing access.

So far as the preservation is concerned, the data may be text, image, video, audio, etc. stored in variety of formats **[21]**:

a. The nature of the data: Data is at risk because it is recorded on a transient medium, in a specified file format, and it needs a transient coding scheme (a programming language) to interpret it. The basic unit of data, the "bit" (binary digit), is represented by one of only two states:'1' or 'o' linked together in a 'bit stream' consisting of many millions of bits or electronic impulses. The kinds of digital data that concerns here is complex and meaning derived from data can depend as much on individual data objects are linked as on what those objects are.

b. Data impermanence: Digital data is in danger, not because it is inherently fragile or flawed, but because there is a continually accelerating rate of replication, adoption and redundancy of hardware, software and data formats and standards which may means that the bit stream may not be readable, interpretable or usable long into the future. All data is stored as a code and therefore require an element of decoding before it is recognizable and usable in a computing environment, even if open data standards are used.

As the electronic and digital documents are very useful to the user in the agricultural university libraries. Thus, more and more resources in that format are developed towards their collection and more services introduced to the library routine day to day activities.

4.8 Use of Electronic Journals:

With advent of ICT technologies, in the phase of information society in the internet era the rapid changes have been taken up in the form of information and presentation. The internet has revolutionized the collection, organization, dissemination and preservation of information which have become a main function of any university library in agricultural field. In case of use of electronic journals, the publication of the documents are under going numerous changes, which are in digitized form available on online as well as offline. The online publications are specially linked with the journals. The major advantage of electronic journals especially the online are as under **[22].**

i. The time lag between the publication and availability of the journals get minimal.

ii. It becomes easy both for the publisher and the user to manage the matter.

iii. The manipulated use of the journal at a time by many people can be possible iv. Barrier of the use of the journal in library building vanishes.

v. Rapid revision; and

vii. Fast contact between the generator of the literature and the user.

No research can be completed without journals, hence journals seems to be important documents in university libraries. 50 to 60 percent of the library budget is generally spent on online journals as well as hard copy of print journals. The term electronic journal can be used for different type of serials available in electronic format inclusive of journals, magazines, newspapers, newsletters, etc. e-journals also

incorporate publishers and journal homepages and pre-print servers. During the late nineteen ninety the use of e-journals increased in USA and the other part of the world. Various commercial services are available for the libraries to make use of the online journals. The table mentioned below is significantly in this perspective. Therefore, university libraries have also adopted the e-journal form especially in Research and Development Libraries. University libraries are also started their initiatives is using e-journals. Infonet Project of UGC-INFLIBNET is a major boon of this. UGC-Infonet is also making a role as a special consortium in the e-journals than the existing efforts of consortia like FORSA of DAE, INDEST and others, especially because of subject coverage. Consortium of electronic Resources in Agriculture (CeRA) is the glaring example of consortia activities. Therefore, it is worthwhile to give brief information on consortia based activities in India in general.

4.9 Movement of Consortia based Approach:

Consortium means "group of libraries". The aim of the consortia is to ensure use of information collectively from one source.

Table 4.6: Consortia based Commercial Services

Name of the Consortium	Web Sites
EBSCO	http://www.ebsco.com
Black well Publishers	http://www.blackwellpublishers.co.uk
Kluwer Online	http://www.kluweronline.com
NASA Technical Reports Server	http://ntrs.nasa.gov
US-Patent Full-Text and Full Image Database	http://www.uspto.gov
World Libraries on the World Wide Web	http://www.123world.com/libraries
Earthquake Information	http://www.eqnet.org

The above commercial publishers provide their service to the group of libraries.

In view of the above environment, specifically in electronic based life, in the matter of e-governance all the activities are connected with network based in LIS field. Computers are linked by telecommunication system where network offers two resources. Firstly, they offer access to people who use computer on the network by

means of using internet via. e-mail, video conferencing, telnet, chatting, ftp, gopher, list serve, etc. lastly, networks permit the use of files in the form of text, graphics, sound and video, software's, subject based databases and peripherals stored on, or attached to computers in the network.

The cooperative approach is proliferating in every field by helping each other and encouraging support and development by individuals and their communities. UN General Assembly has declared 2012 as the International Year of Cooperatives highlighting the contribution of cooperatives to socio-economic development, particularly their impact on poverty reduction, employment generation and social integration with the theme of Cooperative Enterprises Build a Better World **[23].**

Similarly in LIS field, the movements of consortia based activities are very much vital now-a-day. A group of library and information centers are subscribing their scientific literature / periodical by using commercial consortia available in the market. As the aim of consortia is to achieve what members of group cannot achieve individually. Consortia mean "group of libraries come together with common interest to form a consortium". One of the libraries or agencies will work as the coordinator on behalf of all libraries to negotiate with publishers, take care of legal issues, etc. the consortium facilitates the libraries to wider access of electronic resources at affordable cost. A consortium develops with the collective strength of resources of various institutions available openly access for all member institutions **[24].** The Association of libraries in local, regional and national level will provide the systematic and effective coordination of resources of all types of libraries and information centers for improving services to their clientele. The major objectives of the consortia based activities are **[25]:**

- Increasing the cost benefit per subscription.
- Promote the rational use of funds.
- Ensure continuous subscription to the periodicals subscribed.
- Guarantee local storage of the information acquired for continuous use by present and future users
- Develop technical capabilities of the staff in operating and using electronic publication databases

- Strategic alliance with institutions that have a common interest, resulting in reduced information cost, and
- Improved resource sharing.

In view of the above discussion, technological developments, electronic publishing of scholarly journals, the emergence of consortia and the pricing model of publisher give new opportunities for libraries to provide instant access to their collection. Moreover, while developing information collection, the main issues of the consortia approach is to be considered on priority basis. These issues are as under **[26]:**

- Selecting a coordinating agency to deal on behalf of the entire group of participants and executing and monitoring the work.
- Identification of libraries interested in participating and agreeing to common terms and conditions.
- Identification of potential publishers to provide access under consortia purchase.
- Negotiating with publishers to get a commonly acceptable and affordable price.
- Source of funding to meet the subscription cost.
- Legal issues involved in contracts and usage of material within-the consortia.
- Informing of the usefulness / importance of the consortia to the heads of the institutions, faculty, etc., to act upon the issue.
- Identifying the necessary infrastructure for electronic access to resources.
- Issues relating to backup of databases
- Identification and selection of databases to be acquired and hosted at one place (i.e. coordinating agency).
- Documentation and training to staff.
- Access rights whether to provide direst access from publisher site or mount databases at coordinating agency.

4.10 Consortia Projects in Agricultural University Libraries:

The role of university libraries and efficiency of the institute may be gauged by the importance given to its library. The provision for library maintenance of equipment is the primary and most vital need of the university. The university system

comprising researchers, faculties and administrative components may be viewed as an entity with functional elements, operations and program output. ICT libraries form an integral part of the educational system which is rendering their effective and efficient services to their users. This information is generated by central / state departments, public and private institutions, state agricultural universities, krishi vigyan kendras, non-governments organizations, farmers, etc **[27].** The general overview of the projects and programs are initiated and maintained by the agricultural university libraries all over the country and ICT based initiatives are taken for dissemination of information in libraries. The few of the projects are discussed hereunder.

4.10.1 Consortium for Electronic Resources in Agriculture (CeRA):

A national consortium of universities and research centers, in India in agriculture and related sciences promoted by Indian Council of Agricultural Research, New Delhi and funded by National Agricultural Innovation Project launched in 2008 for full-Access by 123 initial participating members. The major objectives of CeRA as under:

- To develop the existing Research and Development information resource base of ICAR institute / Universities etc., comparable to that existing in world's leading institutions organizations.
- To subscribe e-journal and create and e-access culture among scientists / teachers in ICAR Institutes / Agricultural Universities.
- To develop a Science Citation Index (SCI) facility at Indian Agricultural Research Institute, New Delhi for evaluation of scientific publications and
- To assess the impact of CeRA on the level of research publications measured through SCI.

CeRA, is playing a major role while procuring print versions of journals and literature in the field of science and technology. With the advent of ICT facilities and advancement of web technology, almost all reputed international journal are available online and can easily be accessed by the researchers over the network. The ICAR is having network connectivity across the institutes and state agricultural universities, select journals could be made available over the network for the use of scientific community. Keeping this broad objectives in mind, Consortium for e-Resources in Agriculture (CeRA) at the Indian Agricultural Research Institute (IARI)

The universities library as a member of CeRA through which user can retrieve lot of free full-text foreign journals. The URL is http://www.cera.jccc.in. IP authenticated access is provided to this portal. Alphabetical as well as subject-wise list of journals is available on this portal along with search bar tool. The CeRA currently provide access to a collection of 2000 + Journals (electronic + print), from the following participating publishers are: Springer Link, Annual Reviews Inc, Elsevier Science, CSIRO, Indian Journals, Taylor and Francis, American Society Of Agronomy, Oxford University Press and Open J-Gate.

4.10.2 Full-text Database of Ph.D. Dissertations (Krishi Prabha):

The project Krishi Prabha-Indian Agricultural Doctoral Dissertations Repository was devised and envisioned which was initiated by the ICAR under its National Agricultural Innovation Project in November 2007. The enormous information on literature in the field of agriculture, were cataloged, archived and disseminated. The mechanism to archive and disseminate Doctoral dissertations are hardly noticed or read. This resource has been preserved for the prosperity and used by the contemporary scientists while achieving the objectives. There are fifty three agricultural universities and four deemed agricultural universities award doctoral degrees in agriculture and allied subjects. These doctoral dissertations are the important and valuable original sources of information. There is a need to unveil this resource to the scientists across the world. The objectives of the Krishi Prabha are as under **[28]:**

i) Indian Agricultural Dissertations Repository (IADR) is set up for the preservation of information enshrined in these dissertations for the prosperity and use by the current and next generation;
ii) The repository so established, is used for evaluation of research findings, and the evaluation reports are used for further pursuit and generation of agricultural knowledge;
iii) The same repository is utilized for the creation of electronic database of doctoral dissertations;
iv) The database, so created, is made accessible online to the national and international users; and

v) The same database is further utilized for the publication of an e-journal reporting abstracts of the dissertations in order to disseminate information.

While achieving these objectives, the project envisages:

i) The digitization of about 10,500 agricultural doctoral dissertations produced in India during 2000-2006;
ii) The maintenance of the Digital Library thus created;
iii) Collection of hard copies of the old dissertations, if spare copies are available with the respective universities; and
iv) Collection of soft copies of dissertations to be produced in future for updating of the database of the Digital Library.

The expected outcomes / deliverables of this project are as under:

i) Integrated database of abstracts already digitized by SAUs/DUs.
ii) Digital Library (full text) of about 10,500 Indian agricultural dissertations.
iii) Indian Agricultural Dissertations Repository of hard and soft copies.
iv) Standard template for online submission of dissertations from remote locations.
v) Capacity building through Trainings / Workshops.

4.10.3 AgriCat:

AgriCat is the cooperative cataloging of the holding of the twelve major agricultural libraries in India including ICAR institutes and SAUs combine together. As the AgriCat is a part of e-Granth program operated and maintained by the ICAR. This collaboration of the libraries namely Indian Agricultural Research Institute (IARI), Indian Veterinary Research Institute (IVRI), University of Agricultural Sciences (UAS), G B Pant University of Agriculture and Technology (GBPUAT), Choudhari Charan Singh Haryana Agricultural University (CCSHAU), N. G. Ranga Agricultural University (ANGRAU), National Dairy Research Institute (NDRI), Central Institute of Fisheries Education (CIFE), CSKHPKV, MPKV, TNVAS, DIPA of the ICAR institutes and SAUs combined together. The prime objective of AgriCat is to inform the user of a university who has what, which library has a material. The compilation of union catalogues includes periodical, monographs, conference

proceedings, case study collections, reference materials, guide to research, microforms, audio-visual materials, dissertations and theses materials held by the participating libraries. This makes information resource sharing easily.

4.11 Use of ICT in Agricultural Extension Programs:

Agricultural being the most important sector of Indian economy, in the last five decades, the diffusion and adoption of new ICT technologies dedicate efforts to scientists, farmers and its associated personnel. Extension programs with the support of centre and state government, contributed significantly while cultivation of crop. The ICT is used for transfer more effective among the researchers, extension personnel's, farmers and other stakeholders. These new ICT programs are **[29]:**

4.11.1 ICT Best Practices for Agriculture:

i. aAQUA - almost All Questions Answered

ii. Digital Green - Participator Video for Agricultural Extension iii.

e-Arik (e-Agriculture)

iv. e-Sagu (e-Cultivation)

v. KISSAN - Karshaka Information Systems Services and Networking

vi. Lifelines India - Soochna Se Samadhan (Solution through Information) vii.

VASAT-VIRTUAL ACADEMY FOR THE SEMI-ARID TROPICS viii. Touch Screen Kiosk

ix. e-Extension (e-Soil Health Card Programme)

4.11.2 Village Knowledge Centers:

i. MSSRF - M S Swaminathan Research Foundation ii.

ISRO- Indian Satellite Research Organization

[Village Resource Centers (VRCs)]

iii.Community Information Centers (CICs)

iv.Mission 2007

v. Common Service Centers (CSCs) Scheme

4.11.3 Warana Wired Village Project

4.11.4 Web Portals:

i. AGRISNET - Agricultural Resources Information System and Networking ii.

DACNET - Department of Agriculture and Co-operation Network

iii.InDG - India Development Gateway

iv.DEAL - Digital Ecosystem for Agriculture and Livelihood

v. iKisan [http://www.ikisan.com]

vi.e-Krishi [http://www.ekrishi.org]

vii. ASHA

viii. IFFCO - The Indian Farmers Fertilizer Cooperative ix.

Agriwatch Portal

x. iShakti [http://www.stockholmchallenge.se/data/ishakti_bridgoing_digital_]

4.11.5 ICTs for Market Information and Agri-Business:

i. AGMARKNET - Agricultural Marketing Information System Network [http://www.stockholmchallenge.se/data/agmarknet]

ii. e-KRISHI VIPANAN

iii.ITC-e-Choupal [http://www.echoupal.com]

iv.EID Parry-Indiagriline [http://www.eidparry.com/casestudy.asp.]

4.11.6 Telephone / Mobile Telephony:

i. Farmer Call Centre (Kissan Call Centre)

ii. SMS Broadcast Service by KVK [http://www.kvk.pravara.com]

4.11.7 ICT Initiatives of Chambal Fertilizers and Chemicals Limited:

i. Farmers' Website - uttamkrishi.com

ii. Farmers' Helpline - Hello Uttam

iii.Mailers and AVs [http://chambalfertilisers.in/cfcl.asp]

4.11.8 ICT Initiatives of NGO:

i. DHAN Foundation - Development of Humane Action [http://www.dhan.org/themes/itforpoor.php]

ii. ISAP - Indian Society of Agribusiness Professionals

iii.ISAP - Community Technology Learning Centers

iv.ISAP - Query Redress Services (QRS)

v. ISAP - Community Radio Stations (CRS)

4.11.9 Expert Systems, Decision Support Systems:

i. Agricultural Decision Support System by Agro-Climate Planning and Information Bank (APIB)

ii. Expert System on Pests and Diseases of Major Crops in Andra Pradesh

iii.Pesticide Advisor

iv. Vasundhara: Software for Soil and Water Test Based Nutrient recommendations by KVK Ahmednagar, Maharashtra

v. TCS - mKrishi [http://www.tcs.com]

vi. Digital Data Banks

4.11.10 Value Added Services:

i. IFFCO Kisan Sanchar Ltd. [http://www.iffco.nic.in] ii.

BSNL - Mandi on Mobile Service

iii. Nokia Life Tools [http://www.nokia.co.in]

iv. Fisher Friend Project

v. Rubber Board, India - Market Price by SMS [www.rubberboard.org.in]

vi. SMS Service to Farmers by the Department of Agriculture, Haryana

4.11.11 ICT Initiatives by the National Agricultural Innovation Project, ICAR:

i. Re-designing the Farmer Extension Agricultural Research Education Continuum in India with ICT-mediated Knowledge Management

ii. Development of a Set of Alternative ICT Models based on a study and Analysis of the major ICT Initiative in Agriculture in India to meet the information need of the Indian Farmers. [http://www.naip.icar.org.in]

iii. AGROWEB-Digital Dissemination System for Indian Agricultural Research e-Publishing and Knowledge System in Agricultural Research

iv. Developing a Decision Support System for Agricultural Commodity Market Outlook

v. Development of Maintenance of Rice Management Portal

vi. Establishing and Networking of Agricultural Market Intelligence Centers in India

vii. Decision Support System for Enhancing Productivity in Irrigated Saline Environment Using Remote Sensing, Modeling and GIS.

viii. Strengthening of Digital Library and information Management under NARS.

ix. Mobilizing Mass Media Support for Sharing Agro-Information

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CHAPTER V

LIBRARY RESOURCES AND SERVICES: DATA ANALYSIS AND INTERPRETATION

5.1 INTRODUCTION:

In library and information science, there are several methods simplifying procedures like rearrangement, tabulation, graphs, and summarizations which are commonly used to make the data readable and easily comprehensible for clear understanding. This chapter deals with the Analysis and Interpretation of the data collected through questionnaire from eight universities in the fields of Agriculture in western part of the India.

While implementing the ICT and its applications in the university libraries various and delivers the services to users were:

i. Physical Resources
ii. Human Resources
iii. Financial Resources
iv. Services
v. Users / Stakeholders

Two sets of questionnaires were designed to achieve the objective of the study. It was perception of librarians in order to study the use of ICT , librarians of all eight universities were selected. One is for 'library professional' and second group was 'user' of the libraries. The head of the university library / university librarian were considered as they directly use ICT in day to day operation of library system. The second group of 'user' was considered comprising of Deans/Directors, Associate Dean, Head of the Departments, Faculty members, Scientists, Extension Specialists, Research fellows/Scholars, UG / PG Students, Agricultural Staff, Administrative staff. The data was also supported by using direct interview, observation and field visit method of research. Furthermore, for the analysis the data were collected, verified, scanned, coded, tabulated, and interpreted systematically. The observations out of

these interpretations were also made of their proper places as and when required. The response rate of first group was **8** (**100 %**) out of 8 and second group **333 (83.25 %)** out of 400 questionnaires distributed were reported and considered for analysis finally.

The interpretation of each question is used to validate the research findings. 24 questions were posed to the first group of respondents i.e. Librarians on different aspects of ICT. These questions were broadly cover: i) General information of University (Name, Establishment Year of the University, Address, Postal Index Number Code, Telephone Number, Fax, E-mail, Websites Name of the Librarian, Academic qualifications, Pay scales, Age, Professional experiences and ii) Library collection iii) Library professionals iv) Types of problems v) Users vi) Services vii) Library Automation vii) Problems encountered ix) ICT Infrastructures, Network, Telecommunication followed by Digital Library Initiative and Consortia movement. The peripheral information has been collected through internet sources of each university library.

5.2 Status of Agricultural University Libraries and Library Professionals:

It was observed that 4 Agricultural universities each existed in the States of Maharashtra and Gujarat while in Goa there is no Agricultural university. The **Table 5.1** presents the educational qualifications of library professionals, pay scales, age and their experiences.

Table 5.1: Educational Qualifications of Library Professionals

Sr. No.	Name of the Library Professional	Name of the University	Educational Qualifications	Pay Scale in Rs.	Age in years	Professional Experience in years
1	Dr. G.B. Valand	Anand Agricultural University	PhD (Agriculture)	37400 - 67000	58	27
2	Prof. S. M. Rodge	Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth	M.A, M.Lib.I.Sc	37400 - 67000	59	36
3	Prof. P. I. Dave	Junagadh Agricultural University	M.A, B.Lib.I.Sc	15600 - 39000	40	12

4	Dr. B. T. Mundhe	Marathwada Krishi Vidyapeeth	M.A, M.Lib.I.Sc, PhD	37400 - 67000	58	36
5	Prof. P.A. Shinde	Mahatma Phule Krishi Vidyapeeth	M.A, M.Lib.I. Sc	37400 - 67000	56	30
6	Dr. V. C. Raj	Navsari Agricultural University	PhD (Agriculture)	37400 - 67000	58	36
7	Prof. A.B. Bhosale	Dr. Panjabrao Deshmukh Krishi Vidyapeeth	M.Lib.I.Sc	37400 - 67000	48	21
8	Dr. B. N. Suthar	Sardarkrushinagar Dantiwada Agricultural University	PhD (Veterinary)	37400 - 67000	52	20

The above **Table** reveals that four library professionals are having post graduation in library and information science, followed by three PhD's in Agricultural Sciences and one is having PhD and Bachelor in Library and Information Science.

It was observed that 5 (62.5 %) professionals were above 55 years of the age followed by 1 (12.5 %) professionals having age of above 50 but less than 55 and 2 (25 %) professionals are between 40 to 50 years of age that 3 (37.5 %) professionals are having experience of above 35 years followed by 2 (25.00 %) were 20 years experience and remaining each one professionals was having experience of 12 years, 27 years and 30 years respectively.

5.3 Courses offered by these Universities:

The Agricultural Sciences basically encompass the major components of the areas like Agriculture and allied sciences, Veterinary and Animal Sciences, Fisheries Sciences, Food Science and Technology, Forestry, Home Sciences etc.

The **Table 5.2** presents the courses offered by the Agricultural universities of western India:

Table 5.2: Courses offered by the Agricultural Universities of Western India

Name of the University	Courses offered by the University											
	B.Sc/M.Sc (Agri)	B.Sc./M.Sc (Horti.)	B.Sc./M.Sc (Forestry)	B.F.Sc/M.F.Sc. (Fisheries Sc.)	B.Sc./M.Sc. (Agri Biotech)	B.Sc./M.Sc. (Home Sci.)	B.Tech / M.Tech (Agri. Engg.)	M.Tech. /M.Sc (Food Sci.)	BVSc/MVSc (Vety Sci.)	M.B.A. (Agri.)	Ph.D. (Agri.)	Any Other
AAU	Y	Y	N	N	N	N	N	N	Y	Y	Y	N
BSKKV	Y	Y	Y	Y	N	N	Y	N	N	N	Y	N
JAU	Y	Y	N	Y	Y	N	Y	N	Y	N	Y	N
MKV	Y	N	N	N	N	Y	Y	Y	N	N	Y	N
MPKV	Y	Y	N	N	Y	N	Y	Y	N	Y	Y	N
NAU	Y	Y	Y	N	N	N	N	N	Y	Y	Y	N
PDKV	Y	N	Y	N	Y	N	Y	N	N	Y	Y	N
SDAU	Y	Y	N	N	N	Y	Y	N	Y	Y	Y	N

The above **Table** reveals that 14 types of different courses were offered by the eight agricultural universities. The courses offered were: B.Sc./M.Sc.(Agriculture), M.Sc.(Horticulture), M.Sc. (Forestry), M.F.Sc.(fisheries), M.Sc. (Agri. Biotechnology), M.Sc.(Home Science) B.Tech. / M.Tech.(Agricultural Engineering.), M.Tech. (Food Science), B.V.Sc./ M.V.Sc. (Veterinary), M.B.A. (Agriculture), Ph D (Agri.Sciences).

It was further revealed that all the agricultural universities were offering B.Sc., M.Sc. and PhD programs in the field of agricultural sciences, followed by agricultural engineering courses were offered in six universities namely: BSKKV, JAU, MKV, MPKV, PDKV and SDAU, MBA (Agriculture) in five universities namely: AAU, MPKV, NAU, PDKV and SDAU, B.V.Sc.& A. H.,/ M.V.Sc.were offered in four universities namely: AAU, JAU, NAU and SDAU, Biotechnology in three universities namely: JAU, MPKV and PDKV, Home science in two universities namely: MKV and SDAU, and Food science and technology in two universities namely: MKV and MPKV, and other than these disciplines are nil.

5.4 Library Advisory Committee:

For smooth functioning of the library and safe guarding the interest of all section of the library users, formulation of policies, rules and regulations, budget and verifications of stores, implementing the library policies the library advisory committee were set up.

The **Table 5.3** mentioned below, it was observed that all the universities were having library advisory committee. It was further observed that all the functions of the library committee are being adopted by four universities while two universities except functions on funds allotment and checking, two universities except policy and Fund allotment functions, one university except all functions of library committee. The position of library Advisory Committee gives below.

Table 5.3: Library Advisory Committee (Yes = Y, No = N)

Name of the University	Is there any Library Advisory Committee?	Functions of Library Committee					Total No. of Function of Library. Committee
		Development Plan	Rules and regulations	Proper implementation Library Policy	Funds allot and checking	Any other	
AAU	Y	N	N	N	N	Recommendation for purchase of books & journals	1
BSKKV	Y	Y	Y	Y	N	N	3
JAU	Y	Y	Y	Y	Y	N	4
MKV	Y	Y	Y	Y	N	N	3
MPKV	Y	Y	Y	Y	Y	N	4
NAU	Y	Y	Y	Y	Y	N	4
PDKV	Y	Y	Y	N	N	N	2
SDAU	Y	Y	Y	Y	Y	N	4

5.5 Library Building:

The Indian Council of Agricultural Research (ICAR), New Delhi provides separate funds for the construction of independent library building in the university campus. The library building has acquisition section, circulation, cataloguing section, technical section, reading hall, book stack, periodical bound volume sections, non-

book material, reference section, and computer section, etc. The data was collected and presented in the **Table 5.4** below:

Table 5.4: Library Building (n = 8) (Yes = Y, No = N)

Name of the University	Do you have independent library building?	Area of Building			
		Area (sq. ft)	Stacking area (sq. ft)	Area of reading hall	Provision for future extension
AAU	Y	1395	428	713	Y
BSKKV	Y	11567	3486	7185	Y
JAU	Y	42885	15050	21000	Y
MKV	Y	44449	7535	10765	Y
MPKV	Y	35508	16140	18292	Y
NAU	Y	6000	1500	4500	Y
PDKV	Y	52435	19400	22300	Y
SDAU	Y	10975	2367	8608	Y

It was revealed that all the agricultural universities are having an independent library building with total area of between 1395 sq. ft. to 52435 sq. ft.

In regard to stacking area, it was clearly observed that PDKV university library is having 19400 square feet followed by MPKV library 16140 sq. ft., JAU library 15050 sq. ft., MKV library 7535 sq. ft., BSKKV library is having 3486 sq. ft., SDAU library 2367 sq. ft., NAU library 1500 sq. ft., and AAU library 428 sq. ft.

The area used in reading hall was PDKV library 22300 square feet followed by JAU library 21000 sq. ft. MPKV library 18292 sq. ft., MKV library 10765 sq. ft., SDAU library 8608 sq. ft., BSKKV library 7185 sq ft., NAU library 4500 sq. ft. and AAU library 713 sq. ft.

5.6 Library Hours:

Time is very important factor while planning an academic study for the researchers as well as students. Even the library hours should be convenient for the user groups of educational system. The main purpose the working hours are to safeguard

the common interest of all respondents and to enable the library to carry out its functions as efficiently as possible. Therefore, this question was asked to elicit the information regarding library working hours of the each institutions. Thus, library timings are presented in the below given **Table 5.5.**

Table 5.5: Library Working Hours (Yes = Y, No = N)

Name of the University	Library timings				
	From	To	Reading Room From	Reading Room To	Change of working hrs during exam. Period.
AAU	9.00 AM	9.00 PM	9.00 AM	9.00 PM	N
BSKKV	7.00 AM	7.00 PM	7.00 AM	7.00 PM	N
JAU	8.00 AM	8.00 PM	8.00 AM	6.00 PM	N
MKV	8.00 AM	10.00 PM	8.00 AM	10.00 PM	**Y**
MPKV	9.00 AM	9.00 PM	9.00 AM	11.00 PM	N
NAU	8.00 AM	6.10 PM	8.00 AM	6.10 PM	**Y**
PDKV	9.30 AM	5.45 PM	10.00 AM	5.45 PM	N
SDAU	8.00 AM	7.00 PM	8.00 AM	7.00 PM	N

The above table reveals that 14 hours were the maximum working hours of library especially Reading hall timings by MKV, where in other four universities in AAU, BSKKV, JAU and MPKV 12 hours, followed by 11 hours in SDAU, 9.50 hours by NAU and 7.30 hours by the PDKV were implemented.

It was indicated that MKV and NAU library professionals were satisfied with the present working hours of library extended to their users. But remaining six universities were not in favour of extending the working hours or change of timing.

5.7 Library Collection:

Literature is diverse, complex and multilingual in nature. Such types of library collections are playing a vital role while providing information to their users. This collection on reference sources includes Books and Monographs, Periodicals, Research Reports, Patents and Standards, Trade Literatures, Theses and Dissertations, Bibliographies, Indexing and Abstracting Journals, Treatises, Encyclopedias, Dictionaries and Directories, Handbooks and Manuals, Guide to Literature and Non

Documentary Literature. In this respect, this question was posed to the library professionals to provide the information regarding their size of collection. **Table 5.6** represents the data given below.

Table 5.6: Library Collections in Eight Agricultural University Libraries

Library Collection	Name of the University							
	AAU	**BSKKV**	**JAU**	**MKV**	**MPKV**	**NAU**	**PDKV**	**SDAU**
Books and other Documents	73259	40651	42500	72743	72005	32322	115290	26945
Bound Volumes of Journals	9410	7885	20000	25186	26374	9178	28633	4150
Current National Journals	176	76	250	290	100	78	46	136
Current International Journals	44	--	105	--	25	63	37	--
Newspapers / Magazines	13	13	8	17	19	10	14	7
Electronic collections	--	--	--	--	31	--	--	--
CDs/DVDs including databases	700	398	525	950	78	325	20	171
Video Cassettes	--	--	--	--	115	18	--	--
Audio Visuals	--	--	--	--	--	5	--	--
Any other (Theses /Diss.)	435	3306	2500	7346	6901	1287	6608	5650
Total	**84037**	**52329**	**65888**	**106532**	**105648**	**43286**	**150648**	**37059**

5.7.1 Books and other Documents:

Books and other documents of the library in PDKV library were 115290, followed by 73259 in AAU, 72743 in MKV, 72005 in MPKV, 42500 in JAU, 40651 in BSKKV, 32322 in NAU and 26945 books are available in SDAU Library.

It is evident from the data that maximum total collections of 150648 were available in the PDKV Library, followed by 106532 in MKV, 105648 in MPKV,

84037 in AAU, 65888 in JAU, 52329 in BSKKV, 43286 in NAU and 37059 total collections available in SDAU Library.

5.7.2 Bound Volumes of journals:

28633 of total collection of Bound Volumes were available in PDKV, followed by 26374 collection of bound volume available in MPKV, 25186 collections of bound volumes available in MKV, 20000 collections of bound volumes available in JAU, 9410 collection of bond volume available in AAU, 9178 collection of bound volumes available in NAU and 7885 collection of bound volumes available in BSKKV and 4150 collection of bond volume available in SDAU.

5.7.3 Periodicals subscription:

290 **National journals** were subscribed by the MKV, followed by 250 by JAU, 176 by AAU, 136 by SDAU, 100 by MPKV, 78 by NAU, 76 by BSKKV and 46 National journals subscribed by PDKV Library.

105 **International journals** were subscribed by JAU, followed by 63 by NAU, 44 by AAU, 37 by PDKV and 25 International journals are subscribed by MPKV. Three universities namely BSKKV, MKV and SDAU were not subscribing any International journal.

19 **Newspapers and Magazines** were subscribed by MPKV followed by 17 by MKV, 14 by PDKV, 13 each by AAU and BSKKV, 10 by NAU, 8 by JAU and 7 Newspapers and Magazines were subscribed by SDAU Library.

With regard to **Electronic Collections**, only one university MPKV had mentioned a total of 31 collections; where as 7 universities had not expressed their view on this collection.

5.7.4 Databases available in the form of Compact Disk:

Compact Disk Read Only Memory (CD-ROM) and Digital Video Disk (DVD) are concerned, 950 Databases in CD-ROM / DVD-ROM format are available in MKV followed by 700 Databases in CD- ROM / DVD-ROM format are available in AAU, 525 Databases in CD-ROM / DVD-ROM format are available in JAU, 398 Databases in CD-ROM / DVD-ROM format are available in BSKKV, 325 Databases in CD-ROM / DVD-ROM are available in NAU, 171 Databases in CD- ROM/ DVD-

ROM are available in SDAU, 78 Databases in CD-ROM/ DVD-ROM are available in MPKV and 20 Databases in CD-ROM/ DVD-ROM are available with PDKV Library.

5.7.5 Video Cassettes:

In respect of video cassettes are concerned, 115 Video Cassettes were available in MPKV followed by 18 in NAU where as six universities had not provided the data for the same. These universities are AAU, BSKKV, JAU, MKV, MPKV and SDAU.

5.7.6 Audio -Visual Cassettes:

Similarly in case of audio visual cassettes are concerned, only university namely NAU is having a total collection of five Audio Cassettes. Other seven universities are not having collection of Audio Cassettes. These universities are AAU, BSKKV, JAU, MKV, MPKV, PDKV and SDAU. It seems that these Audio Cassettes are mostly used for the entertainment music purposes.

The category of library collection 'Any other' means other than the fields mentioned in the questionnaire, therefore, under the 'Any other' category five universities had mentioned these collection of Theses and Dissertations. A total of 7346 Theses and Dissertations are available in MKV followed by 6901 Theses and Dissertations are available in MPKV, 6608 Theses and Dissertations are available in PDKV, 2500 Theses and Dissertations are available in SDAU and 435 Theses and Dissertations are available in AAU. 3306 are available in BSKKV, 2500 Theses and Dissertations are available in JAU, 1287 Theses and Dissertations are available in NAU and 435 Theses and Dissertations are available in AAU Library.

It is observed that professional core journal needs to be subscribed and necessary funds are provided for regular procurement of journals in the subject of Agricultural Sciences by the two universities namely: AAU and SDAU Library.

The International journals subscription needs to be accelerated and maintain accordingly in three universities namely: BSKKV, MKV and SDAU. Subsequent upon the specific directives by the ICAR, the funding body, had encouraged making use of online journals available in CeRA (Consortium for electronic Resources in Agriculture).

It is noticed that CD/DVD, Video / Audio Cassettes, etc. are to be promoted for the acquisition and maintain the collection in all the university libraries as universities are working in electronic era.

5.8 Subscription to International Databases:

The bibliographic data are systematically stored in Database Management Information System. These databases are either numerical or statistical method. Later on, data is usually structured, designed, created and maintained in computer file for retrieval purposes automatically. These data is available online as well as offline in the form of CD-ROM or DVD-ROM. International database disseminate information available reliable reference materials.

Table 5.7: Subscription to International Databases (Yes=Y, No=N)

Subscription to International Databases	Name of the University							
	AAU	BSKKV	JAU	MKV	MPKV	NAU	PDKV	SDAU
CAB Abstracts	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
AGRIS	**Y**	**Y**	**Y**	N	**Y**	**Y**	**Y**	**Y**
AGRICOLA	**Y**	**Y**	**Y**	N	N	**Y**	**Y**	**Y**
Biological Abstracts	N	N	N	N	N	N	**Y**	N
Bio-tech Abstracts	**Y**	N	**Y**	N	N	N	**Y**	N
Food Sc. and Tech Abstracts	**Y**	N	N	**Y**	**Y**	N	**Y**	N
Indian Science Abstracts	N	N	N	N	N	N	N	N
Current Contents	N	**Y**	N	**Y**	N	**Y**	N	N
Water Resources Abstracts	N	N	N	N	N	N	**Y**	N
Agril. & Natural Resources	N	N	N	N	N	N	**Y**	N
Chemical Abstracts	N	N	N	N	N	N	N	N
Biol. And Agri. Index	N	N	N	N	N	N	**Y**	N
Indian Harvest	**Y**	N	**Y**	N	**Y**	N	N	N
Aquatic Sciences	N	N	N	N	N	N	**Y**	N
Any other	N	N	N	N	N	N	N	N
Total	**6**	**4**	**5**	**3**	**4**	**4**	**10**	**3**

From the Table given above, it is possible to have a comparative study of the Databases subscribed by these Universities.

The fifteen databases have been identified and selected for the option. The data received and presented as under in the tabular form represented that, the International Databases subscribed by the university libraries. It depicted that as many as ten International Databases are subscribed by the PDKV library. This is followed by six International Databases subscribed by AAU, five International Databases subscribed by JAU, four International Databases subscribed by each of the three universities namely: BSKKV, MPKV and NAU, three International Databases subscribed by two universities i.e. MKV and SDAU.

5.8.1 Commonwealth Agricultural Bureaux (CAB) it is satisfying to note that this database was subscribed **by all** the universities of western India, as it is a core database for the use of researchers in the field of agricultural sciences and allied subjects.

5.8.2 International Systems for Agricultural Science and Technology (AGRIS) database was subscribed by the seven universities. These universities are: AAU, BSKKV, JAU, MPKV, NAU, PDKV and SDAU.

5.8.3 Agriculture Online Access (AGRICOLA) database is subscribed by the six Universities namely: AAU, BSKKV, JAU, NAU, PDKV and SDAU. Food Science and Technology Abstracts Database are subscribed by four Agricultural universities namely: AAU, MKV, MPKV and PDKV. Whereas remaining four universities namely: BSKKV, JAU, NAU and SDAU. Three International databases namely: Biotechnology Abstracts (Biotech), Current Contents and Indian Harvest is being subscribed by each of the three universities.

5.8.4 Biotechnology Abstracts Database was subscribed by three universities namely: AAU, JAU and PDKV. The remaining five universities are not having this database. These universities are: BSKKV, MKV, MPKV, NAU and SDAU.

5.8.5 Current Contents Database is concerned, the Current Content database usually covers the research trends in the field of Agricultural and allied sciences. This

Database was subscribed by three Universities namely: BSKKV, MKV and NAU. Remaining five Universities are not subscribing to this Database as they are least interested to subscribe the same. These universities are: AAU, JAU, MPKV, PDKV and SDAU.

5.8.6 Indian Harvest database is major source of information. It provides detailed data on agricultural, inputs and outputs, rainfall and news relating to Indian agriculture up to district level. This database is being subscribed by three universities namely: AAU, JAU and MPKV. Where as five universities were not subscribing to this Database. These universities are: BSKKV, MKV, NAU, PDKV and SDAU.

5.8.7 Biological Abstracts was subscribed by single university namely PDKV where as other seven universities are not subscribing to this database. These universities are: AAU, BSKKV, JAU, MKV, PDKV, NAU and SDAU.

5.8.8 Water Resources Abstracts database was only one university i.e. PDKV is subscribing to this where as remaining seven Universities are not subscribing to this Database. These Universities are: AAU, BSKKV, JAU, MKV, MPKV, NAU and SDAU.

5.8.9 Agricultural and Natural Resources Only one university PDKV was subscribed to this. Where as remaining seven universities were not subscribing this database. These universities are: AAU, BSKKV, JAU, MKV, MPKV, NAU and SDAU.

5.8.10 Biological and Agricultural Index, only one university PDKV was subscribing to this. Where as remaining seven Universities were not subscribing to this. These universities are: AAU, BSKKV, JAU, MKV, MPKV, NAU and SDAU.

5.8.11 Aquatic Sciences database, only one university PDKV was subscribing to this where as remaining seven universities were not subscribing to this. These universities are: AAU, BSKKV, JAU, MKV, NAU and SDAU.

It is observed that ten international databases were subscribed by a single university namely PDKV and having a biggest collection size of resources.

It is noteworthy that 'CAB Abstracts' database was the most comprehensive, core and popular database of its kind giving researchers instant access to over four

million documents, approximately 1,80,000 documents of high relevance get added to that at CAB each year and published in more than 50 languages, covering agriculture and allied fields, Animal Sciences, Forestry, Food and Nutrition, etc. From the table 5.8 mentioned above, it has been generated a rank list of international databases subscribed by the eight universities..

While having a glance of above data, the table can be generated while ranking of International Databases. The **Table 5.8** represents the data given below.

Table 5.8: Ranking of the International Databases

Sr. No.	Name of the Databases	Ranking
1.	CAB Abstracts, Biological Abstracts, Water Resources Abstracts, Agricultural and Natural Resources, Biological and Agricultural Index and Aquatic Sciences	I
2.	AGRIS	II
3.	AGRICOLA, Biotechnology Abstracts, Current Contents and Indian Harvest	III
4.	Food Science and Technology Abstracts.	IV

It is significantly note that under ranking list of utility of International Databases, CAB Abstracts, Biological Abstracts, Water Resources Abstracts, Agricultural and Natural Resources and Biological and Agricultural Index and Aquatic Sciences are placed under ranked 'One', followed by AGRIS ranked 'Two', followed by AGRICOLA. Biotechnology Abstracts, Current Contents and Indian Harvest ranked 'Third' and Food Science and Technology Abstracts ranked 'Forth'.

It is also observed that two databases were hardly subscribed by any universities. These databases were: Indian Science Abstracts and Chemical Abstracts.

5.9 Classification Scheme Adopted for Book Collection:

As library collection needs to be organized by a logical system. Unless users become familiar with the essential tools like classification scheme and cataloguing code they cannot retrieve the document from the collection. In a properly organized university library, it is possible to maximize the services with minimum resources.

This question provided four options in each case. They are: Colon Classification (CC), Dewey Decimal Classification (DDC), Universal Decimal Classification (UDC) and others. In case of cataloguing code, Classified Cataloguing Code (CCC), American Library Association (ALA), Anglo-American Cataloguing Rules (AACR-II) and others. Accordingly, the data were obtained and presented in the **Table 5.9**

Table 5.9: Organization of Collection in Agricultural University Libraries of Western India

Sr. No.	Name of the University	Classification Scheme	Cataloguing Code
1	AAU	**UDC**	AACR-II
2	BSKKV	DDC	**AACR-I**
3	JAU	DDC	AACR-II
4	MKV	DDC	AACR-II
5	MPKV	DDC	AACR-II
6	NAU	DDC	AACR-II
7	PDKV	DDC	AACR-II
8	SDAU	DDC	AACR-II

The above table reveals that 7 (87.5 %) university libraries were organizing their collection by using Dewey Decimal Classification (DDC) scheme, namely: BSKKV, JAU, MKV, MPKV, NAU, PDKV and SDAU. Whereas Universal Decimal Classification (UDC) scheme was used by one (12.5 %) AAU library.

In case of Cataloguing Codes, Anglo-American Cataloguing Rules II was used by seven Universities. Namely: AAU, JAU, MKV, MPKV, NAU, PDKV and SDAU, where as AACR-I was used by single University namely BSKKV.

It is observed that, DDC Classification scheme is widely used throughout the Western part of the country. The DDC is extensively used which allows for more complex relationship to be shown with less enumeration. In the DDC, there are ten main classes, with detailed schedules listing sub-divisions within these classes. There is normally an alphabetical arrangement. The Relative Index which act as a verbal entry to the schedules and shows the links and relationship between terms and concepts, in the matter of Colon Classification (CC). Cataloguing code is concerned, it can be observed that the Anglo-American Cataloguing Rules (AACR-II) which is

widely been used in all agricultural university libraries, and has been translated into a number of different languages.

5.10 Open Access System / Services:

Access to the collection is very important factor in democratic set up. Usually, only two methods of access are being followed in the library all over the world. In this connection, this question was asked to know the method of access to their users. The options are: i) open access and ii) closed access. The data gathered for this question was presented in **Table 5.10** given below presented that open access method had adopted by all the universities except PDKV.

Table 5.10: Method of Access to the Document

Sr. No.	Name of the University	Access to Users
1	AAU	Open
2	BSKKV	Open
3	JAU	Open
4	MKV	Open
5	MPKV	Open
6	NAU	Open
7	PDKV	**Closed**
8	SDAU	Open

It is observed that open access method of collection used in seven universities. Only the PDKV library was following closed access, it was accepted traditionally since the inception of the university.

5.11 Financial Resources:

Now a day for sustainable development finance is needed in every organization for the future direction. Each activity of library organizations needs financial support in the form of grants, gratis and endowments. As library professionals are trying to provide maximum services with minimum finance. Lot many activities cannot be executed due to the paucity of funds. In this respect, this question was posed to the library Professionals to provide the information in regards to grants received by them during 2005-2010 are specific period was chosen for the present study. The grants received by these universities are shown in **Table 5.11** and **Table 5.12** given below.

Table 5.11: Grants Received (Rs. lakh)

Sr. No.	Name of the University	2005-06				2006-07				2007-08			
		State	ICAR	Other	Total	State	ICAR	Other	Total	State	ICAR	Other	Total
1	AAU	-	-	-	**24.25**	-	-	-	**38.3**	-	-	-	**51.57**
2	BSKKV	-	5.57	-	**5.57**	-	4.23	-	**4.23**	-	5.37	-	**5.37**
3	JAU	14.00	4.80	-	**18.80**	14.25	24.80	-	**39.05**	11.75	15.00	-	**26.75**
4	MKV	22.46	5.00	4.9	**32.36**	20.03	6.00	4.26	**30.29**	23.97	17.00	3.91	**44.88**
5	MPKV	13.87	13.20	8	**35.07**	15.02	12.06	5	**32.08**	16.23	32	21.65	**69.88**
6	NAU	-	-	-	**40.55**	-	-	-	**58.77**	-	-	-	**84.12**
7	PDKV	-	-	-	**25.50**	-	-	-	**31.75**	-	-	-	**27.10**
8	SDAU	-	-	-	**35.10**	-	-	-	**30.08**	-	-	-	**60.28**

Sr. No.	Name of the University	2008-09				2009-10				Total			
		State	ICAR	Other	Total	State	ICAR	Other	Total	State	ICAR	Other	Total
1	AAU	-	-	-	**85.82**	-	-	-	**58.88**	-	-	-	**258.82**
2	BSKKV	-	5.00	-	**5.00**	-	5.75	-	**5.75**	-	25.92	-	**25.92**
3	JAU	20.00	-	-	**20.00**	7.00	1.24	-	**8.24**	67	45.84	-	**112.84**
4	MKV	23.97	14.00	11.04	**49.01**	37.41	-	15.00	**52.41**	127.84	42	39.11	**208.95**
5	MPKV	23.82	2	60.85	**86.67**	34.60	5.327	92	**131.927**	103.54	64.587	187.5	**355.627**
6	NAU	-	-	-	**101.50**	-	-	-	**109.00**	-	-	-	**393.94**
7	PDKV	-	-	-	**39.50**	-	-	-	**41.25**	-	-	-	**165.1**
8	SDAU	-	-	-	**86.30**	-	-	-	**131.35**	-	-	-	**343.11**

Table 5.12: Comparison of total Grants received during the year 2005-2010.

(Rs lakh)

Name of The University	2005-06	2006-07	2007-08	2008-09	2009-10	Total
AAU	24.25	38.30	51.57	85.82	58.88	258.82
BSKKV	5.57	4.23	5.37	5.00	5.75	**25.92**
JAU	18.80	39.05	26.75	20.00	8.24	112.84
MKV	32.36	30.29	44.88	49.01	52.41	208.95
MPKV	35.07	32.08	69.88	86.67	131.927	355.627
NAU	40.55	58.77	84.12	101.50	109.00	**393.94**
PDKV	25.50	31.75	27.10	39.50	41.25	165.10
SDAU	35.10	30.08	60.28	86.30	131.35	343.11

The **Table 5.12** depicted that the maximum of Rs. 393.94 lakh of grants received by the NAU Library during 2005-2010. The library was planned for the modernization of the library, which includes Automation, Networking, Broadband Access, Servers, and Digitization and Reprographic facilities extended during the specific financial year. This is followed by Rs. 355.627 lakh of grants received by the MPKV, Rs. 343.11 lakh of grants received by the SDAU, Rs. 258.82 lakh of grants received by the AAU, Rs. 208.95 lakh of grants received by the MKV, Rs. 165.10 lakh of grants received by the PDKV, Rs. 112.84 lakh of grants received by the JAU and Rs. 25.92 lakh of grants received by the BSKKV library.

It is observed that BSKKV Library received minimum grants during 2005-2010. As funding authorities should have been encouraged, promoted new schemes and projects to improve the overall library system.

5.11.1 Separate Budget for ICT:

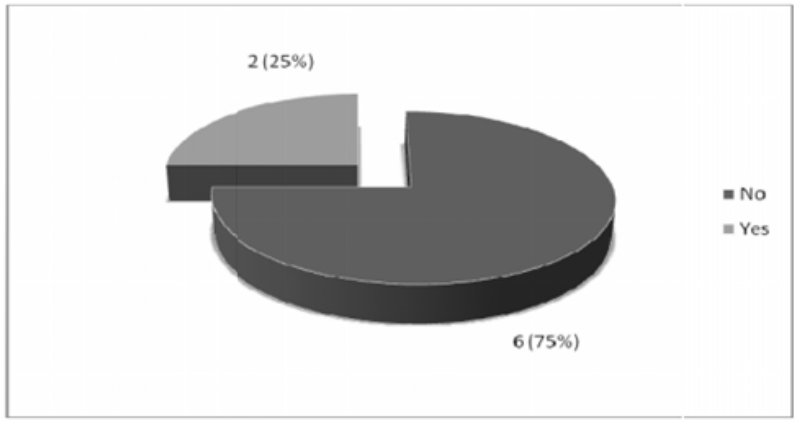
The finance has not continually increased, as it should increase proportionately. The budget is an essential part of acquisition of library resources. The acquisition covers the purchase of different subject, materials on formats. The library should know how much money to be spent on different heads of budget. This specific question was formulated to know whether a separate budget for ICT made the eight universities in western India. As such, the data was obtained and presented

in following **Table 5.13** and **Figure: 5.1** given below represents the data gathered on separate budget for ICT.

Table 5.1 3: Separate Budget for ICT (Yes=Y, No=N)

Sr. No.	Name of the University	Separate budget for ICT	Amount (Rs. lakh)
1	AAU	N	N
2	BSKKV	N	N
3	JAU	N	N
4	MKV	**Y**	**40.00**
5	MPKV	N	N
6	NAU	**Y**	**0.56**
7	PDKV	N	N
8	SDAU	N	N

Figure 5. 1: Separate Budget for ICT (Yes=Y, No=N)



It is evident that only two university libraries have made a provision for separate budget for ICT planning. Those universities are MKV and NAU. The other six universities had not made provision for separate budget for ICT. These universities are: AAU, BSKKV, JAU, MPKV, PDKV and SDAU.

5.12 Human Resources:

University is the important institution of higher education. Again, the development of any society or nation largely depends upon its quality of education and R and D activities. In order to provide right information to the right user at the right time is possible when right professionals employed and developed. In the LIS field, library professionals are considered as major resource of workforce. It motivates the entire system of library while providing various arrays of services. This question was asked to library professionals to state the total number of staff, experience, adequacy of staff, ICT literacy, professional training and its mode, frequency of use of ICT and various types of problem evaluated while using ICT applications. Thus, data received was presented in **Table 5.14** and **Figure 5.2** as under while comparative study of library professionals in eight universities of Western India.

Table 5.14: Comparison of Library Professionals in Agricultural University Libraries

Name of the University	AAU	BSKKV	JAU	MKV	MPKV	NAU	PDKV	SDAU
NO. of Professionals	3	1	1	5	1	5	4	0
NO. of Among Professionals Computer trained	0	1	1	5	0	0	0	0
NO. of Semi-Professionals	0	0	0	6	3	2	7	3
NO. of Among Semi-Professionals Computer trained	0	0	0	6	2	0	0	3
NO. of Administrative Staff	3	2	5	1	2	5	3	3
Other Staff	8	11	5	18	9	2	13	7
Total Number of Staff	**14**	**15**	**12**	**41**	**17**	**14**	**27**	**16**

Figure: 5.2: Categories of Library Professionals in Agricultural University Libraries of Western India

The **Table 5.14** and **Figure 5.2** given above, while studying a library professional the data represented that 41 (26.28 %) maximum library professionals are deployed in the MKV library. This is followed by 27 (17.31 %) in the PDKV, 17 (10.90 %) in the MPKV, 16 (10.26 %) in the SDAU, 15 (9.62 %) in the BSKKV, 14 (8.97 %) each of the universities namely NAU, (6.97 %) and AAU, (8.97 %), 12 (7.69 %) in the JAU.

It is also possible to generate the below given **Table 5.15** while comparing professional, Semi professional, Administrative with other staff.

Table 5.15: Professionals Working in Libraries

Professional	Semi Professional	Administrative	Other	Total
27 (17.31 %)	32 (20.51 %)	24 (15.38 %)	73 (46.80 %)	156 (100 %)

- ***Library Professional****: Those library professionals considered as University librarian, Deputy University Librarian, Assistant University librarian, Documentation Officer, and Information Scientist.*

- ***Semi Professional****: Means Chief Cataloguer, Classifier, Documentionist, Library Assistant, Technical Assistant (Library), Issue Assistant, Junior Library Assistant, Senior Assistant and Issue Assistant.*
- ***Administrative****: Accountant, Clerk, Steno, and Personnel Assistant.*
- ***Other Staff****: Library Attendant, Peons, Messenger, Helper and watchman.*

The **Table 5.15** given above represents that a total of 156 library personnel are working in eight agricultural university libraries. In the categories of "Professional" the data shows that a total of 27 (17.31 %) number of staff working as professional in eight universities. This is followed by 32 (20.51 %) personnel are "Semi Professional", 24 (15.39 %) are "Administrative", and 73 (46.79 %) are "Other Staff" working in eight university libraries.

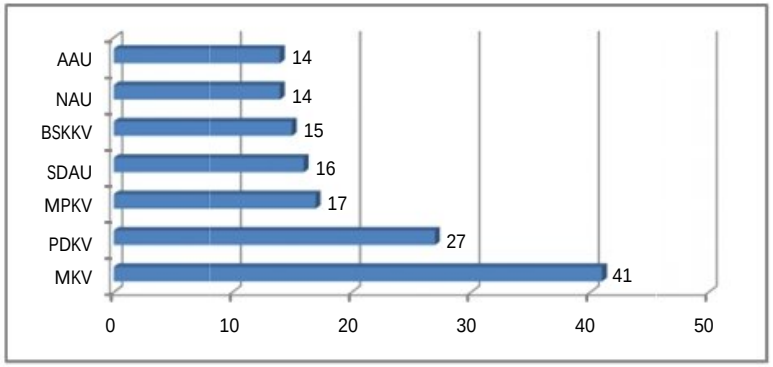
5.12.1 Additional staff required:

As per the staffing pattern prescribed by the ICAR libraries under survey are demanded additional staff. However, considering the ICT applications and workload, it is felt that the state government concerned should give due consideration to give some proportional increase of staff in these libraries. The data collected were presented in the below given **Table 5.16** and **Figure 5.3**

Table 5.16: Additional Staff Requirements

Sr. No.	Name of the University	Additional staff requirements
1	AAU	23
2	BSKKV	05
3	JAU	15
4	MKV	20
5	MPKV	46
6	NAU	05
7	PDKV	20
8	SDAU	05
	Total	**139**

Figure 5.3: Number of Existing Staff in Agricultural University Libraries



The element of Library staff adequacy, the data represented that a total of 139 numbers of additional staff required by the eight universities in addition to 156 of total existing staff were on the job.

5.12.2 ICT Training:

Table 5.17 has been generated on major kinds of training while using ICT applications.

Table 5.17: Number of Staff Undergone Training/Workshops / Seminars / C onferences during last three Years

Sr. No.	Name of the Univers ity	staff undergone training/workshops/seminars/conferences during last 3 Years
1	AAU	3
2	BSKK V	0
3	JAU	1
4	MKV	3
5	MPK V	2
6	NAU	5
7	PDK V	1
8	SDA U	0

In case of staff ICT training, the data represented that 15 (9.62%) staff has been deputed for special ICT training in the courses, workshops, Seminars, and

Conferences, etc. Whereas 141 (90.38 %) staff has not been sent for any kind of training in ICT.

Table 5.18: Method of Training to Staff for using ICT (Yes = Y, No = N)

Sr. No.	Name of the University	Method of training to staff for using ICT		
		In House Training	Outside Training	Other
1	AAU	Y	Y	N
2	BSKKV	Y	N	N
3	JAU	Y	N	N
4	MKV	Y	Y	Conf/ Workshop
5	MPKV	Y	Y	N
6	NAU	Y	Y	N
7	PDKV	Y	Y	N
8	SDAU	Y	Y	N

The above **Table** indicates that all eight universities were imparting "In house" training to their library staff while using ICT applications. Whereas six universities have sent their staff for "Outside" training for using ICT applications. These universities were: AAU, MKV, MPKV, NAU, PDKV, and SDAU. The remaining two university libraries namely: BSKKV and JAU were not sending their staff for outside training so far. The "other" kind of training is shown nil due to the field identified other than the two options given in the questionnaire.

Table 5.19: Mode of Training to Staff using ICT (Yes = Y, No = N)

Sr. No.	Name of the University	Mode of training to staff using ICT				
		Con./Semi/Hands on exp. course	Workshops	Short term course	Long term course	Any other
1	AAU	Y	N	N	N	N
2	BSKKV	Y	N	N	N	N
3	JAU	Y	N	N	N	N
4	MKV	Y	Y	N	N	N
5	MPKV	Y	Y	N	N	N
6	NAU	Y	Y	N	N	N
7	PDKV	Y	Y	N	N	N
8	SDAU	Y	Y	N	N	N

In case of mode of training of staff, is concerned, all the universities in Western India has conducted seminars, conferences, hands on experience training are organized for the benefit of the staff to enhance their skill and practical knowledge. In the other mode of training i.e. workshop is concerned, five universities are organized workshop training for their library staff. These universities are: MKV, MPKV, NAU, PDKV, and SDAU. Whereas three universities, namely AAU, BSKKV, and JAU are not organized any kind of workshop for their library staff. The other mode of "short Term" and "Long Term" trainings are concerned, data represented that not a single university library is organized so far for their staff, as it is a very poor state of affairs. The other field means other than the fields given in the questionnaire.

Table 5.20: Sharing of Experiences in Use of ICT Applications (Yes = Y, No = N)

Sr. No.	Name of the University	Like to share experience in use of ICT applications
1	AAU	Y
2	BSKKV	Y
3	JAU	Y
4	MKV	Y
5	MPKV	Y
6	NAU	Y
7	PDKV	Y
8	SDAU	**N**

Sharing experiences in the use of the ICT applications, the data represented that seven universities were ready to share the experiences of use of ICT applications to other user or potential user in the agricultural universities library systems. These universities were: AAU, BSKKV, JAU, MKV, MPKV, NAU, and PDKV. The remaining one university library namely SDAU has expressed their inability to share the experiences in the use of ICT applications.

5.13 Problems faced by the Librarians:

In the ICT era, adequate training support is necessitated while trouble shooting technical problems. Technical support inspires to use more and more ICT services during changing situation. The staff always faces problem while working with new technology. In this context, question was addressed to seek the opinion on frequency of the problem encountered while using ICT application. Five structured

problems were indicated for using ICT. These problems are: a) Lack of knowledge b) Communication gap between LIS and computer professionals c) Lack of staff training d) Unwillingness of staff and e) Lack of awareness about ICT. In this respect, frequency and rating of the problems encountered while using ICT application by the library professionals are given in the **Table 5.21** below.

Table 5.21: Frequency of the Problems Encountered while using ICT Applications

Name of University	Problems faced by librarian (1= Rarely, 2= Sometimes, 3= Often, 4= Very frequently)				
	lack of knowledge of LICs	Communication gap bet LIS and Comp. Prof.	lack of staff training	Unwillingness of staff	Lack of awareness about ICT
AAU	1	1	2	1	4
BSKKV	2	1	2	2	1
JAU	1	2	1	2	3
MKV	2	1	1	1	2
MPKV	4	2	3	1	3
NAU	2	2	1	2	2
PDKV	1	1	1	1	1
SDAU	1	2	2	3	4

The responses received have been summarized in the **Table** given above. It is revealed that majority of the respondents stated the problems as under:

5.13.1. Lack of knowledge of LIS professionals 4 (50 %) respondents rated that they face problem 'Rarely' followed by 3 (37.5 %) respondents rated it as 'Sometimes', 1 (12.5 %) respondents rated it as 'Very Frequently' and none of the rated 'Often'.

5.13.2 Communication gap between LIS and computer professional problem, 4 (50 %) respondents rated that they face problem 'Rarely' followed by 3 (37.5 %) respondents rated it as 'Sometimes' and none of the respondents rated 'Often' and 'Very Frequently'.

5.13.3 Lack of staff training problem, 4 (50 %) respondents rated that they face problem 'Rarely' followed by 3 (37.5 %) respondents rated it as 'Sometimes' and 1 (12.5 %) respondents rated 'Often' and none of the respondents rated it as 'Very Frequently'.

5.13.4 Unwillingness of staff problem 4 (50 %) respondents rated that they face problem 'Rarely' followed by 3 (37.5 %) respondents rated it as 'Sometimes' and 1 (12.5 %) respondents rated it as 'Often' and none of the respondents rated 'Very Frequently'.

5.13.5 Lack of awareness about ICT, 2 (25 %) respondents each that they face problem 'Rarely', 'Sometimes', 'Often' and 'Very Frequently'. The observations made by the investigator are given as under:

i. The "professional" staff are lacking in some of the university library. This needs to paid proper attention towards to make efforts in order to maximize the effectiveness of library systems. The professional practices to be created and maintained by the government and university authorities of the Agricultural University library.

ii. As far as, ICT applications/computer literacy are concerned, user education program (UEP) is to be introduced, and proper training may be provided in order to improve the proficiency, skill and knowledge. Finally, the ICAR as an apex body of agriculture education would have insists to fill the position.

iii. In the Agricultural University Libraries, total number of 139 additional staff is required by the all the libraries with the 156 existing staff. To maximize the services, it is very much essential to give top priority to fill up the additional staff for the smooth functioning of university library.

iv. It is also observed that, three university libraries are managed by the non-professional staff other than LIS field. Therefore, the professional vision is lacking while developing a university library and using ICT application.

v. It is noticed that, SDAU library is managed by Semi Professional which show the real remedies while facing and use of ICT applications.

vi. Staff training is very much lacking in all the agricultural university libraries. The activity of the training courses needs to be accelerated by providing funds, as well as resource persons in the field of ICT. The existing staff would be deputed regularly to the workshop, Seminar, conference and convention in the LIS field to enhance their skill, proficiency and knowledge.

vii. The 'short term' and 'long term' courses of modes are to be introduced and enhance the training facilities.

5.14 Library Clientele:

User is the integral, indispensible and very important component of the library system. Generally, those who use a library services are called users. This term includes client, patron, reader, user, customer, inquirer, member etc. The present research deals with the academic library i.e. agricultural university libraries. Therefore, this question was designed to seek the detailed information of library user group. The option provided for the library professionals. These options are: a) Dean / Director b) Associate Dean / Head of the Department c) Faculty members, d) Scientist e) Extension specialist f) Research Scholar g) Under graduate / Post graduate student h) Agricultural staff i) Administrative staff and j) Any Other. The collected data is summarized in **Table 5.22** given below.

Table 5.22: Library User-Group (Yes = Y, No = N)

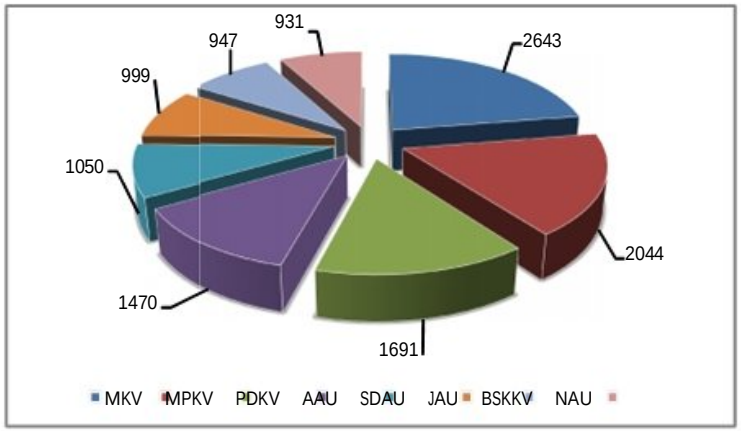
User Group	Name of the University							
	AAU	**BSKKV**	**JAU**	**MKV**	**MPKV**	**NAU**	**PDKV**	**SDAU**
Dean/Directors	Y	N	Y	Y	Y	Y	Y	Y
Associate Dean/HODs	Y	Y	Y	Y	Y	Y	Y	Y
Faculty members	N	Y	Y	Y	Y	Y	Y	N
Scientists	Y	Y	Y	Y	Y	Y	Y	Y
Extn. Specialists	Y	Y	Y	Y	N	Y	Y	Y
Research Scholars	Y	Y	Y	Y	Y	Y	Y	Y
UG/PG Students	Y	Y	Y	Y	Y	Y	Y	Y
Agricultural Staff	Y	N	Y	Y	Y	Y	Y	Y
Administrative staff	Y	N	N	Y	Y	N	Y	Y
Any other	Visitors	N	N	Temp. Lib. Member	N	N	Casual User	N

The above **Table** revealed that all types of user groups are in the eight libraries. The rank list has been developed on basis of total number of users in the eight universities. The collected data presented in **Table 5.23** and **Figure 5.4** .

Table 5.23: Total Number of Registered Library Users in Descending Order

Sr. No.	N ame of the U niversity	Total Number of Users
1	MKV	2643
2	MPKV	2044
3	PDKV	1691
4	AAU	1470
5	SDAU	1050
6	JAU	999
7	BSKKV	947
8	NAU	931

Figure 5.4: Ranki ng of Registered Library Users in Descending Order



It is revealed that according to the ascending order of the library users, a total number of 931 users of the NAU library followed by 947 of the BSKKV library, 999 from JAU library, 1050 of SDAU, 1470 of AAU library, 1691 of PDKV, 2044 MPKV library and 2643 bonafide users of MKV library.

It is observed that MKV library is having maximum number of library users as compare to other university libraries as they having ideal complex includes five

undergraduate colleges of agriculture and allied subjects. The undergraduate users are major beneficiaries of the university libraries.

5.15 Library Services:

Library services are very essential component in the university library system. Services are always translated into an effective action in the benefit of user. Usually library services cater to the needs of their esteemed users. The university library provides different arrays of library services which include Reference Service, Current Awareness Service, Translation Services, Computer Based Services, (Retrospective Services, Prospective Service) and the like. The purpose of the question was in mind that the services provided by the eight universities in the field of Agricultural Sciences. The options provided are us under.

a) Lending service b) Reference service c) Inter library loan / Document Delivery Service d) Reading Room e) Book bank f) Photocopying service g) Bibliographic service h) Current Awareness Service: i) Monthly list of additions ii).Display of books / periodicals iii) Book talk iv) Book exhibition i)Selective Dissemination of Information j) Online Database service k) Translation service l) Indexing and Abstracting service m) Internet based service n) CD-ROM Database search and o) Any other.

Table 5.24: Different kinds of Library Services (Yes = Y, No = N)

Different Kinds of Library Services	Name of the University							
	AAU	BSKKV	JAU	MKV	MPKV	NAU	PDKV	SDAU
Home Lending	Y	Y	Y	Y	Y	Y	Y	Y
Reference Service	Y	Y	Y	Y	Y	Y	Y	Y
Inter Library Loan / DDS	N	Y	N	Y	Y	Y	Y	Y
Reading Room	Y	Y	Y	Y	Y	Y	Y	Y
Book Bank	Y	Y	Y	Y	Y	Y	Y	N
Audio-Visual	Y	Y	Y	Y	Y	Y	Y	Y
Record Player / Cassette	Y	Y	Y	Y	Y	Y	Y	Y

Photocopying	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Bibliographic Service	**Y**	**Y**	N	**Y**	N	**Y**	**Y**	N
Current Awareness Service	**Y**	**Y**	N	**Y**	**Y**	**Y**	**Y**	**Y**
Online Database	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Translation	N	N	N	N	N	N	N	N
Indexing / Abstracting	N	N	N	**Y**	N	N	N	N
Internet based Services	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
CD-ROM database	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**	**Y**
Any Other	N	N	N	Cubicle availa ble	N	N	N	N

It is evident from **Table 5.24** that the services namely: Home Lending, Reference, Reading Room, Audio-Visual, Internet Based Services, CD-ROM Database Services, and Record Player provided by all the university libraries in the field of agricultural sciences in western India.

5.15.1 Inter Library Loan (ILL) or **Document Delivery Services** are concerned, it is provided by Six (75 %) university libraries namely BSKKV, MKV, MPKV, NAU, PDKV and SDAU. Remaining 2 (25 %) university libraries namely AAU and JAU were not providing these services.

5.15.2 Book Bank Scheme introduced for a under privileged (SC / ST) community students. The scheme in library was concerned, seven university libraries were providing this service while implementing the service specially funded by government agencies. These universities were: AAU, BSKKV, JAU, MKV, MPKV, NAU and PDKV. Remaining 1 (12.5 %) university SDAU is not at all providing such service.

5.15.3 Bibliographic Service, 5 (62.5 %) respondents providing this service. These university libraries are namely JAU, BSKKV, MKV, NAU and PDKV. Remaining 3 (37.5 %) university libraries were not providing the service. These universities are JAU, MPKV and SDAU.

5.15.4 Current Awareness Service (CAS); the service specifically includes a) List of additions b) New arrivals c) Group discussions on new book d) Occasional book exhibition. 7 (87.5 %) university libraries were providing this service. These universities were JAU, BSKKV, MKV, MPKV, NAU, PDKV and SDAU. Only 1 (12.5 %) university namely JAU is not at all providing this service.

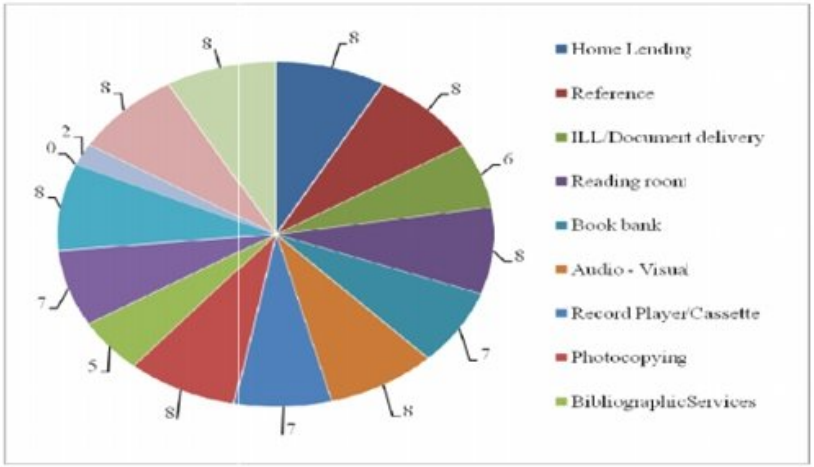
5.15.5 The Selective Dissemination of Information (SDI) service, 5 (62.5 %) university libraries were provided the service of SDI. These universities were: BSKKV, MKV, NAU, PDKV and SDAU. Whereas remaining 3 (37.5 %) universities were not providing these services. These universities were namely: AAU, JAU, and MPKV.

5.15.6 Translation Services, not a single university library is providing this service, as it positively needs to be introduced properly.

5.15.7 Indexing and Abstracting service; A total of 2 (25 %) university libraries were provided this service, these universities were: MKV and PDKV. Remaining six (75 %) university libraries were not at all providing these services. These universities were namely: AAU, BSKKV, JAU, MPKV, NAU and SDAU.

In case of 'any other' services which other than the services given in the questionnaire are concerned, only One (12.5 %) university library has responded to this option namely: MKV. The services mentioned by the respondent were: Cubicles seating arrangement for research scholars and Computer based several services.

Figure 5.5: Library Services



In view of the above analysis, the major observations are made as under:

i) It is satisfying to note that, most of the services are provided by all the university libraries. These services are Reference Service, Home Lending, Reading Room Facilities, Audio-Visual, Record Player, Reprographic, Online databases, Internet Based Services, and CD-ROM Database services.

ii) So far as **translation services** not at all introduced in any of the university libraries. Languages need to be translating in order to understand the scientific literature. Languages paid significant attention while presenting research report. Generally, languages are the vehicle of thought contents of the subject. Presently, there are machine oriented translation services are available in all scientific organization all over the world. The basic objective of translation is to make a document accessible to them who have insufficient knowledge a language to be able to comprehend the text in its original form. Therefore translation services are needs to be introduced, funded, promoted and maintained by providing the various translations in major languages in the global scenario. A majority of scientific literature published in the language Korean, Japanese, Chinese, French, German, Spanish and the like. Especially, in the field of agricultural services translation activity needs to be started in the western India.

5.16 User Education Programme:

In the LIS field, user education, user instructions, and user orientation is the synonyms term being used. The user education in the form of training of how to use the library, were information is available, why to use a particular strategy, what other sources can help and how to exploit them for the purpose of agricultural research study. The user education to require for LIS services and facilities and for retrieving information precisely, exhaustively, and expeditiously, user in the field of agricultural research are heterogeneous, and information seeking is a complex activity. In this respect, this question was asked to seek the information on user education program to encourage their user to enhance the ICT use and application. In this question four options were provided to library professionals as under:

i) Training from time to time. ii) Awareness to use database. iii) Addition to any ICT and iv) Feedback from the user to evaluate from ICT based services.

The data collected were summarized as i) the activity of training from time to time is concerned, 7 (87.5 %) respondents have expressed their views to provide the same. These universities are: AAU, BSKKV, MKV, MPKV, NAU, PDKV, and SDAU. Where as a 1 (12.5 %) respondent from JAU is expressed inability to conduct this activity of user education program. ii) the activity of awareness to new database is concerned, 6 (75 %) respondents were expressed their view to make aware to new databases added to their collection. These universities are: AAU, BSKKV, JAU, MKV, NAU, and SDAU. Whereas 2 (25 %) respondents from MPKV and PDKV have expressed their inability to carry out to make aware of new database added to the collection of library. iii) the activity of addition of new ICT equipment and services are concerned, 5 (62.5 %) respondents were expressed their view to organize an activity for the addition of new ICT equipment and services. These universities are: JAU, MKV, NAU, PDKV, and SDAU. Whereas remaining 3 (37.5%) respondents from AAU, BSKKV, and MPKV are expressed their inability to organize the activity of addition of any new ICT equipment and services. And iv) the activity of users feedback to evaluate the ICT base services are concerned, 3 (37.5 %) respondents were expressed their view to evaluate the ICT based services feedback received from the users. These universities are: MKV, NAU and SDAU. Whereas 5 (62.5 %)

respondents from AAU, BSKKV, JAU, MPKV, and PDKV expressed their inability to carry out to evaluate the feedback.

It is observed that while providing user education program the activity of training from time to time to encourage and enhance the level of user understanding of ICT use and applications are being carried out in all the university libraries. Where the activity of evaluation of feedback received from users about the ICT based services are not being done. These activities under user education program are to be accelerated and enhanced for maximize the services for benefit of user.

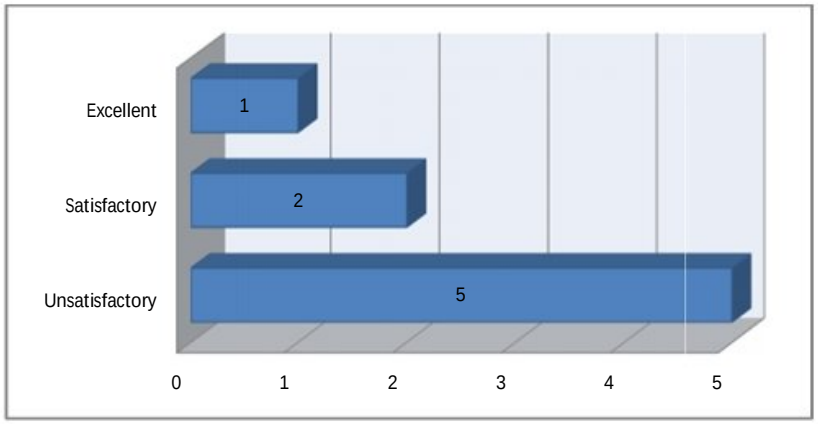
5.17 Reprographic Facilities:

Reprography is the reproduction graphic through mechanical or electrical means, such as photography or xerography. This reprographic technology had been emerged in 1960's, where the branch of technology concerned with the copying and reproduction of documentary and graphic material. This is a duplication of original document and transforming the output of information. In this connection, the question was designed to seek the data on reprographic services provided by the agricultural university libraries. Under this question three option. These options are a) Total number of copying machine b) After sale service and c) rating of the reprographic services with the parameter given are i) Excellent ii) Satisfactory and iii) Unsatisfactory. Thus, data were collected and presented in the following **Table 5.25** and **Figure 5.6** given as under.

Table 5.25: Reprographic Services in Agricultural University Libraries of Western India (Yes = Y, No = N)

Sr. No.	Name of the University	Reprographic facilities :		
		No. of Copier Machines	Local maintenance Service?	If Yes Excellent = 1 Satisfactory = 2 Unsatisfactory =3
1	AAU	2	Y	2
2	BSKKV	2	Y	2
3	JAU	1	Y	3
4	MKV	2	Y	2
5	MPKV	3	Y	2
6	NAU	4	Y	1
7	PDKV	1	Y	2
8	SDAU	2	Y	3

Figure 5.6: Rating of Reprographic Services Provided in the Agricultural University Libraries of in Western India



It is seen that all university libraries are having reprography/photocopy machines for the operation of reprographic services and response received positively. The data show that four numbers of copier machines are having with NAU library. This is followed by three number of copier machines having with MPKV, two each in four university libraries namely: AAU, BSKKV, MKV, and SDAU, one copier machine in each of two university libraries namely: JAU and PDKV. In case of after sale services all library professionals have expressed their view positively.

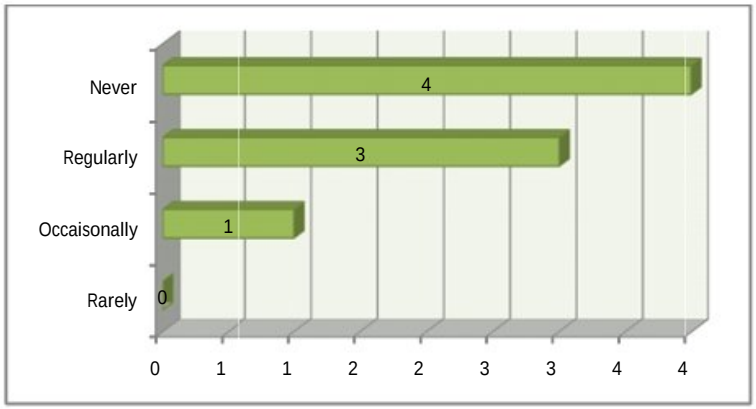
In case of rating of reprographic services the data represents that only 1 (12.5 %) respondent from NAU has rated their reprographic services as "Excellent". This followed by 5 (62.5 %) respondents namely: AAU, BSKKV, MKV, MPKV, and PDKV have rated their reprographic services as "Satisfactory" and 2 (25 %) respondents from JAU and SDAU has rated their reprographic services as "Unsatisfactory".

5.18 Access to E-Resources:

In the ICT era, the concept of information stored electronically and made accessible to users through electronic systems and networks, but having no single physical location. It is therefore, analogous to a library as a storehouse of information, but has an existence in virtual library. The online electronic resources can be accessed

through web based services. The resources like online databases, online journals, electronic document delivery, electronic data interchange, and electronic books are available online using LAN, WAN and city based network. In this respect, the question was designed to seek the opinion about the access to e-resources in Agricultural University Libraries. In order to evaluate the extent of use of e-resources four options were provided. These options are: a) Regularly b) Occasionally c) Rarely and d) Never. The Figure **5.7** given below summarized the rating of frequency for access to electronic resources.

Figure 5.7: Rating of frequency for Access to E- Resources



It is revealed from the data that 3 (37.50 %) respondents from MKV, MPKV, and PDKV has rated their frequency of use while access to e-resources as "Regularly". This is followed by 1 (12.5 %) respondent from BSKKV has rated their frequency of use while access to e-resources as "Occasionally", and 4 (50 %) respondents from three university libraries namely AAU, JAU, NAU and SDAU has rated their frequency of use while access to e-resources as " Never " as they do not provide access to e-resources electronically. None of a respondents has rated their frequency of use while access to e-resources as "Rarely".

It is observed that 50 % of university libraries of the western India are not providing access electronically to their collection such as: Web OPAC, Online Journals and Online Databases.

5.19 Library Computerization:

Automation is playing an important role in the world economy and daily experiences. The activity which uses method and machine in order to avoid human labour. It is also useful for accuracy, speed, and effectiveness in the work of any organizations. Even the library is also not excluded organizations without Automation. Therefore, in LIS field now a day's market is being flooded with the wide variety of software. Therefore, the activity of library automation is the general term for Information and Communication Technologies (ICT) that are used to replace manual systems in the library. Historically, as libraries are in fourth generations include client-server architecture, access to other sources over the network and allow accessing multiple sources. Automation is needed for saving time of user as well as library professionals, resource sharing, security and for library management. The major advantages of library automation are:

i. improve the quality, speed and effectiveness of services;

ii. services relieve professional staff from clerical work;

iii. improve access to remote users;

iv. facilitate wider dissemination of improve products and services;

v. resource sharing among other library networks;

vi. enable rapid communication with other libraries and

vii. Improve the management of physical and financial resources.

In order to achieve these advantages, any library professional needs to plan for automation. The planning steps comprises: a) needs mapping b) best possible package c) staff involvement d) budget e) hardware and software requirement f) platform (Operating System) g) user awareness and h) maintenance.

In this respect, the nine questions were designed and formulated on: i) Satisfaction of Automation ii). Library Management Software iii). Different kinds of Modules iv). Upgradations of Software v). Satisfaction of use of Library Software vi) Technical Support vii) Performance of AMC viii) Ranking of constraints while

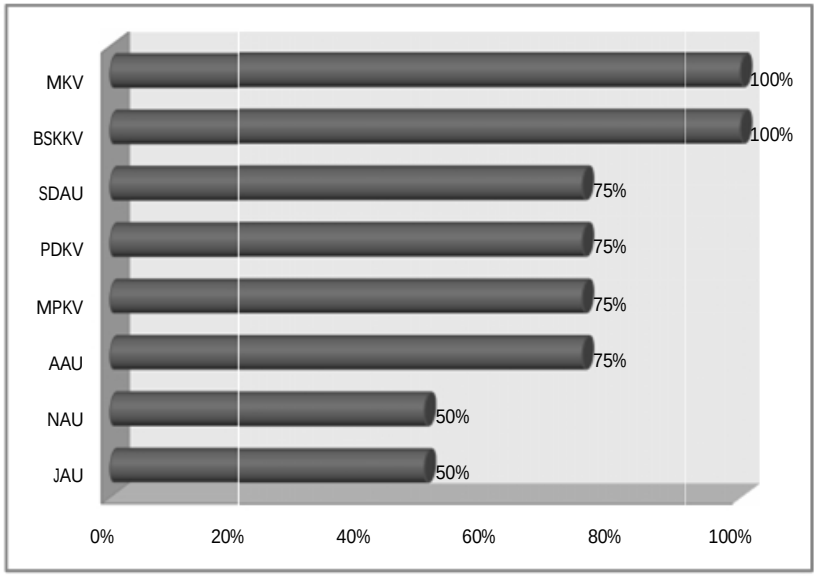
Computerizing Libraries and ix) Assessment of Library Automation. The data were gathered on following nine sub questions.

The library professionals to state their satisfaction of achievement while fulfilling the objectives of automation activities. Thus, data were collected and summarized in **Table 5.26** and **Figure 5.8** given below.

Table 5.26: Achie vement of the objectives of the Library Auto mation (Yes = Y, No = N)

Name of the University	Objectives achieved in percentage				
	100%	75%	50%	25%	Below 25%
AAU	N	**Y**	N	N	N
BSKKV	**Y**	N	N	N	N
JAU	N	N	**Y**	N	N
MKV	**Y**	N	N	N	N
MPKV	N	**Y**	N	N	N
NAU	N	N	**Y**	N	N
PDKV	N	**Y**	N	N	N
SDAU	N	**Y**	N	N	N

Figure 5.8: Achievement of the objectives of Library Automation



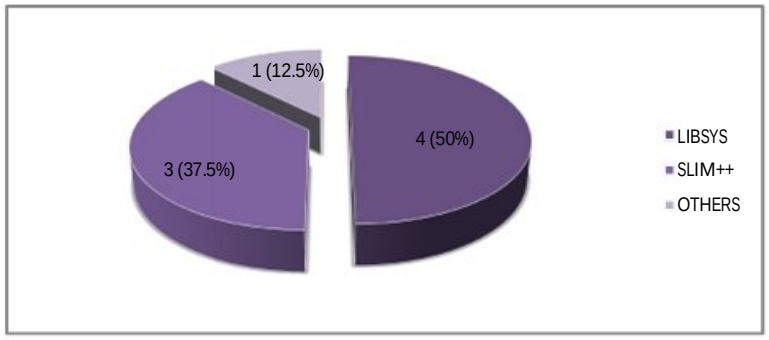
The above **Table 5.26** and **figure 5.8** revealed that only 2 (25 %) university libraries has achieved 100 % their objectives of automation. Those libraries are BSKKV and MKV. This is followed by 75% had achieved their objectives by the four (50 %) university libraries namely: AAU, MPKV, PDKV, and SDAU, 50 % has achieved their objectives by the two (25 %) university libraries namely: JAU and NAU, even 25 % and below 25 % has not opted by the any of the respondents in the sample data.

The library professionals to opt the Library Management Software they used. The options provided were: CDS/ ISIS, MINISIS, WINSYS, LIBSYS, LIBSUITE, SLIM++, SOUL and any other. The data were presented in **Table 5.27** given below.

Table 5.27: Use of Library Management Software (Yes = Y, No = N)

Name of the University	Library Management Software							
	CDS/ISIS	MINISIS	WINSYS	LIBSYS	LIBSUIT	SLIM++	SOUL	Any other
AAU	N	N	N	**Y**	N	N	N	N
BSKKV	N	N	N	N	N	**Y**	N	N
JAU	N	N	N	**Y**	N	N	N	N
MKV	N	N	N	N	N	**Y**	N	N
MPKV	N	N	N	N	N	**Y**	N	N
NAU	N	N	N	**Y**	N	N	N	N
PDKV	N	N	N	**Y**	N	N	N	N
SDAU	N	N	N	N	N	N	N	TLSS

Figu re 5.9: Library Management Software



The above **Table 5.27** and **Figure 5.9** revealed that the software like CDS/ISIS, MINISIS, WINSYS, LIBSUITE, and SOUL is not at all used by any of the respondents from the agricultural libraries in western India. It is interesting to note that 4 (50 %) respondents from the AAU, JAU, NAU and PDKV libraries are using and operating the **LIBSYS** software. This is followed by three university libraries namely BSKKV, MKV, and MPKV are using and operating the **SLIM++** library management software. A single library namely SDAU is using and operating **TLSS** library management software.

Library Software modules used by the library professionals, the options for this question were provided as i) Acquisition ii) Cataloguing iii) Serial Control iv) Circulation Control v) OPAC / WEB OPAC and vii) any other. Thus, data collected and presented in the **Table 5.28** mentioned below.

Table 5.28: Use of Library Software Modules (Yes = Y, No = N)

Sr. No.	Name of the University	Modules					
		Acquisition	Cataloging	Serial control	Circulation control	OPAC/ Web OPAC	Any Other
1	AAU	Y	Y	Y	Y	Y	N
2	BSKKV	Y	Y	Y	Y	Y	N
3	JAU	Y	Y	Y	Y	Y	N
4	MKV	Y	Y	Y	Y	Y	N
5	MPKV	N	Y	Y	Y	Y	Export/Import
6	NAU	Y	Y	Y	Y	Y	N
7	PDKV	N	Y	Y	Y	Y	N
8	SDAU	Y	Y	Y	Y	Y	N

The **Table 5.28** mentioned above, it is cleared from the data that the modules such as Cataloguing, Serial control, Circulation and OPAC / Web OPAC are used by all the respondents. Whereas 'Acquisition' module not used by the two (25 %) respondents namely MPKV, and PDKV. Remaining respondents are using it. The reason is that these modules are available on costing scheduled. This is followed by the option under 'any other' single (12.5 %) respondents from MPKV are using the IMPORT/ EXPORT module which is very important for exchanging the data.

The frequency while upgrading library software up gradation is essential activity dependent upon the requirements such as collection size, services, and number of database created. In this question five options were given as i) once ii) twice iii) thrice iv) fourth and v) never. Accordingly, data were collected and presented as under. **Table 5.29** mentioned below namely frequency of up gradation of library software.

Table 5.29: Frequency of Upgradation of Library Software
(Yes = Y, No = N)

Sr. No.	Name of the University	Frequency of Upgradation			
		Once	Twice	Thrice	Never
1	AAU	N	N	**Y**	N
2	BSKKV	**Y**	N	N	N
3	JAU	**Y**	N	N	N
4	MKV	N	N	N	**Y**
5	MPKV	**Y**	N	N	N
6	NAU	N	N	**Y**	N
7	PDKV	N	**Y**	N	N
8	SDAU	N	N	N	**Y**

Figure 5.10: Frequency of Upgradation of Library Software

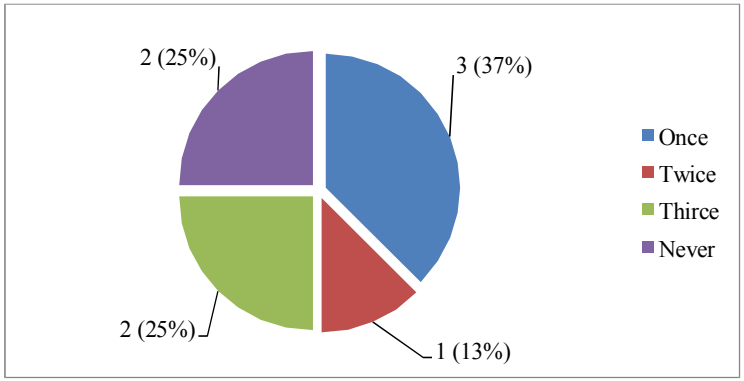


Table 5.29 and **Figure 5.10** mentioned above, it is seen that 3 (37.5 %) respondents namely BSKKV, JAU and MPKV had upgraded their library software "once" in a while, followed by 1 (12.5 %) respondents namely PDKV had upgraded

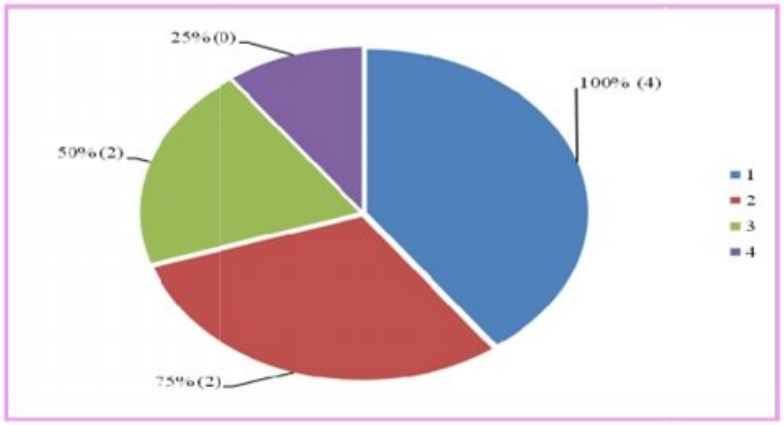
its library software "twice" 2 (25 %) respondents namely AAU and NAU had upgraded their library software "thrice", and remaining 2 (25 %) respondents namely MKV and SDAU had "never" upgraded their library software.

The information on satisfaction with the performance of the library software they used. As result oriented software are used normally. The five options provided to this question were asked in percentage. These are a) 100 % b) 75 % c) 50 % d) 25 % and below 25 %. The data received from the respondents are presented in the **Table 5.30** as under.

Table 5.30: S atisfaction with Performance of Library Soft ware (Yes = Y, No = N)

Sr. No.	Name of the University	Satisfaction with the Performance of Library Software Used				
		100%	75%	50%	25%	Below 25%
1	AAU	**Y**	N	N	N	N
2	BSKKV	**Y**	N	N	N	N
3	JAU	N	N	**Y**	N	N
4	MKV	**Y**	N	N	N	N
5	MPKV	N	**Y**	N	N	N
6	NAU	N	N	**Y**	N	N
7	PDKV	**Y**	N	N	N	N
8	SDAU	N	**Y**	N	N	N

Figure 5.11: Sa tisfaction with Performance of Library Softw are



The **Table 5.30** and **Figure 5.11** given above, it seen that, 4 (50 %) respondents namely AAU, BSKKV and PDKV library were 100 % satisfied with the performance of library software they used. Where as 4 (50 %) respondents namely JAU, MPKV, NAU and SDAU were not agree with 100 % satisfaction of performance. In case of 75 % of the satisfaction of library software, 2 (25 %) respondents namely MPKV and SDAU were 75 % satisfied with the performance of library software they used whereas six universities namely: AAU, BSKKV, JAU, MKV, NAU and PDKV were not agree with 75 % satisfaction of the performance.

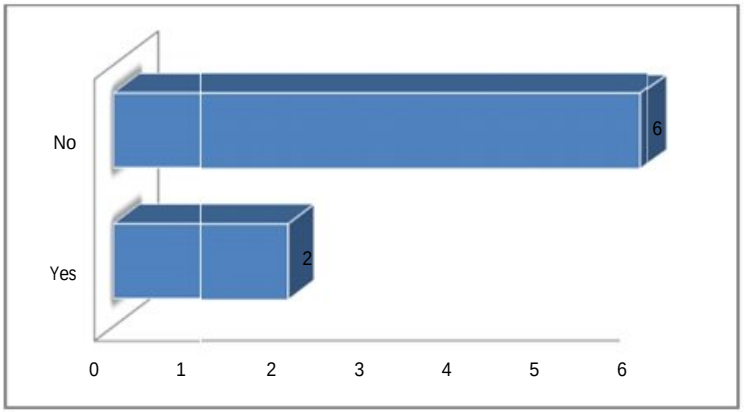
In case of 50 % satisfaction of the performance with the library software, 2 (25 %) respondents namely: JAU and NAU were 50 % satisfied with the performance of library software they used whereas six respondents namely: AAU, BSKKV,MKV, MPKV, PDKV and SDAU were not agree with 50 % satisfaction with the performance. In case of 25 % and below 25 % options, none of the respondents had expressed their willingness to opt.

The problem after purchase, three problems had been identified as: a) by approaching the vendor / consultant b) by upgrading software and c) by upgrading the hardware. Accordingly, data were collected and presented in the **Table 5.31** and **figure 5.12** mentioned below.

Table 5.31: Technical Problems faced after purchase of Library Software (Yes = Y, No = N)

Sr. No	Name of the University	Problems in Library Software		
		Approaching Vendor/Consultant	Upgrading software	Upgrading Hardware
1	AAU	N	**Y**	**Y**
2	BSKKV	N	**Y**	N
3	JAU	N	**Y**	**Y**
4	MKV	**Y**	**Y**	**Y**
5	MPKV	**Y**	**Y**	N
6	NAU	N	**Y**	**Y**
7	PDKV	N	N	N
8	SDAU	N	N	N

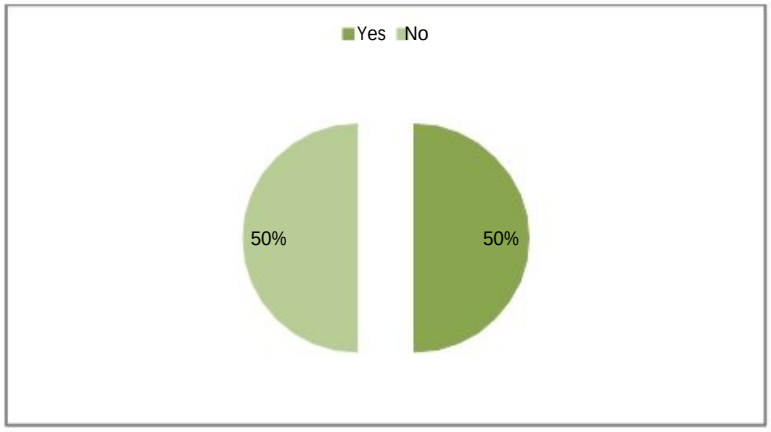
Figure 5.12: Approaching Vendor / Consultant



The **Table 5.31** and **Figure 5.12** given above, the response received from all the respondents. Seven university libraries had stated that they face technical problems after purchase of library software. These universities are AAU, BSKKV, JAU, MKV, MPKV, NAU and PDKV. The remaining single respondent from SDAU had stated that they do not encounter any problem after purchase of library software as he is operating different software other than these university libraries. The software is Total Library Software System (TLSS) developed by Total IT solutions Pvt. Ltd. New Delhi.

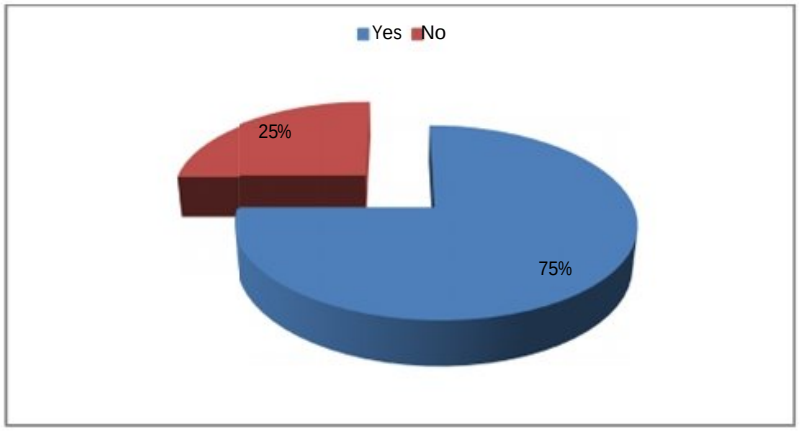
The problem addressed after purchase of library software, 2 (25 %) respondents from MKV and MPKV had expressed their option positively "by approaching vendor/consultant". The remaining 6 (75 %) respondents from AAU, BSKKV, JAU, NAU, PDKV and SDAU had expressed their view negatively.

Figure 5.13: Upgrading Hardware



In case of "by upgrading the hardware" 4 (50 %) respondents from AAU, JAU, MKV, and NAU had expressed their option positively by "upgrading the hardware" The remaining 4 (50 %) respondents from BSKKV, MKV, PDKV and SDAU had expressed their option negatively.

F igure 5.14: Upgrading software



In case of "by upgrading the software", 6 (75 %) respondents from AAU, BSKKV, JAU, MKV, MPKV and NAU had expressed their option positively "by upgrading the software". The remaining 2 (25 %) respondents from PDKV and SDAU had expressed their option negatively.

The library professionals gets after sale service and the rating their assessment of the service. The options were provided as: a) excellent b) very good c) good d) fair and d) poor. The data were collected and presented in the graphical format in table **5.33** given below.

Table 5.32: Assessment of After Sales Service of Library Software (Yes = Y, No = N)

Sr. No.	Name of the University	Performance of Library Software Used				
		Excellent	Very good	Good	Fair	Poor
1	AAU	N	N	**Y**	N	N
2	BSKKV	N	N	**Y**	N	N
3	JAU	N	N	**Y**	N	N
4	MKV	**Y**	N	N	N	N
5	MPKV	N	N	**Y**	N	N
6	NAU	N	N	N	**Y**	N
7	PDKV	N	N	**Y**	N	N
8	SDAU	**Y**	N	N	N	N

Figure 5.15: Assessment of after sales service of Library Software

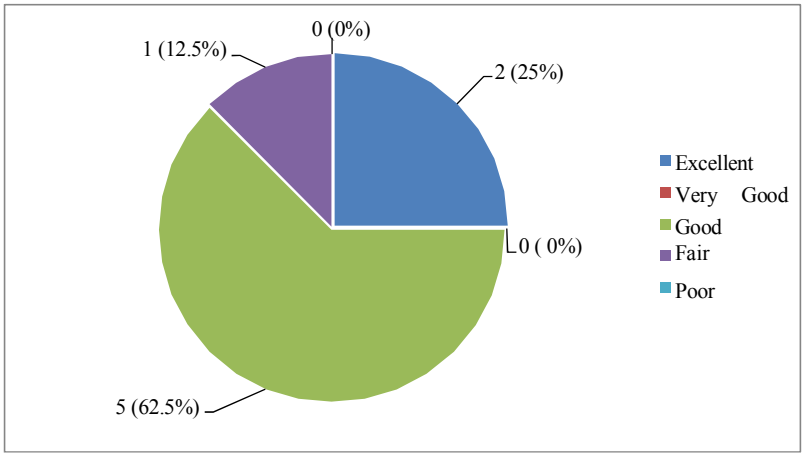


Table 5.32 and **Figure 5.15** given above, all the eight respondents have expressed their views positively.

The rating of after sale service, 5 (62.5 %) respondents from AAU, BSKKV, JAU, MPKV and PDKV had rated and assessed the satisfaction as "good" followed by 2 (25 %) respondents from MKV and SDAU had rated and assessed the satisfaction as "excellent", 1 (12.5 %) respondents from NAU had rated and assessed the satisfaction as "fair". The option as "very good" and "poor" had not at all rated by any of the respondents.

The opinion on the constraints and ranking them while implementing library computerization. The eight constraints had been identified as: 1) Low priority to the library 2) Lack of management support. 3) Lack of policy guide lines. 4) Inadequate library budget 5) Non-availability of standard software 6) Under-trained library 7) Resistance from the staff and 8) any other.

The ranking had provided in numerical. As 1= top and 8= low.

Table 5.33: Rank (1 to 8) Problems encountered while implementation of Library Computerization

Name of the University	Rank (1 to 8) Problems encountered while implementation of library Computerization							
	Low priority to Library	Lack of Management support	lack of policy guidelines	Inadequate library budget	Non-availability of std. software	Under-trained lib. Staff	Resistance from the staff	Any other
AAU	0	0	0	0	0	0	0	
BSKKV	3	3	2	3	8	1	8	
JAU	1	8	6	6	8	1	4	
MKV	5	2	2	4	2	2	2	
MPKV	8	8	8	8	8	1	8	Additional staff needed for ICT
NAU	2	3	4	3	3	4	8	
PDKV	8	8	8	1	8	8	8	
SDAU	7	7	8	4	8	2	2	
Total	**34**	**39**	**38**	**29**	**45**	**19**	**40**	

With the help of above mentioned **Table 5.33**, it is possible to generate the **Table 5.34** given below on ranking of problems faced while implementation of library computerization.

Table 5.34: Ranking of Problems Encountered While Implementation of Library Computerization

Sr. No.	Types of Problem	Rank
1	Non- availability of standard Software	I
2	Resistance from the staff	II
3	Lack of Management Support	III
4	Lack of Policy Guidelines	IV
5	Low priority to library	V
6	Inadequate Library Budget	VI
7	Under-Trained Library Staff	VII
8	Any other	VIII

The **Table 5.34** given above, represented that the problems encountered while implementing library computerization, "Non-availability of standard software" had ranked I faced by the library professionals, followed by "Resistance from the staff" ranked II, "Lack of management support"ranked III, "Lack of policy guidelines "ranked IV, "Low priority to library "ranked V, "Inadequate library budget "ranked VI, and "Under-trained library staff" ranked VII,. The "additional staff needed for ICT" had been identified the problem under the column of "Any other "ranked VIII.

It is observed that the 'Non-availability of standard software' is ranked I. The library automation was formulated to assess the entire library automation. The options were provided as: i) excellent ii) very good iii) good iv) fair and v) poor. The data were collected and summarized in the following **Table 5.35** given below.

Table 5.35: Assessment of Library Automation (Yes = Y, No = N)

Sr. No.	Name of the University	Performance of Library Software Used				
		Excellent	Very good	Good	Fair	Poor
1	AAU	N	**Y**	N	N	N
2	BSKKV	N	N	**Y**	N	N
3	JAU	N	**Y**	N	N	N
4	MKV	**Y**	N	N	N	N
5	MPKV	N	N	**Y**	N	N
6	NAU	N	**Y**	N	N	N

7	PDKV	N	N	**Y**	N	N
8	SDAU	N	**Y**	**N**	N	N

It is evident from the **Table 5.35** that 4 (50 %) respondents from AAU, JAU, NAU, and SDAU have assessed their satisfaction as **"**very good**",** followed by 3 (37.5 %) respondents from BSKKV, MPKV and PDKV have assessed their satisfaction as **"**good", 1 (12.5 %) respondents from MKV library has assessed their satisfaction as **"**excellent**"** whereas no one had assessed as **"**fair" and **"**poor".

5.20 ICT Infrastructure:

ICT Infrastructure is basic physical and organizational structures needed for the operation of a society, enterprise and for economic development. It can be generally defined as the set of interconnected structural elements that provides framework supporting an entire structure of development. It is an important backbone for judging a national development. For any national development infrastructure, there are various types of infrastructure such as: a) Transportation b) Energy c) Water management d) Communication and e) Economic Infrastructure.

Due to the unprecedented developments in computer and communication technology, the computers are used increasingly to automate various activities in agricultural libraries. Tremendous storage and processing potential of computers are being fully realized using ICT new technology. Communication and being fully realized are interdependent, inseparable and share a symbolic relationship. Therefore, ICT infrastructure namely computer (mini and main frame), electronic and communication technology and their fusion are used. The emergence of Internet as new tool of information delivery, coupled with availability of powerful hardware, software and networking technology has accelerated the large scale digitization programs allows the world. The CD-ROM products, online databases, multimedia products, printers, scanners, electronic journals are used for storing accessing the information. In this respect, several libraries had taken up to shift new information communication technology for their products, technology for their products, services and application.

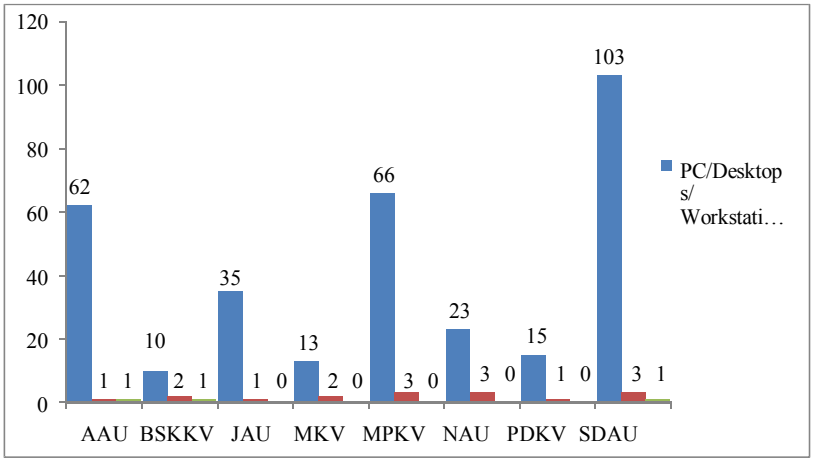
In view of the above, the question was designed to get the availability of ICT infrastructure while designing a question five groups were formed as i) Computers ii) Scanners iii) Printers iv) Digital equipments and v) Security systems. This is followed by various kinds of operating system while using ICT applications. a) Windows 95 / 98 / 2000 b) Window NT c) Window XP d) Window Seven e) LINUX f) UNIX g) Sun Solaris h) Novel Netware and i) Any other The collected data were statistically analyzed and interpreted using percentage and frequency distribution in **Table 5.36** mentioned below.

Table 5.36: ICT Infrastructures Available in Eight Agricultural University Libraries.

Hardware and Software																	
Name of the University	Computers (No. of items)			Printers (No. of items)					Scanners (No. of items)			Digital equipments (No. of items)			Security System (No. of items)	
	Servers/ CD servers	PC's /Desktops/ Workstations	Laptops	Dot matrix	Inkjet	Laser/ color laser	Barcode Printer	Identity card Printer	Scanners	Barcode Readers	Scanners for digitization	Digital Camera	Digital Video Camera	Web Camera	Electronic Surveillance System (ESS)/ CCTV	RFID
AAU	1	62	1	2	6	0	0	0	6	2	0	1	0	3	0	0
BSKKV	2	10	1	2	1	0	2	0	1	1	1	1	0	0	0	0
JAU	1	35	0	1	0	1	1	0	2	2	0	0	0	0	0	0
MKV	2	13	0	4	1	7	1	0	3	2	1	0	0	0	16	0
MPKV	3	66	0	1	1	2	1	0	1	2	0	0	1	0	21	0
NAU	3	23	0	0	2	6	0	0	2	0	0	0	0	0	0	0
PDKV	1	15	0	0	0	3	0	0	2	0	0	0	0	0	0	0
SDAU	3	103	1	0	0	5	0	0	1	2	0	0	0	2	3	0

The **Table 5.36** given above, it is evident that five categories have been clearly indicated. It is possible to devise four figures of each group as mentioned below. **First group of computers**: Includes as server, laptop, and personal computers (work stations)

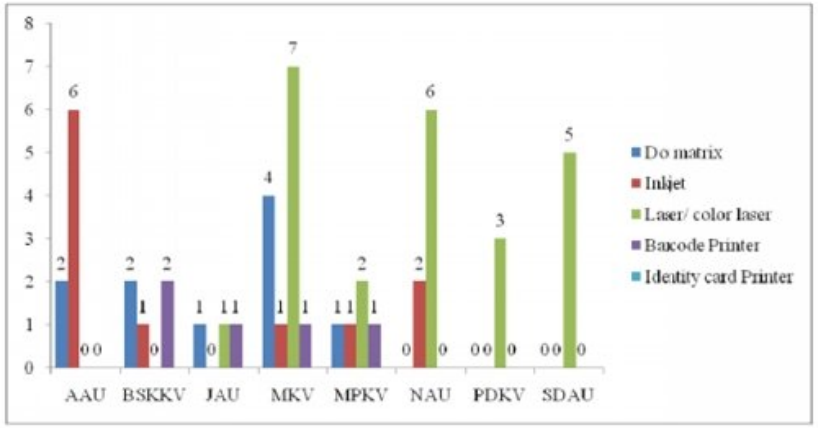
Figure 5.16: Availability of Computers



The **Table 5.36** and **Figure 5.16** given above, it seen that, in the first group of computers, 107 computers were available for the use of SDAU library, followed by 69 computers were available for use of MPKV , 64 computers were available for use of AAU, 36 computers were available for use of JAU, 26 computers were available for use of NAU, 16 computers were available for use of PDKV, 15 computers available for use of MKV, and 13 computers were available for the use of BSKKV.

The second groups of Printers, as this group comprising Dot Matrix, Inkjet, Laser / Color laser, Bar code Printer and Identity Card Printer. The **Figure 5.17** given below elaborates the availability and use of Printers.

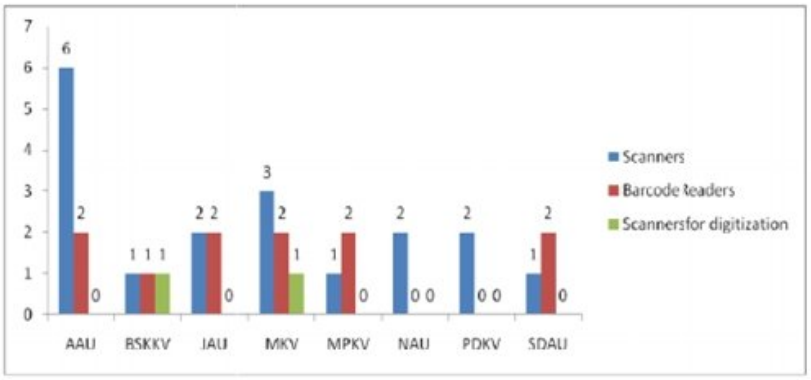
Figure 5.17: Availability of Printers



The **Table 5.36** and **Figure 5.17** given above, it is seen that 13 printers were available for the use of MKV, followed by 8 printers that were available for the AAU, 6 printers were available for the use of NAU, 5 printers were available for the use of MPKV, 4 printers were available for the use of BSKKV and 3 printers were available for the use of each of JAU and PDKV.

The third group of Scanners, as this group comprising Scanners, Bar code Reader and Scanner for Digitization. The **Figure 5.18** represents the data collected and presented.

F igure 5.18: Availability of Scanners



It is seen from the **Table 5.36** and **Figure 5.18** given above, it is seen from the data that, 8 scanners and available for the use of AAU, followed by 6 scanners were available for use of MKV, 4 scanner were available for use JAU, 3 scanners were available for the use in each of three libraries namely BSKKV, MPKV and SDAU, 2 scanners were available for use in each of two university libraries namely NAU, and PDKV.

The forth group of Digital Equipments, as this group comprising: a) Digital Camera b) Digital Video Camera and c) Web Camera.

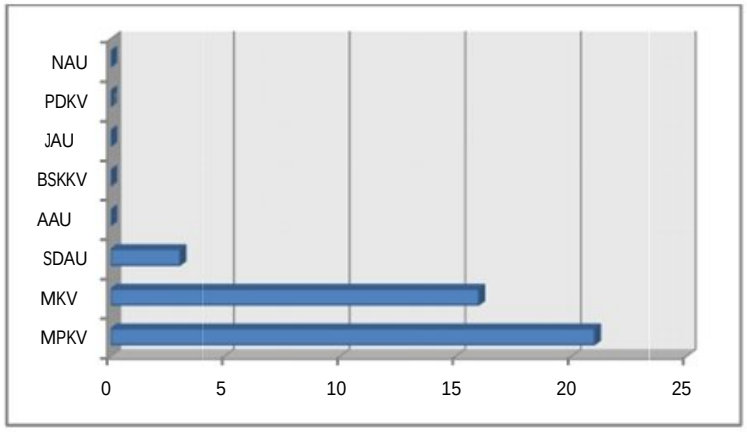
Table 5.37: Availability of Digital Equipments

		Digital Equipments		
Sr.No	Name of the University	Digital Camera	Digital Video Camera	Web Camera
1	AAU	1	0	3
2	BSKKV	1	0	0
3	JAU	0	0	0
4	MKV	0	0	0
5	MPKV	0	1	0
6	NAU	0	0	0
7	PDKV	0	0	0
8	SDAU	0	0	2

The **Table 5.37** given above represents that 4 digital equipments were available for the use of AAU, followed 2 digital equipments were available for the use of SDAU and one digital equipment was available for the use of each of BSKKV and MPKV libraries. Not single digital equipment was available for the use of four libraries namely: JAU, MKV, NAU, and PDKV.

Last group of Security System, as the group comprising: a) Electronic Surveillance Systems (ESS) and Radio Frequency Identification (RFID). The **Figure 5.19** mentioned below represents the data.

Figure 5.19: Availability of Electronic Surveillance System



The **Table 5.37** and **Figure 5.19** as given above, it is seen that 21 Security Systems namely Electronic Surveillance Systems (ESS) were available for the use of MPKV library followed by16 Security Systems namely Electronic Surveillance Systems were available with MKV, 3 Security Systems namely Electronic Surveillance were available for the use of SDAU. Not a Single Security Systems was available in AAU, BSKKV, JAU, NAU and PDKV. In case of Security System namely RFID was not at all available in any of the university libraries.

It is observed that lack of RFID Security Systems, as it is expensive technology.

5.20.1 ICT Tools as Physical Resources:

Information and Communication Technologies are making rapid strides consequently there is a need to use of electronic equipments in the digital era. The various kinds of electronic equipments, application and resources are being used while utilizing ICT services. Therefore, this question was asked to availability and use of electronic equipments. The options provided were: i) CD/DVD Writer ii) Modem /Networking equipments iii) LCD Slide Projector iv) Overhead Projectors v) VCR VCP vi) Television vii) Film Slide Projector viii) Recorder / Player ix) Beamers

(Data Projectors) x) Flash Memory Sticks and xi) Any other. Thus, data was gathered and summarized in below given **Table 5.38.**

Table 5.38: Availability of Electronic gadgets/ Multimedia Resources

(Yes = Y, No = N)

Name of the University	Availability of Electronic gadgets/ Multimedia Resources										
	CD/DVD Writers	Modem/ Networking equip.	LCD Projector	Overhead Projector	VCR/VCP	Television	Film Slide Projector	Recorder/Player	Beamers(Data Projector)	Flash Memory Sticks	Any other
AAU	Y	Y	Y	Y	N	N	N	X	N	N	N
BSKKV	Y	Y	N	N	N	Y	N	X	N	N	N
JAU	Y	Y	N	N	N	N	N	X	N	N	N
MKV	Y	Y	N	N	N	N	N	X	N	N	N
MPKV	Y	N	Y	N	Y	Y	N	X	N	N	N
NAU	Y	Y	Y	Y	Y	Y	Y	Y	N	N	N
PDKV	Y	Y	N	N	N	N	N	X	N	N	N
SDAU	Y	Y	Y	Y	N	N	N	X	N	N	N

The **Table 5.38** given above, it is observed that all the respondents had responded positively.

Electronic equipment of **Compact Disc/ Digital Video Disc (CD/ DVD)**, all the respondents were aware, use and available with them. Therefore, the storage technology techniques were very much used as ICT application.

Electronic equipment of **Modem** which translate the data from analogue to digital and digital to analogue, 7 (87.5 %) respondents from AAU, BSKKV, JAU, MKV, NAU, PDKV and SDAU were aware, use and available with them. Where as 1(12.5%) respondent from MPKV had expressed negatively.

Electronic equipment of **liquid crystal display (LCD)** projector, 4 (50 %) respondents from AAU, MPKV, NAU and SDAU were aware, use and available with

them, whereas 4 (50 %) respondents from BSKKV, JAU, MKV, and PDKV had expressed negatively.

Electronic equipment of **Overhead Projector**, 3 (37.5 %) respondents from AAU, NAU and PDKV libraries were aware, use and available with them. Where as 5 (62.5 %) respondents from BSKKV, JAU, MKV, and PDKV had expressed negatively.

Electronic equipment of **Video Cassette Recorder**/ **Video Cassette Player**, 2 (25 %) respondents from MPKV and NAU libraries were aware, use and available with them. Where as 6 (75 %) respondents from AAU, BSKKV, JAU, MKV, PDKV and SDAU had expressed negatively.

Electronic equipment of **Television**, 3 (37.5 %) respondents from BSKKV, MPKV and NAU libraries were aware, use and available with them. Where as 5 (62.5 %) respondents from AAU, JAU, MKV, PDKV and SDAU had expressed negatively.

Electronic equipment of **Film Slide Projector**, 1 (12.5 %) respondent from NAU library were aware, use and available with them. Where as 7 (87.5%) respondents from AAU, BSKKV, JAU, MKV, MPKV, PDKV and SDAU had expressed negatively.

Electronic equipment of **'Recorder / Player'**, 1(12.5%) respondent from NAU library were aware, use and available with them. Where as 7 (87.5 %) respondents from AAU, BSKKV, JAU, MKV, MPKV, PDKV and SDAU had expressed negatively.

Electronic equipment of '**Beamers (Data Projectors) Flash Sticks'** and 'any other' were not used in eight university libraries. The option 'any other' means other than the option provided in the questionnaire.

Operating Systems, in case of series of Windows 95, 98 and 2000, 4 (50 %) respondents were using this system. These libraries were: BSKKV, MPKV, PDKV and SDAU. Whereas 4 (50 %) respondents from AAU, JAU, MKV and NAU were noted using this system.

Table 5.39: Operating System Used (Yes = Y, No = N)

Operating System Used (Y/N)									
Name of the University	Win95/98/ 2000	Win-NT	Win - XP	Win-7	Lunix	Unix	Sun Solaris	Novell Netware	Any other
AAU	N	N	N	N	Y	N	N	N	-
BSKKV	Y	N	Y	N	N	N	N	N	-
JAU	N	N	Y	N	N	N	N	N	-
MKV	N	N	Y	N	Y	N	N	N	Win-Vista
MPKV	Y	N	Y	N	N	N	N	N	-
NAU	N	N	Y	N	N	N	N	N	-
PDKV	Y	N	Y	N	N	N	N	N	Win-Vista
SDAU	Y	N	Y	Y	Y	N	Y	N	-

It is observed that the operating systems such as WIN NT, UNIX and Novel Netware do not at all exist in any one of the university library. As these are the advance extended technology systems which required trained manpower.

5.21 Telecommunication Services:

Telecommunication means sending information in any form from one place to another using electronic mail. Data communication is a more specific term. It describes the transmitting and receiving of data over communication links. It may comprise wires, co-axial, fiber cables, optical fibers, radio waves, micro waves or another media of transmissions. In the agricultural libraries, specific media such as: a) Electronic mail b) modem c) wireless networking d) any other. Therefore, this question was designed to get the opinion on the same. All the respondents had responded their choices.

The **'modem and electronic mail'**; all the respondents have expressed their choices positively. It means Internet technology is used in agricultural libraries in a sound manner with these kinds of telecommunications media.

Item **'wireless network'** is concerned, 3 (37.5 %) respondents from AAU, BSKKV and NAU have expressed their views positively, whereas 5(62.5 %) respondents from JAU, MKV, PDKV, and SDAU expressed their view negatively. The option 'any other' means other than the option provided in the questionnaire.

It is noticed that 'modem and electronic mail' are the instant media communication in the ICT era.

Table 5.40: Telecommunications Media (Yes = Y, No = N)

Name of the University	Telecommunications Media			
	Modem	E-mail	Wireless Network	Any Other
AAU	N	Y	Y	N
BSKKV	N	Y	Y	N
JAU	N	Y	N	Fax/ Speaker
MKV	N	Y	N	N
MPKV	N	Y	N	N
NAU	N	Y	Y	N
PDKV	N	Y	N	N
SDAU	X	Y	N	N

5.22 Network / Internet Connectivity:

A computer network often simply referred to as a network is a collection of hardware and computer interconnected by communication protocol that allow sharing of resources and information communication protocol define the rules and data format for network exchanging information in a computer network and provide the basis of network programming. As there is wide variety of networks, such as Personal Area Network, Computer Network, Local Area Network, Metropolitan Area Network , Wide Area Network, Enterprise Private Network, Virtual Private Network, Internet Network, Intranets and Extranets, Internet.

Whereas, the Internet is a global system of interconnected computer networks and use the Standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of Private, Public academic, business and government network of local to global scope, that are linked by a broad array of electronic, wireless, optical network technology and Internet

carries extensive range of information resources and services. Such interlinked hypertext documents of the World Wide Web (WWW) and the infrastructure to support e-mail.

In this context, this question was designed to know the network related questions. These broad concepts are: a) Local Area Network b) Internet Connectivity c) Internet Service Providers (ISP) d) Types of Connections e) Information Bandwidth f) Anti-virus Security Systems g) Agricultural University Libraries Network h) Internet Access Point i) Network Problems and j) Backup.

The data is presented in the **Table 5.41** as under.

Table 5.41: Total Number of LAN Connections

Sr. No.	Name of the University	No. of LAN connections
1	AAU	60
2	BSKKV	10
3	JAU	35
4	MKV	40
5	MPKV	66
6	NAU	19
7	PDKV	15
8	SDAU	50

The **Table 5.41** given above, all the respondents had expressed their view positively. In case of total number of LAN connections, as many as 66 points of nodes are available for LAN in the MPKV, followed by 60 points of nodes are available for LAN in the AAU, 50 points of nodes are available for LAN in the SDAU, 40 points of nodes are available for MKV, 35 points of nodes are available for JAU, 19 points of are available for available for NAU, 15 points are available for PDKV and 10 points of nodes are available for BSKKV.

It is observed the Internet Connectivity in the form of Local Area Network (LAN) is in sound position.

Seek the information on types of Internet Connection. The options were provided as: a) Dial-up b) Broadband c) Leased line d) ISDN e) V-SAT f) RF Technology (Wireless) g) Cable Modem and h) Any Other. Accordingly, the data were collected and presented. It is revealed that 4 (50 %) respondents had connection of Internet i.e. **"Broadband"** in the BSKKV, JAU, MKV and MPKV. Whereas remaining four university libraries were not having this connection. These universities were AAU, NAU, PDKV and SDAU. This is followed by 3(37.5 %) respondents had connection of Internet i.e. **"Leased Line"** in the NAU, PDKV, and SDAU. Whereas remaining five university libraries were not having this connection. These university libraries were AAU, BSKKV, JAU, MKV, and MPKV, 2(25 %) respondents had connection of internet i.e. **"V-SAT'** (Very Small Aperture Terminal) in the MKV and MPKV. Whereas remaining six university libraries were not having this connection. These university libraries were AAU, BSKKV, JAU, NAU, PDKV and SDAU. Only one (12.5 %) respondents had connection i.e. **"Cable- Modem"** in the AAU. Whereas remaining seven university libraries were not having this connection. These were: BSKKV, JAU, MKV, MPKV, PDKV and SDAU.

The type of connections such as Dial-up, ISDN, RF Technology (Wireless) and 'Any other' were not at all used in eight university libraries. As Dial-up & ISDN is obsolete method of connection. Radio Frequency (RF) Technology is also not so popular method as very new methods of connections are coming up. The option "Any other" is other than option provided.

Internet Service Providers (ISP), means is an organization that provides access to the Internet. These accesses directly use to connect user / client to the Internet using Copper wires, Wireless, and Fiber Optics connections. Internet Service Provider firms are identified as: a) ERNET India b) BSNL c) VSNL d) TATA e) Reliance f) Sify and g) Any Other. The data were collected and summarized in the following **Table 5.42** given below.

Table 5.42: Internet Service Providers (Yes = Y, No = N)

Internet Service Provider							
Sr. No.	**Name of the University**	**ERNET India**	**BSNL**	**VSNL**	**TATA**	**RELIANCE**	**SIFY**
1	AAU	**Y**	N	N	N	N	N
2	BSKKV	N	**Y**	N	N	N	N
3	JAU	N	**Y**	N	N	N	N
4	MKV	N	**Y**	N	N	N	N
5	MPKV	**Y**	**Y**	N	N	N	N
6	NAU	N	N	**Y**	N	N	N
7	PDKV	N	N	**Y**	N	N	N
8	SDAU	N	N	**Y**	N	N	N

The **Table 5.42** revealed that 4 (50 %) respondents from BSKKV, JAU, MKV and MPKV libraries were subscribing Internet services from BSNL, whereas remaining four university libraries not subscribing to this. These university libraries were AAU, NAU, PDKV, and SDAU, followed by 3 (37.5 %) respondents from NAU, PDKV, and SDAU libraries were subscribing Internet services from VSNL, whereas remaining five respondents from AAU, BSKKV, JAU, MKV, and MPKV were not to subscribing this. 2 (25 %) respondents from AAU, MPKV, libraries were subscribing Internet services from ERNET India. Whereas remaining six university libraries from BSKKV, JAU, MKV, NAU, PDKV and SDAU were not subscribing to this. The Internet Service Providers namely TATA, Reliance, SIFY and any other were not at all subscribing to this service.

It is observed that in the field of Research and Development as well as educational institutions / organizations using internet connection from the undertaking bodies of the government of India.

The libraries are connected to the Internet and whether it is shared, dedicated one and third options was “any other” and to state their comments. The data were collected and presented in the following **Table 5.43** mentioned below.

Table 5.43: Internet Connectivity to Library (Yes = Y, No = N)

Sr. No.	Name of the University	Internet connectivity		
		Shared	Dedicated	Any other
1	AAU	N	**Y**	N
2	BSKKV	**Y**	N	N
3	JAU	**Y**	N	N
4	MKV	**Y**	N	N
5	MPKV	**Y**	N	N
6	NAU	**Y**	N	N
7	PDKV	N	**Y**	N
8	SDAU	N	**Y**	N

The **Table 5.43** given above, it is evident that 5 (62.5 %) respondents from BSKKV, AAU, MKV,MPKV and NAU libraries were using "shared line" whereas 3 (37.5 %) respondents from AAU,PDKV, and SDAU were using "dedicated line" of Internet. The option given as "any other" mean other than the fields given in the questionnaire and not expressed by any one.

Bandwidth is a measure of the width of range and frequencies, measure in 1 hertz. The option provided were as: i) 256 kbps ii) 512 kbps iii) 1 mbps iv) more than 1 mbps. Thus data collected and summarized in following **Table 5.44.**

Table 5.44: Bandwidth (Yes = Y, No = N)

Name of the University	Bandwidth			
	256 KBPS	512 KBPS	1 MBPS	More than 1 MBPS
AAU	N	N	N	**Y**
BSKKV	**Y**	N	N	N
JAU	**Y**	N	N	N
MKV	N	N	N	**Y**
MPKV	N	N	**Y**	N
NAU	N	N	N	**Y**
PDKV	N	N	N	**Y**
SDAU	N	N	N	**Y**

The **Table 5.44** given above, it is seen that 5 (62.5 %) respondents from AAU, MKV, NAU, PDKV and SDAU libraries were utilizing speed of 'more than 1 mbps' internet services, whereas 2 (25 %) respondents from BSKKV and JAU libraries were utilizing speed of 256 kbps. 1 (12.5 %) respondents from MPKV is utilizing a speed of 1 mbps of internet. The speeds of Internet services i.e. 512 kbps were not at all using any one of the university library.

The Anti-virus Security System for the data preservation and up keepness of the database. Usually, this software used to prevent, detect and remove mail ware.The respondents to elicit their opinion about anti-virus security system software. Three options were provided as under.

a) Whether this software always up to date on their PC?

b) Whether their library shares the electronic resources to other library? and

c) If answer is positive, under which library associate the data and its name. While seeking data was elicited and tabulated in the following pattern: The **Table 5.45** given below represents the data.

Table 5.45: Name of the Anti-Virus Software Used

Sr. No.	Name of the University	Name of Anti-Virus Software
1	AAU	Quick Heal Security
2	BSKKV	Norton
3	JAU	Quick Heal Security
4	MKV	Quick Heal Security
5	MPKV	Symantec
6	NAU	Quick Heal Security
7	PDKV	Net Protector 2011
8	SDAU	Norton

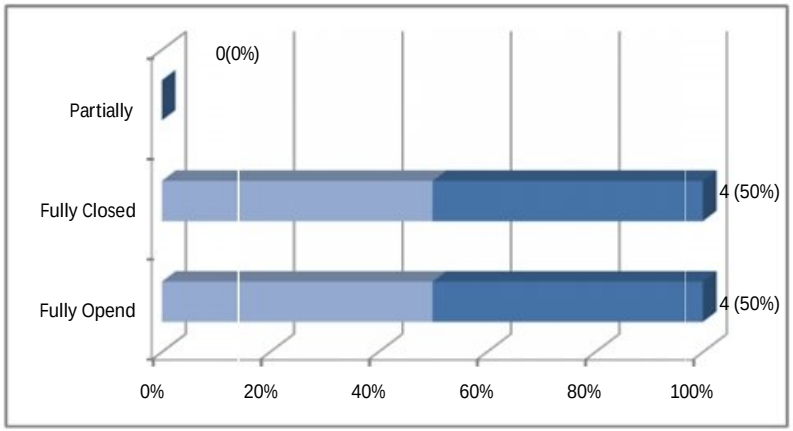
The **Table 5.45** given above, it is seen that all the university libraries were uploaded the antivirus software. 4 (50 %) respondents of university libraries were uploaded and operated by them from time to time to prevent the data i.e. **"Quick Heal Security".** These universities were namely AAU, JAU, MKV and NAU, followed by 2 (25 %) respondents from BSKKV and SDAU were uploaded and operated by them from time to time to prevent data i.e. **"Norton".** 1 (12.5 %) respondent each from

MPKV uploaded and being operated by them from time to time to prevent the data i.e. **"Symantec"** and PDKV was uploaded and operated **"Net Protector 2011".**

.It is satisfying to note that all the respondents from all the universities are ready to share their resources to other member libraries, as it shows their mood of consortia movement is appreciated in the ICT era.

The information on access to the Internet services in relation to internal users. The options provided were: a) fully opened b) fully closed c) Partially open. Thus, data were collected and presented in **figure 5.20** given below.

Figure 5.20 Accesses to Internet Service



The figure **5.20** given above, revealed that 4 (50 %) respondents have allowed to access the Internet service to their internal users i.e. "fully opened". The respondents were namely: JAU, MPKV, NAU and SDAU. Where as 4 (50 %) respondents have allowed to access the Internet service to their internal users i.e. "partially open". These libraries were: AAU, BSKKV, MKV and PDKV. The option of "fully closed" was not opted by any one of the respondents.

In case of outside users, the libraries namely from AAU, MKV, PDKV and SDAU, 4 (50 %) respondents had expressed their views to allow to use the ICT services and its applications. Where as 4 (50 %) respondents had expressed negatively

for access to outsiders. These university libraries were: BSKKV, JAU, MPKV and NAU.

Any permission was required for outsiders. It is evident that all the respondents had expressed their responses. 5 (62.5 %) respondents from AAU, BSKKV, JAU, MPKV and NAU had expressed their view negatively on the issue of outsiders need prior permission to use the library ICT services and its applications. Whereas 3 (37.5 %) respondents expressed their view positively in the view of outsiders need prior permission to use the ICT services and its applications namely: MKV, PDKV, and SDAU.

It is observed that using ICT based library services outsides were allowed to access and use their services positively in the 5 (62.5 %) university libraries. Only 3 (37.5 %) respondents had reservations while accessing this ICT based services to outsiders.

It is observed that 62.5 % university libraries were ready to access their data positively which is noteworthy attitude in democratic process of the nation.

Generally, uninterrupted power supply is very much essential in the network area. Besides this, several problems are faced by the users. In this respect, this question was addressed to library professionals to state their frequencies of problems faced in the network connectivity. This question provides readymade options to the respondents as i) Access Control ii) Computer Viruses iii) Low Bandwidth d) Other if any. While measuring the frequency of problems, option formulated a) Rarely b) Sometimes c) Often d) Very frequently. Thus, data were collected and presented in the following **Table 5.46.**

Table 5.46: Frequency of Network Problem (Yes = Y, No = N)

Sr. No.	Name of the University	Access control			
		Rarely	Sometimes	Often	Very Frequently
1	AAU	N	**Y**	N	N
2	BSKKV	N	**Y**	N	N
3	JAU	N	**Y**	N	N
4	MKV	N	**Y**	N	N
5	MPKV	**Y**	N	N	N

6	NAU	**Y**	N	N	N
7	PDKV	**Y**	N	N	N
8	SDAU	N	**Y**	N	N

The **Table 5.46** mentioned above, it is seen that all the respondents have given their choices. The types of problem of computer access, 5 (62.5 %) respondents from AAU, BSKKV, JAU, MKV and SDAU have rated their problem as " Sometimes" whereas other 3 (37.5 %) respondents have rated their problem as " Rarely" these respondents are: MPKV, NAU and PDKV.

The option for rating the problem as "Often" and "Very Frequently" are concerned, none of the respondents rated this option.

Table 5.47: Computer Viruses (Yes = Y, No = N)

Name of the University	Computer viruses			
	Rarely	**Sometimes**	**Often**	**Very Frequently**
AAU	N	**Y**	N	N
BSKKV	N	**Y**	N	N
JAU	N	N	**Y**	N
MKV	N	**Y**	N	N
MPKV	N	N	**Y**	N
NAU	**Y**	N	N	N
PDKV	N	**Y**	N	N
SDAU	**Y**	N	N	N

About types of problems of Computer Viruses, 4 (50 %) respondents from AAU, BSKKV, MKV, and PDKV have rated their problems as "sometimes". This followed by 2 (25 %) respondents have rated as "rarely'. These respondents are from NAU, and SDAU. The remaining 2 (25 %) respondents have rated as "often". these universities are JAU and MPKV.

Table 5.48: Frequency of Low Bandwidth (Yes = Y, No = N)

Name of the University	Low Bandwidth			
	Rarely	**Sometimes**	**Often**	**Very Frequently**
AAU	N	**Y**	N	N
BSKKV	N	**Y**	N	N
JAU	N	N	**Y**	N

MKV	N	**Y**	N	N
MPKV	N	**Y**	N	N
NAU	**Y**	N	N	N
PDKV	**Y**	N	N	N
SDAU	**Y**	N	N	N

The types of problems of Low Bandwidth, 4 (50 %) respondents from AAU, BSKKV, MKV and MPKV have rated their problem as **"sometimes"** 3 (37.5 %) respondents from NAU, PDKV and SDAU have rated their problem as **"rarely".** Only 1 (12.5 %) respondent from JAU has rated their problem as **"often".** The response choices of **"**very frequently**"** and 'others' are not expressed by any one else.

The comparing the study of: i) access control ii) computer viruses and iii) low bandwidth, 62.2 % respondents rated for the types of problems of **'access control'** faced **"sometimes".** 50 % respondents rated for the types of problems of **'computer viruses'** and **'low bandwidth'** faced **"sometimes".**

The terms **"Web 2.0"** is originally coined by Dale Daugherty and Tim O'Reily in the year 2004 during a brain storming session of a special conference organized to discuss the future of web and emerging techniques. This is a dynamic platform for productive communications. Web 2.0 is a user-centered websites, where blog, wikis, social networks, multimedia applications, dynamic programming scripts are being used for collection, contribution and collaboration concepts on the web. Therefore, this semantic web and inter operability of various tools and techniques. So this question was asked to state their perception about Web 2.0 tool for scientific communication.

Table 5.49: Use Web 2.0 for Scientific Communication (Yes = Y, No = N)

	Yes	**No**
Responses	1	7
Percentage	12.5 %	87.5 %

The Table 5.49 given above, it is seen that 7 (87.5 %) respondents were not using the software Web 2.0 as tool for scientific communication especially to load their

productive research activities. Where as 1 (12.5 %) respondent from NAU was expressed his perception positively for Web 2.0 semantic web version.

It is observed that scientific communication is usually covers the topics in social sciences and humanities. Communications is traditionally divided into two types a) formal and b) informal. Scholarly communication typically access between researcher and general audience. The electronic mail and electronic video conferences are common method of propagating their research activities. As Web 2.0 is transmission model being used for many everyday purposes by the researchers.

If power failure, library professionals unable to carry out and present the demonstrations of library activities as well as other services. The electric power is integral part of the ICT services. Therefore, back-up of data is essential for every day activities of library professionals. Nevertheless, this question was posed to the library professionals to state their opinions about back-up system. While responding these questions, 6 (75 %) respondents from BSKKV, MKV, MPKV NAU, PDKV and SDAU have expressed that they are using UPS, Inverters and Generators for back-up of data in power failure. Whereas 2 (25 %) respondents from AAU and JAU have expressed their opinion negatively as they would have back-up data in case of power failure.

It is observed that 2 (25 %) respondents have to make a provision of back-up of data in case of power failure.

5.23 Digital Library:

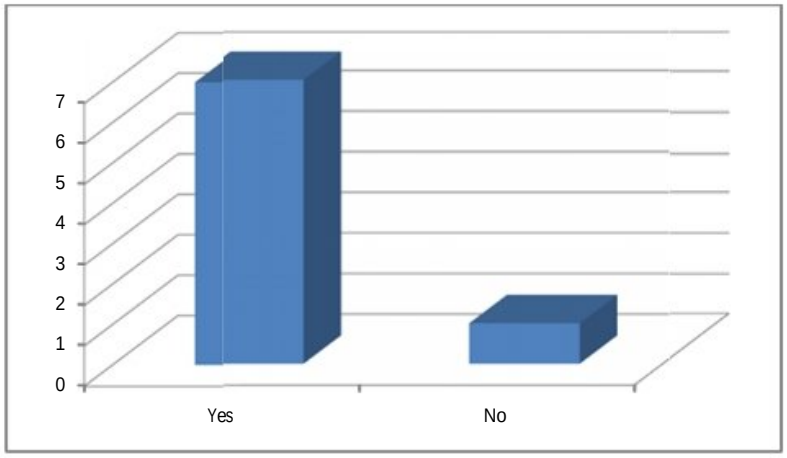
Most of the education and research institutions are funded by the central and state governments. These institutions have made a significant contribution to the transmission of knowledge and to research in all fields and disciplines. Universities and research institutes have played a leading role in transforming the country into a modern industrialized and technologically advanced state. The libraries of those institutions also play a vital role in acquiring and disseminating information for academic activities. Digital libraries are a way of making education and research data and information available to faculty, scientist, students and others at the institutions and worldwide.

The traditional method of collecting, storing, processing and accessing information has undergone a massive transformation due to the growth of virtual libraries, digital libraries, online databases and library and information networks. Digital technology, Internet connectivity and physical content can now be developed, resulting in a digital library. In India, a substantial number of libraries and information centers have initiated digital library projects including and e-journals or by digitizing their own valuable collections. In this relation, this question was designed to seek information on digital library Initiation program consists of the following area as under.

i. Initiative of developing a digital library
ii. Funds
iii. Software used for digital library
iv. Nature of document which includes digital library
v. Collections on subjects and total number of documents
vi. Digital library enabled websites
vii. Institutional Repository (IR)
viii. Objectives of Institutional Repository
ix. Electronic book
x. Name of the library consortium
xi. Participation of consortium

The information on whether library has taken any initiative of developing a digital library. Thus, data were gathered and presented in the following Figure **5.21**.

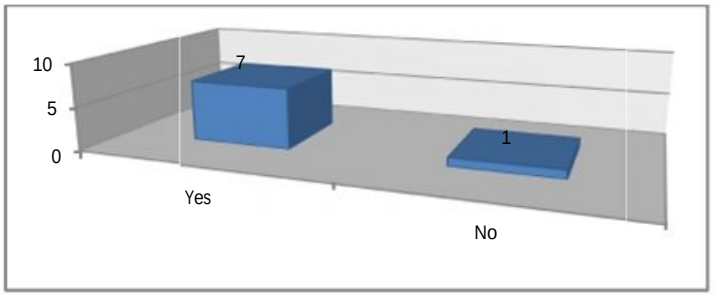
Figure 5.21: Initiative for Development of Digital Library



From the figure given above, it is seen that 7 (87.5 %) respondents from AAU, BSKKV, JAU, MKV, MPKV, NAU and PDKV have responded their choice positively, whereas 1 (12.5 %) respondent from SDAU has expressed his choice negatively.

The library professionals where asked to elicit the information on whether they get funds from ICAR for initialization of digitization their collections. The data were obtained and presented in the following Figure 5.22

Figure 5.22: Separate Funds from ICAR for the Digital Library



The above **Figure 5.22** reveals that 7 (87.5 %) respondents from AAU, BSKKV, JAU, MKV, MPKV, NAU and PDKV have responded their choices positively; where as 1 (12.5 %) respondent from SDAU has not responded.

Name of digital library software they used. Accordingly, data were gathered but all the respondents are remains silent to this question. As all the university libraries are getting funds from the ICAR, apex body at national level for digital library and they entered into the contract of fixing up agency/institutions for digitizing the activity of their collection.

For documents to be digitized, thus, data were collected and reveals that 4 (50 %) respondents from BSKKV, MKV, MPKV and PDKV have stated specifically mentioned the PhD theses of the document, whereas 3 (37.5 %) respondents from AAU, JAU and SDAU have remained silent. 1 (12.5 %) respondent from NAU has expressed his view as digitization is under process.

The collection, subject and total number of documents covered in the digital library. Nevertheless, the data were collected and studied. A total number of 28154 PhD theses and M.Sc. dissertations were digitized by the four university libraries. This information was authenticated by the libraries on their websites.

Access to the digital library on their library website, as such, data were obtained, studied and analyzed that 4 (50 %) respondents have expressed their opinion on access to the digital library on their library website. These libraries were: MKV, MPKV, PDKV and SDAU Whereas 4 (50 %) respondents remain silent. These libraries were: AAU, BSKKV, JAU and NAU.

The library professional are planning to create an Institutional Repository. As the data were collected and analyzed. It is seen that 6 (75 %) respondents namely JAU, MKV, MPKV, NAU, PDKV and SDAU expressed their view as they are planning to create an Institutional Repository. Where as 2 (25 %) respondents namely: AAU and BSKKV are remained silent.

Table 5.50: Planning to Create an Institutional Repository

(Yes = Y, No = N)

University	Planning to create an Institutional Repository	If yes outline the plans
AAU	Y	-
BSKKV	N	-
JAU	Y	-
MKV	Y	I. Repository of Question papers, PhD theses, E-books, Current contents, Ongoing research, Syllabus, etc. for the benefit of users
MPKV	Y	Theses, research reports, Annual reports, etc. are to be made available through Internet by creating Institutional Repository under e-Granth Project.
NAU	Y	Digitization of library material work is in progress
PDKV	Y	Digital material will be kept on website, University research publications will be digitized.
SDAU	Y	-

For the outline, plan and objectives of institutional repository, majority of the respondents have communicated their motive to plan and develop Institutional Repository.

Regarding information on electronic books and electronic journals, data were collected and seen that 3 (37.5 %) respondents from AAU, JAU and NAU have expressed that they subscribe **e-books**, whereas 5 (62.5 %) respondents from BSKKV, MKV, MPKV, PDKV and SDAU have expressed that they do not subscribe e-books.

In case of **e-journals** it is seen that, 4 (50 %) respondents from JAU, MKV, MPKV and NAU have expressed that they do subscribe e-journals for their use. Where as 4 (50 %) respondents have expressed negatively. These libraries are AAU, BSKKV, PDKV and SDAU.

The library professionals mentioned the name of the consortium. Accordingly, data were collected. It is seen that all the respondents have expressed that they get online journals on agricultural and allied subjects through Consortium for electronic Resources in Agriculture (CeRA).

In view of the above, it is observed as under:

i. Digital library and digitization are crucial for disseminating and preserving knowledge. Digital libraries activities are gathering momentum in agricultural university libraries especially in western India. Since most of the university libraries are funded and controlled by the central and state government, the clear cut digitization program and policies needed for infrastructure, standards, metadata, interoperatibility, multi-lingual databases, training support, co-ordination, copyright and archiving and preservation methods, so that of PhD theses and M.Sc. dissertations can be greatly benefited by researcher.

ii. For the 50 % of the university libraries are very much needed technical support in respect of digitizing entire collection on PhD theses and M.Sc. dissertations for the future use. These technical support means trained computer specialists, hardware and software, sophisticated scanners, printers, digital cameras, high bandwidth connectivity, back-up system to protect data in case of power failure and high performance workstations and like. About 50 % of the agriculture libraries need to support by providing more funds and encourage them to go ahead with digitization program of their core collection for the benefit of users.

iii. While developing Institutional Repository (IR) everyone has to initiate planning and management of digitizing their own collection and make it ready for information retrieval as and when required by their users.

5.24 Responses Sought and Analyzed:

Respondents had communicated their comments on future plan while developing ICT use in library. The respondents from JAU, MPKV, NAU, and PDKV have offered comments as under respectively:

i. While developing future plan on the programme of ICT use and its application, maximize the facilities to their users for the best access to e-resources especially to students and researchers.

ii. For the benefit of users single window access point is being developed through digital library portal. The library portal is being designed for the core group of users. This work is in progress.

iii. The respondents had vision of entire library collection to be digitized, network facilities to be extended for maximization of use of collection. In order to protect the library collection, RFID system is being implemented at their libraries.

iv. The program of special collection such as M.Sc. Dissertations and PhD theses are to be digitized and the work is in progress. This collection would be linked and will be made available to the remote users through websites.

5.25 Expert Comments by Respondents:

Respondents had communicated their valuable comments on overall improvement about university libraries. The respondents from MPKV, NAU and PDKV had provided respectively.

i. The concept of sustainable development must be cultivated by allocating funds to libraries. Also there is great need of training of staff. Lack of trained staff is also the main hurdle while handling ICT based services. In the complex of ICAR, library staff should have been recruited according to the norms given by the ICAR.

ii. The joint venture of ICAR and INFLIBNET consortia activities are very useful and valuable, due to the development of ICT, special grants should be provided by the ICAR to develop IT cell in the university library.

iii. Entire university library collection is to be uploaded on Online Public Access Catalogue (OPAC). Subject catalogue is provided to users.

CHAPTER VI

LIBRARY USERS: DATA ANALYSIS AND INTERPRETATION

6.1 Introduction:

Users are major components of the library and information system. In order to study the use of ICT in all the eight agricultural universities in western part of India, 400 users from these universities were selected. Nature of services being provided by the university libraries are similar and users are also from the categories of UG/PG students, research scholars, faculty members, scientists, extension specialists, agricultural staff , which is also common in all the universities, a random sample of 50 respondents (users) per university has been taken. Of the 400 respondents selected for the study, 333 users have responded. University-wise, users identified and responses received are given in the following table:

Table 6.1: University-wise Response Rate of Respondents

Sr. No.	Name of the University	Questionnaire Distributed	Questionnaire Received	Percentage
1	AAU	50	34	68
2	BSKKV	50	38	76
3	JAU	50	40	80
4	MKV	50	47	94
5	MPKV	50	49	98
6	NAU	50	42	84
7	PDKV	50	39	78
8	SDAU	50	44	88
Total		**400**	**333**	**83.25**

Average 83 per cent respondents have indicated their opinion on use of ICT. The highest response percentage of 98 was from MPKV and the lowest was 68 % from AAU.

6.2 Demographic Information of Users:

In the first part of general information, nine questions were designed. This was regarding the specific names of user for identification and reliability. The question was asked to state the age of individual user on the date of filling up the questionnaire. However, age groups had been divided into eight categories. These are from 18-25 years as first group, 26-30 years as second group, 31-35 years as third group, 36-40 years as forth group, 41-45 years in fifth group, 46-50 years in sixth group, 51-55 years as seventh group and 56 and above as last group.

6.3 Age:

It is seen from the data that 193 **(57.96 %)** respondents belongs to the **age group of 18-25 years,** followed by 34 (10.21 %) respondents belongs to 26-30, 24 (7.21 %) respondents belongs to 46-50, 23 (6.91 %) respondents belongs to 56 and above, 22 (6.61 %) respondents belongs to 51-55, 14 (4.20 %) respondents belongs the age group of 21-35 and 12 (3.60 %) respondents belongs to the age group of 41-45 years and 11 (3.30 %) respondents belongs to the age group of 36-40 years.

It is evident that the highest respondents (58 %) were in the age group of 18-25 years.

6.4 Gender:

Table 6.2: Gender-wise presentation of the Respondents

Sr. No.	Respondents Category	Number of Respondents	Male (%)	Female (%)
1	UG/PG Student	193	133 (68.91)	60 (31.09)
2	Research Scholar	24	19 (79.17)	5 (20.83)
3	Faculty Member	78	72 (92.31)	6 (7.69)
4	Scientist	22	21 (95.45)	1 (4.55)
5	Extension Specialist	2	2 (100.00)	0 (0.00)
6	Agricultural Staff	6	6 (100.00)	0 (0.00)
7	Others	8	7 (87.50)	1 (12.50)
Total		**333**	**260 (78.08)**	**73 (21.92)**

The above **Table 6.2** reveals that 133 (68.91 %) respondents were male and 60 (31.09 %) respondents were female in the category of '**UG / PG students**, followed by 72 (92.31 %) were male and 6 (7.69 %) were female in the category of '**faculty members'**, 19 (79.17 %) were male and 5 (20.83 %) were female in the category of '**research scholar'**, 21 (95.45 %) respondents were male and 1 (4.55 %) respondent was female in the category of '**scientist**', 6 (100 %) respondents were male and no female in the category of '**agricultural staff**,' 2 (100 %) respondents were male and no female in the category of '**extension specialists'**. Whereas 7 (87.50 %) respondents were male and 1 (12.50 %) respondents were female, in the category of 'other', other means other than the option in the questionnaire.

It was observed that use of ICT applications in the field of agriculture, generally dominated by the male members.

6.5 Qualifications:

This question was addressed to the user category to know its educational and professional qualification. The objective of this question was to seek the particular status of respondents in population of present study. The data were gathered and shown in the **Table 6.3** given below.

Table 6.3: Educational and Professional Qualifications of Respondents

Sr. No.	Educational Qualifications	Number of Respondents	Percentage
1	B.Sc.	65	19.52
2	M.Sc.	96	28.83
3	B.Tech.	25	7.51
4	M.Tech.	12	3.60
5	M.B.A.	11	3.31
6	B.V.Sc & A. H.	3	0.90
7	M.V.Sc.	15	4.50
8	Ph.D.	106	31.83
	Total:	**333**	**100.00**

The above **Table** shows that 106 (31.83 %) respondents are doctorate degree (PhD) followed by 96 (28.83 %) respondents are M.Sc., 65 (19.52%) respondents are B.Sc., 25 (7.51 %) respondents are B. Tech., 15 (4.50 %) respondents are M.V.Sc, 12 (3.60 %) are M. Tech, 11 (3.31 %) respondents are MBA and 3 (0.90 %) respondents are B.V.Sc.& A.H.

It is observed that a majority of 106 (31.83 %) respondents are having qualifications of PhD in agricultural sciences and the rest being UG / PG degrees.

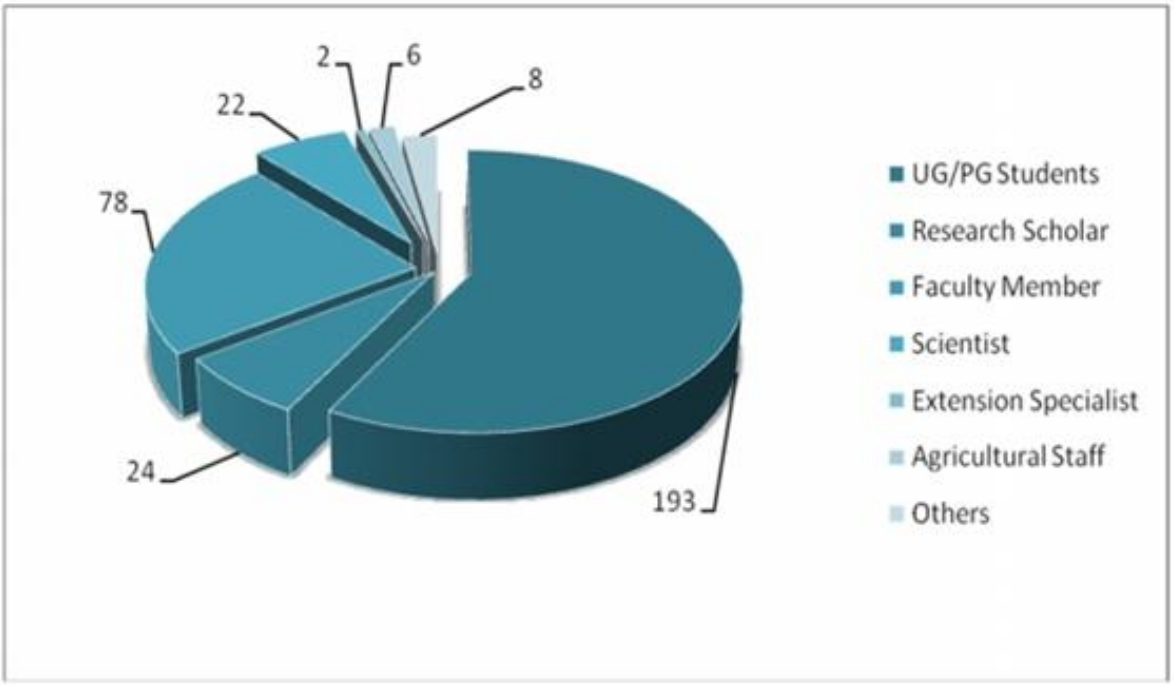
6.6 Category of Users:

This question was designed to understand the category of respondents. Their positions have been identified in the following categories: a) under graduate / post graduate students b) research scholar c) faculty member d) scientist e) extension specialist f) agricultural staff including agricultural supervisors, assistants, gardeners, etc. and g) others i.e. administrative staff . Thus, the data collected and presented in the **Table 6.4** and Figure **6.1** given below.

Table 6.4: **Category-wise Classification of Respondents**

Sr. No.	Respondents Category	Number of Respondents	Percentage
1	UG / PG Students	193	57.96
2	Research Scholars	24	7.21
3	Faculty Members	78	23.42
4	Scientists	22	6.61
5	Extension Specialists	2	0.60
6	Agricultural Staff	6	1.80
7	Other (administrative staff)	8	2.40

Figure 6.1 : Category-wise Classification of Respondents



The above **Table** and **Figure** indicates that 193 (57.96 %) respondents were 'under graduate as well as post graduate students' engaged in the teaching and research activities followed by 78 (23.42 %) from 'faculty members', 24 (7.21 %) from 'research scholars', 22 (6.61 %) from 'scientists', 6 (1.80 %) from 'agricultural staff', 2 (0.60 %) from 'extension specialists' and 8 (2.40 %) respondents were from 'others' category. It is possible to draw a **table 6.5** of gender-wise categorization of the respondents as below.

Table 6.5: University-wise, Category-wise and Gender-wise Response of Respondents

Sr. No.	Name of the University	UG/PG Student (N = 193)		Research Scholar (N = 24)		Faculty Member (N = 78)		Scientist (N= 22)		Extension Specialist (N= 2)		Agricultural Staff (N= 6)		Other (N= 8)	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
1	AAU	26 (13.47)	0 (0.0)	1 (4.16)	1 (4.16)	3 (3.84)	1 (1.28)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (16.66)	0 (0.00)	1 (12.5)	0 (0.00)
2	BSKKV	12 (6.22)	17 (8.81)	1 (4.16)	0 (0.00)	6 (7.69)	0 (0.00)	2 (9.09)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
3	JAU	16 (8.29)	3 (1.55)	4 (16.66)	4 (16.66)	8 (10.25)	1 (1.28)	0 (0.00)	0 (0.00)	1 (50.00)	0 (0.00)	2 (33.33)	0 (0.00)	1 (12.5)	0 (0.00)
4	MKV	27 (13.99)	5 (2.59)	2 (8.33)	0 (0.00)	6 (7.69)	0 (0.00)	2 (9.09)	0 (0.00)	1 (50.00)	0 (0.00)	1 (16.66)	0 (0.00)	3 (37.5)	0 (0.00)
5	MPKV	5 (2.59)	6 (3.11)	1 (4.17)	0 (0.00)	21 (26.92)	2 (2.56)	11 (50.00)	1 (4.55)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	2 (25.00)	0 (0.00)
6	NAU	12 (6.22)	4 (2.07)	8 (33.33)	0 (0.00)	14 (17.94)	1 (1.28)	3 (13.63)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
7	PDKV	18 (9.33)	14 (7.26)	0 (0.00)	0 (0.00)	4 (5.12)	0 (0.00)	2 (9.09)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	1 (12.5)	0 (0.00)
8	SDAU	17 (8.81)	11 (5.70)	2 (8.33)	0 (0.00)	10 912.82)	1 (1.28)	1 (4.54)	0 (0.00)	0 (0.00)	0 (0.00)	2 (33.33)	0 (0.00)	0 (0.00)	0 (0.00)
Total		**133 (68.91)**	**60 (31.09)**	**19 (79.17)**	**5 (20.83)**	**72 (92.31)**	**6 (7.69)**	**21 95.45)**	**1 (4.55)**	**2 (100.0)**	**0 (0.00)**	**6 (100.00)**	**0 (0.00)**	**8 (100.00)**	**0 (0.00)**

6.7 Users and their Departments:

The Agricultural Universities are complex of the multidisciplinary departments in the fields of agricultural sciences, technologies and allied subjects. The following table gives the department-wise respondents:

Table 6.6: Department-wise Respondents

Sr. No.	Departments	Total Number of Respondents	Percentage
1	Agriculture and Allied Subjects	274	82.28
2	Veterinary and Animal Sciences	41	12.32
3	Food Science and Technology	4	1.20
4	Forestry	8	2.40
5	Home Science	6	1.80
	Total	**333**	**100.00**

It was observed that 274 (82.28 %) respondents were from 'departments of agriculture and allied subjects'. This is followed by as 41 (12.32 %) respondents were from 'departments of veterinary and animal sciences', 8 (2.40 %) respondents were from 'departments of forestry', 6 (1.80 %) respondents were from 'departments of home science'. 4 (1.20 %) respondents were from the 'department of food science and technology.' None was from the fisheries sciences department.

6.8 Frequency of Library Visit:

Libraries are the store house of knowledge of the university. The Libraries are the backbone of the teaching, research and extension endeavor in the area of agriculture sciences and technology. Therefore, this question was addressed to the respondents to know the frequency of use of library and information centre in eight universities in western India. As such, data were gathered and presented in the **Table 6.7** given below.

Table 6.7: Frequency of the Use of Library

Sr. No.	Frequency of Use	No. of Respondents	Percentage
1	Daily	181	54.35
2	Twice a week	69	20.72
3	Weekly	43	12.91
4	Fortnightly	8	2.40

5	Monthly	17	5.11
6	Occasionally	15	4.51
	Total	**333**	**100**

The figures as given in the **Table** reveals that 181 (54.35 %) respondents are using their library 'daily'. This is followed by 69 (20.72 %) respondents are using their library 'twice a week', 43 (12.91 %) respondents are using their library 'weekly', 17 (5.11 %) respondents are using their library 'monthly', 15 (4.51 %) respondents are using their library 'occasionally' and 8 (2.40 %) respondents are using their library 'fortnightly'.

It is observed that 54.35 % respondents of the various categories are visiting and using their library for the purpose of the education, research, and extension education activities. It means libraries are not only the storehouse of knowledge but also act as an agency between knowledge and users of it.

6.9 Library Hours:

Normally, working hours are an important factor for library users. Accordingly, data on library hours were collected and presented that 177 (91.71 %) out of 193 respondents expressed their satisfaction with existing working hours, whereas 16 (8.29 %) respondents were displeased with this, in the category of 'UG / PG students', 74 (94.87 %) out of 78 respondents are expressed their satisfaction with the working hours, whereas 4 (5.13 %) respondents displeased, in the category of 'faculty members', 23 (95.83 %) out of 24 respondents expressed their satisfaction with the working hours, whereas 1 (4.17 %) respondents expressed dissatisfaction, in the category of 'research scholars', 22 (100 %) out of 22 respondents are expressed their satisfaction with the library hours in the category of 'scientists', 6 (100 %) out of 6 respondents are expressed their satisfaction with the working hours in the category of 'agricultural staff ', and 1 (50 %) out of 2 respondents are expressed their satisfaction with working hours, whereas 1 (50 %) respondents are expressed negatively. In the category of 'extension specialist', and 6 (75 %) out of 8 respondents are expressed their satisfaction with working hours, whereas 2 (25 %) respondents are expressed negatively, in the category of 'other'. other mean the option other than provided in the questionnaire.

As a general observation, most of the respondents are happy and satisfied with their existing library working hours.

6.10 Reading Room Timing:

Reading room timing of the libraries also plays an important role for users. In this respect, a question was designed to get the opinion about the satisfaction of reading room timings of libraries. Thus, the data was collected and summarized that 167 (86.53 %) out of 193 respondents from the category of 'UG / PG students' have expressed their satisfaction with the reading room timing positively, where as 26 (13.47 %) respondents from the category have expressed their satisfaction with the reading room timing negatively. This followed by 75 (96.15 %) out of 78 respondents from the category of 'faculty members' have expressed their satisfaction with the reading room timing positively, where as 3 (3.85 %) respondents expressed their satisfaction negatively. 22 (91.67 %) out of 24 respondents from the category of 'research scholars' have expressed their satisfaction with the reading room timing positively, where as 2 (8.33 %) respondents expressed their satisfaction negatively. 22 (100 %) respondents from the category of 'scientists', 6 (100 %) respondents from the category of 'agricultural Staff' and 2 (100 %) respondents from the category of 'extension specialist' have expressed their satisfaction with the reading room timing positively and 6 (75 %) out of 8 respondents from the other category expressed their satisfaction with the reading room timing positively, whereas 2 (25 %) respondents expressed their satisfaction negatively.

It is observed from above that all the category of respondents satisfied with the present library reading room timing.

6.11 Mode of Information:

Information is important commodity in everyone's life. Human beings are not only requiring a basic needs of air, shelter, food, and clothes for their life blood but also the information for every day activity. The question was addressed to the respondents from where they get the information for their study purposes. The data were collected and presented in the **Table 6.8** given below.

Table 6.8: Various Modes of Information (N= 333)

Sr. No.	Modes of Information	Yes (%)	No (%)
1	Library	251 (75.38)	82 (24.62)
2	Internet	268 (80.48)	65 (19.52)
3	Personal Discussions / Colleagues	73 (21.92)	260 (78.08)
4	Other Organizations / Library	36 (10.82)	297 (89.18)
5	Any other	10 (3.00)	323 (97.00)

The above **Table** reflects that 268 (**80.48 %**) respondents expressed their responses positively and they get information for purpose from the mode of 'internet', whereas 65 (19.52 %) respondents expressed their response negatively. This is followed by 251 (75.38 %) respondents expressed that they get information from the mode of 'library and information centre', whereas 82 (24.62 %) respondents expressed their responses negatively. 73 (21.92 %) respondents expressed that they get information from the mode of 'personal discussions / colleagues', whereas 260 (78.08 %) respondents expressed their responses negatively. 36 (10.82 %) respondents expressed that they get information from the mode of 'other organizations / library', whereas 297 (89.18 %) respondents expressed their responses negatively and 10 (3.00 %) respondents expressed that they get information from the mode of 'any other', whereas 323 (97.00 %) respondents replied negatively.

It is observed that **internet** is the major mode of source of information to the users.

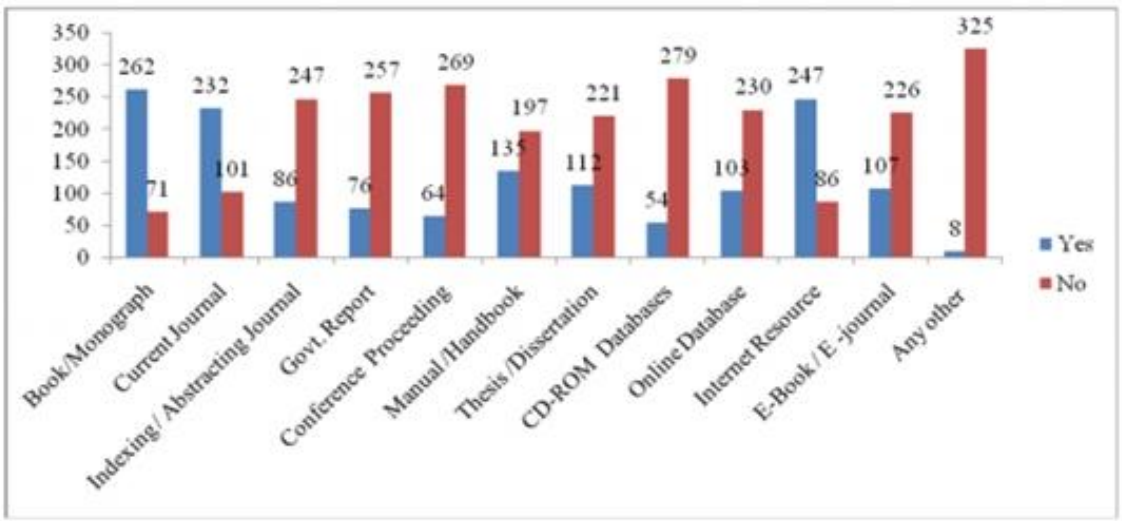
6.12 Utilization of Library Resources:

The library resources are books, monographs, conference proceedings, encyclopedias, dictionaries and directories, handbooks and manuals, theses and dissertations, standards and patents, periodicals, guide to periodical literature, indexing and abstracting journals, research reports, reviews, special collection such as manuscripts, diaries, maps, atlases, gray literatures, etc. The data as collected is summarized in the following Table 6.9 and Figure 6.1:

Table 6.9: Consultation of Various Library Resources

Sr. No	Library Resources	Number of Responses	
		Yes (%)	No (%)
1	Book / Monograph	262 (**78.68**)	71 (21.32)
2	Current Journal	232 (69.66)	101 (30.34)
3	Indexing / Abstracting Journal	86 (25.82)	247 (74.18)
4	Government Report	76 (22.82)	257 (77.18)
5	Conference Proceeding	64 (19.22)	269 (80.78)
6	Manuals and Handbook	135 (40.55)	197 (59.15)
7	Thesis / Dissertation	112 (33.64)	221 (66.36)
8	CD-Rom Database	54 (16.22)	279 (83.78)
9	Online Database	103 (30.94)	230 (69.06)
10	Internet Resource	247 (**74.18**)	86 (25.82)
11	E-book / E-journal	107 (32.14)	226 (67.86)
12	Any other	8 (2.40)	325 (97.60)

Figure 6.2: Consultation of Various Library Resources



The above **Table** and **Figure** revealed that 262 (78.68 %) respondents were consulting 'books and monographs' regularly as library resources. Whereas 71 (21.32 %) respondents were expressed their opinion negatively. This followed by 247 (74.18 %) respondents were consulting 'internet resources' regularly as library resources, whereas 86 (25.82 %) respondents were expressed their opinion negatively. 232 (69.66 %) respondents were consulting 'current journals' regularly as library resources, whereas 101 (30.34 %) respondents were expressed their opinion negatively. 135 (40.55 %) respondents were consulting 'manuals and handbooks'

regularly as library resources, whereas 197 (59.15 %) respondents were expressed their opinion negatively. 112 (33.64 %) respondents were consulting 'theses and dissertations' regularly as library resources, whereas 221 (66.36 %) respondents were expressed their opinion negatively. 107 (32.14 %) respondents were consulting 'electronic books and electronic journals' regularly as library resources, whereas 226 (67.86 %) respondents were expressed their opinion negatively. 103 (30.94 %) respondents were consulting 'online databases' regularly as library resources, whereas 230 (69.06 %) respondents were expressed their opinion negatively. 86 (25.82 %) respondents are consulting 'Indexing and Abstracting Journals' regularly as library resources, whereas 247 (74.18 %) respondents were expressed their opinion negatively. 76 (22.82 %) respondents are consulting 'government reports' regularly as library resources, whereas 257 (77.18 %) respondents were expressed their opinion negatively. 64 (19.22 %) respondents were consulting 'conference proceedings' regularly as library resources, whereas 269 (80.78 %) respondents were expressed their opinion negatively. 54 (16.22 %) respondents are consulting 'CD-ROM databases' regularly as library resources, whereas 279 (83.78 %) respondents were expressed their opinion negatively. 8 (2.40 %) respondents were consulting 'any other' regularly as library resources, whereas 325 (97.60 %) respondents were expressed their opinion negatively. 'any other' means the option other than given in the questionnaire.

The observations are made as: i) The library resources as '**books and monographs**' is ranked I by the respondents (78.68 %) as compared by the other resources as the books provide an oversight of the total subjects. Whereas 'monographs' as a separate treatise, which is concerned with a single subject, usually giving a detailed and thoroughly researched treatment of the topic. Therefore, these resources are regularly consulted by the respondents for the seeking knowledge in agricultural sciences.

'**Internet resources'** are considered at the second position in the ranked list. As internet resource is the hub of knowledge on all the subjects. These sources are online databases, consortia websites, electronic books, as well as journals, library portal, knowledge gateways, electronic mail, electronic publishing and the like. The extensive and exhaustive information can be browsed and downloaded from the Internet Sources. Therefore, this source has ranked at second position. From the above

data it is possible to devise a ranking of library resources they consult by the respondents. The **Table 6.10** given below represents the data on the basis of ranking.

Table 6.10: Ranking of Consultation of Library Resources by Respondents

Sr. No	Library Resources	Ranking
1	Books / Monographs	I
2	Internet Resources	II
3	Current Journals	III
4	Manuals and Handbooks	IV
5	Theses / Dissertations	V
6	E-books / E-journals	VI
7	Online Databases	VII
8	Indexing / Abstracting Journals	VIII
9	Government Report	IX
10	Conference Proceedings	X
11	CD-ROM Databases	XI
12	Any other	XII

The above **Table 6.10** represents that the library resources such as 'books and monographs' is ranked I, followed by internet resources as ranked II, current journals as ranked III, 'manuals and handbooks' as rank IV, 'theses and dissertations' ranked V, 'electronic books and journals' ranked VI, 'online databases' as ranked VII, 'indexing and abstracting journals' as ranked VIII, 'government reports' as ranked IX, 'conference proceedings' as ranked X, 'CD-ROM databases' as ranked XI, and any other as ranked XII. Thus, **internet** resources are the prime resources in the library.

6.13 Library Collection:

Overall satisfaction is depending upon the library collection or the resources available in the library. The purpose of this question was to know the efficiency and efficacy of library by which respondents are using it regularly. Thus, data was gathered from the respondents and presented that 162 (83.94 %) out of 193 respondents belongs to the 'under and post graduate students' which were major beneficiaries of the library collection. Where as 31 (16.06 %) respondents expressed their satisfaction negatively. This followed by 60 (76.92 %) out of 78 respondents belongs to the 'faculty members' expressed their satisfaction positively, whereas 18 (23.08 %) respondents expressed their satisfaction negatively, 22 (91.66 %) out of 24 respondents belongs to the 'Research Scholar' expressed their satisfaction positively,

whereas 3 (8.34 %) respondents expressed their satisfaction negatively, 20 (90.90 %) out of 22 respondents belongs to the 'scientists' expressed their satisfaction positively, whereas 2 (9.10 %) respondents expressed their satisfaction negatively, 6 (100 %) respondents belongs to the 'agricultural staff' expressed their satisfaction positively, whereas none of the respondents expressed their satisfaction negatively and 1 (50 %) respondents belongs to the 'Extension Specialist' expressed their satisfaction positively, whereas 1 (50 %) out of 2 respondents expressed their satisfaction negatively. From the last category of respondents i.e. 'others' 7 (87.50 %) out of 8 respondents expressed their satisfaction positively where as 1 (12.50 %) respondents expressed their satisfaction negatively.

It is observed from the above data that nearly **84 %** respondents belong to the category of '**under and post graduate students'** who were satisfied with library collection.

6.13.1 Awareness of Use of Digital Information Resources:

Information services have dramatically changed over the last ten years. There is no need to leave the home or office to locate and access information now readily available online via digital gateways furnished by a wide variety of information providers e.g. libraries, electronic publisher, organization, individuals. Information is electronically accessible from a wide variety of globally distributed information repositories. Information is no longer simply text and pictures. It is electronically in a wide variety of formats, many of which are large, complex and often integrated i.e. multimedia. These digital information resources are playing a major role in the information resource collection. Therefore, this question was addressed to the respondents to measure their use and awareness about the digital information resources. Furthermore, data was collected and represented in the **Table 6.11** given below.

Table 6.11: Awareness and Use of Digital Information Resources

Sr. No.	Respondents Category	Awareness of using digital information resources	
		Yes (%)	No (%)
1	UG / PG Students (N= 193)	134 (69.44)	59 (30.56)
2	Research Scholars (N = 24)	20 (83.34)	4 (16.66)

3	Faculty Members (N = 78)	59 (75.64)	19 (24.36)
4	Scientists (N = 22)	18 (81.82)	4 (18.18)
5	Extension Specialists (N = 2)	0 (0.00)	2 (100.00)
6	Agriculture Staffs (N = 6)	6 (100.00)	0 (0.00)
7	Other (N =8)	4 (50.00)	4 (50.00)
	Total (N = 333)	**241 (72.38)**	**92 (27.62)**

The above **Table** depicted that 134 (69.44 %) respondents belongs to the category of 'under graduate and post graduate students' expressed that they use and aware about the digital information resources, whereas 59 (30.56 %) respondents expressed negatively. This followed by 59 (75.64 %) respondents belongs to the 'faculty members' expressed that they use and aware about the digital information resources, whereas 19 (24.36 %) respondents expressed negatively, 20 (83.34%) respondents belongs to the 'research scholars' expressed that they use and aware about the digital information resources, whereas 4 (16.66 %) respondents expressed negatively, 18 (81.82 %) respondents belongs to the 'scientists' expressed that they use and aware about the digital information resources, whereas 4 (18.18 %) respondents expressed negatively, 6 (100 %) respondents belongs to the 'agricultural staff' expressed that they use and aware about the digital information resources whereas no one has expressed negatively. No one out of among the respondents belongs to 'extension specialist' expressed that they do not use and unaware about digital information resources, 4 (50 %) respondents belongs to the 'others' expressed that they use and aware about the digital information resources, whereas 4 (50 %) respondents expressed negatively.

It is observed that the respondents belong to the category of 'under and post graduate' that are aware and use the digital information resources followed by the 'faculty members'. Whereas the respondents belongs to 'extension specialist' were not at all aware and use the new technology based digital information resources in the library. It seems that these groups are engaged in the extension activities with farmers.

6.14 User Education Programme:

Every library makes a provision of user training to use their electronic resources. These activities are called how to use the library, where and how information is available, what are the resources for it, how to search, browse and download a particular information available electronically while doing their activity. One must know the search strategy while retrieving information.

In order to hypothesis formulated in the study, it was decided this question was to test the same. This question was addressed to the respondents to know whether their library provide a user training while using electronic resources. Two options were provided as a) Yes and b) No. Further the data was collected and represented in **Table 6.12** given below.

Table 6.12: Training for Using Electronic Resources

Sr. No.	Respondents Category	Does your library provide training for using e-resources?	
		Yes (%)	No (%)
1	UG / PG Students (N= 193)	87 (45.08)	106 (54.92)
2	Research Scholars (N = 24)	10 (41.66)	14 (58.34)
3	Faculty Members (N = 78)	39 (50.00)	39 (50.00)
4	Scientists (N = 22)	15 (68.18)	7 (31.82)
5	Extension Specialists (N = 2)	0 (00.00)	2 (100.00)
6	Agriculture Staff (N = 6)	1 (16.66)	5 (83.34)
7	Other (N = 8)	3 (37.50)	5 (62.50)
Total (333)		**157 (47.14)**	**176 (52.86)**

From the above **Table**, it is noticed that 106 (54.92 %) respondents belongs to the category of 'under Graduates and post graduate students' expressed negatively that their library do not provide training for using electronic resources, where as 87 (45.08 %) respondents expressed 'positively' this is followed by 39 (50 %) respondents belongs to 'faculty members' expressed negatively that their library do not provide training for using electronic resources, where as 39 (50 %) respondents expressed 'positively'. 14 (58.34 %) respondents belongs to 'research scholars'

expressed negatively that their library do not provide training for using electronic resources where as 10 (41.66 %) respondents expressed 'positively '. 7 (31.82 %) respondents belongs to 'scientists' expressed negatively that their library do not provide training for using electronic resources, where as 15 (68.18 %) respondents expressed 'positively '. 5 (83.34 %) respondents belongs to 'agricultural staff' expressed negatively that their library do not provide training for using electronic resources where as 1 (16.66 %) respondents expressed 'positively '. 2 (100 %) respondents belongs to category of 'extension specialists' expressed negatively that their library do not provide training for using electronic resources, where as none of the respondents expressed 'positively ' and 5 (62.50 %) respondents belongs to 'others' expressed negatively that their library do not provide training for using electronic resources where as 3 (37.50 %) respondents expressed 'positively'.

It is noticed from the table that 54.92 % respondents belongs to the group from 'under and post graduate students', 58.34 % research scholar, 83.33 % agricultural staff, 50 % faculty members and 31.82 % scientists are expressed their option 'negatively' that their library do not provide any training while using electronic resources. More than 50 % of the users state that library does not provide training in ICT application. It is recommended that the university authorities should consider of providing ICT training to the user of the library. Therefore, comprehensive training while using electronic resources is required to make them self-reliant in locating, sorting and repackaging information. The precondition for sustainable library development is the availability, accessibility and affordability of relevant reading materials, which can inspire user interest, involvement and confidence in reading. Therefore, lectures, tours, seminars and hands on experiences needs to be provided to the respondents while using electronic resources.

6.15 Frequency of Use of ICT Tools:

While seeking information, today's researcher seems to be compatible with using a wide variety of sources for information other than print and digital. Internet, search engines, e-print services, author website, full-text databases, electronic journals and telephonic services, television, e-mail and video conferencing are the most electronic facilities available in the libraries. In this relation, this question was addressed to respondents to state their frequency while using the electronic facilities

such as: a) telephone b) television c) internet d) electronic mail and e) video conferencing. While measuring the frequencies parameters such as: a) always b) sometimes c) rarely are provided. Nevertheless the data were collected and presented in the **Table 6.13** given below represents the data and summarized.

Table 6.13: Frequency of Use of Library Facilities apart from Print and Digital

Electronic facilities	Frequency of Use		
	Always (%)	Sometimes (%)	Rarely (%)
Telephone	106 (31.83)	82 (24.63)	145 (43.54)
Television	80 (24.02)	106 (31.83)	147 (44.15)
Internet	245 (73.57)	64 (19.22)	24 (7.21)
Electronic mail	163 (48.95)	96 (28.83)	74 (22.22)
Video conferencing	5 (1.50)	36 (10.81)	292 (87.69)

The above **Table** reveals that '**Internet**' electronic facility, 245 (**73.57 %**) respondents expressed that they use this facility 'always' followed by 64 (19.22 %) respondents expressed that they use this facility 'some times' and 24 (7.21 %) respondents expressed that they use this facility 'Rarely.

Electronic mail facility, 163 (48.95 %) respondents expressed that they use 'always' followed by 96 (28.83 %) respondents expressed that they use 'some times', 74 (22.22 %) respondents expressed that they use 'rarely'. **Telephone** as electronic facility, 106 (31.83 %) respondents expressed that they use 'always,' followed by 82 (24.62 %) respondents expressed that they use 'some times' and 145 (43.55 %) respondents expressed that they use 'rarely'. **Television** as electronic facility, 80 (24.02 %) respondents expressed that they use 'always', followed by 106 (31.83 %) respondents expressed that they use 'some times' and 147 (44.15 %) respondents expressed that they use 'rarely'. **Video conferencing** as electronic facility, 5 (1.50 %) respondents expressed that they use 'always', followed by 36 (10.81 %) respondents expressed that they use 'some times' and 292 (87.69 %) respondents expressed that they use 'rarely'.

From the above data, it is possible to rank the **electronic facility** which is being used 'always' apart from the print and digital facilities. It is clearly seen from

the data that 73.57 % respondent use 'always' the **'internet'** as electronic facility available in the library apart from print and digital channel of information. Therefore, it may notice that internet is an integral part of the library services. This is followed by the 48.95 % e-mail, 31.83 % telephone, 24.02 % television and 1.50 % video conferencing they use 'always'.

6.16 Library Services:

Libraries as a centre of information have always been prime importance to scientific research and development. It supports R and D activities of its parent organization by way of facilitating library, documentation and information services to respondents. Agriculture libraries have always been at, the forefront to cater the needs of respondents in their pursuits to advance frontier of knowledge in science and technology of agriculture. In this respect the question was addressed to the respondents to seek the opinion about the level of satisfaction of library services. Data collected and presented in the following Table 6.14:

Table 6.14: Level of Satisfaction about the Library Services

Sr. No.	Library Services	Level of Satisfaction (%)				
		Excellent	Good	Fair	Poor	Not Used
1	Reading Room Service	125 (37.54)	150 (45.05)	21 (6.31)	13 (3.90)	24 (7.20)
2	Home Lending Service	68 (20.42)	113 (33.93)	38 (11.41)	15 (4.51)	99 (29.73)
3	Inter Library Loan /DDS	29 (8.71)	75 (22.52)	30 (9.00)	14 (4.21)	185 (55.56)
4	Reference Service	103 (30.93)	129 (38.74)	44 (13.22)	9 (2.70)	48 (14.41)
5	Photocopying Service	60 (18.02)	117 (35.14)	38 (11.41)	31 (9.30)	87 (26.13)
6	Subject Bibliographic Service	62 (18.62)	113 (33.93)	41 (12.32)	15 (4.50)	102 (30.63)
7	CAS / SDI Service	20 (6.00)	73 (21.92)	42 (12.62)	14 (4.20)	184 (55.26)
8	Abstracting / Indexing Service	64 (19.22)	121 (36.34)	38 (11.41)	11 (3.30)	99 (29.73)
9	Newspaper Clippings	123 (36.94)	114 (34.24)	33 (9.90)	8 (2.40)	55 (16.52)
10	Internet Usage	109 (32.73)	114 (34.24)	35 (10.51)	25 (7.51)	50 (15.02)
11	Online Database Searching	82 (24.62)	106 (31.83)	39 (11.71)	24 (7.21)	82 (22.63)
12	CD-ROM Database Searching	37 (11.11)	85 (25.53)	56 (16.82)	27 (8.10)	128 (38.43)
13	E-book / E-journal	51 (15.32)	100 (30.03)	36 (10.81)	29 (8.70)	117 (35.14)

The above **Table** represents that the following analysis made on the basis of 'excellent' rated by respondents. In case of **'reading room'** library services, 125 (37.54 %) respondents have rated their level of satisfaction as 'excellent' followed by 150 (45.05 %) as 'good', 21 (6.31 %) as 'fair', 13 (3.90 %) as 'poor' and 24 (7.20 %) respondents have not used.

Newspaper clippings library services, 123 (36.94 %) respondents had rated their level of satisfaction as 'excellent' followed by 114 (34.24 %) as 'good', 33 (9.90 %) as 'fair', 8 (2.40 %) as 'poor' and 55 (16.52 %) respondents have not used.

Internet usage library services, 109 (32.73 %) respondents had rated their level of satisfaction as 'excellent' followed by 114 (34.24 %) as 'good', 35 (10.51 %) as 'fair', 25 (7.51 %) as 'poor' and 50 (15.02 %) respondents have not used.

Reference service library services, 103 (30.93 %) respondents have rated their level of satisfaction as 'excellent' followed by 129 (38.74 %) as 'good', 44 (13.22 %) as 'fair', 9 (2.70 %) as 'poor' and 48 (14.41 %) respondents have not used.

Online database searching library services, 82 (24.62 %) respondents have rated their level of satisfaction as 'excellent' followed by 106 (31.83 %) as 'good', 39 (11.71 %) as 'fair', 24 (7.21 %) as 'poor' and 82 (22.63 %) respondents have not used.

Home lending library services, 68 (20.42 %) respondents have rated their level of satisfaction as 'excellent' followed by 113 (33.93 %) as 'good', 38 (11.41 %) as 'fair', 15 (4.51 %) as 'poor' and 99 (24.73 %) respondents have not used.

Abstracting and indexing library services, 64 (19.22 %) respondents have rated their level of satisfaction as 'excellent' followed by 121 (36.34 %) as 'good', 38 (11.41 %) as 'fair', 11 (3.30 %) as 'poor' and 99 (29.73 %) respondents have not used.

Subject bibliographic library services, 62 (18.62 %) respondents have rated their level of satisfaction as 'excellent' followed by 113 (33.93 %) as 'good', 41 (12.32 %) as 'fair', 15 (4.50 %) as 'poor' and 102 (30.63 %) respondents declined to comment.

Photocopying library services, 60 (18.02 %) respondents have rated their level of satisfaction as 'Excellent' followed by 117 (35.14 %) as 'Good', 38 (11.41 %) as 'fair', 31 (9.30 %) as 'Poor' and 87 (26.13 %) respondents have not used.

Electronic book / Electronic journals library services, 51 (15.32 %) respondents have rated their level of satisfaction as 'excellent' followed by 100 (30.03 %) as 'good', 36 (10.81 %) as 'fair', 29 (8.70 %) as 'poor' and 117 (35.14 %) respondents not used.

CD-ROM database searching library services, 37 (11.11 %) respondents have rated their level of satisfaction as 'excellent' followed by 85 (25.53 %) as 'good', 56 (16.82 %) as 'fair', 27 (8.10 %) as 'poor' and 128 (38.43 %) respondents not used.

Inter library loan library services, 29 (8.71 %) respondents have rated their level of satisfaction as 'excellent' followed by 75 (22.52 %) as 'good', 30 (9.00 %) as 'fair', 14 (4.21 %) as 'poor' and 185 (55.56 %) respondents not used.

CAS / SDI library services are concerned, 20 (6.00 %) respondents had rated their level of satisfaction as 'excellent' followed by 73 (21.92 %) as 'good', 42 (12.62 %) as 'fair' and 14 (4.20 %) as 'poor' and 184 (55.26 %). It is possible to draw a table of ranking of library services on the basis of level of satisfaction as '**excellent**'. The **Table 6.15** summarized as under.

Table 6.15: Ranking of Library Services by Users

Sr. No.	Library Services	Ranking
1	Reading Room Service	I
2	Newspaper clippings	II
3	Internet Service	III
4	Reference Service	IV
5	Online Database Searching	V
6	Home Lending	VI
7	Indexing and Abstracting Service	VII

8	Subject Bibliographic Service	VIII
9	Photo copying Service	IX
10	Electronic book and journals	X
11	CD-ROM Database Searching	XI
12	Inter Library Loan Service	XII
13	CAS / SDI Service	XIII

As per the ranking given above, Reading room services is much preferred by the users. CAS / SDI services are given the least priorities. It shows that because of Internet facilities, readers are not much interested in these services.

It is satisfying to note that, the library services such as ' Reading Room' is ranked at the top followed by newspaper clippings, internet service, reference service, online database searching, home lending service, indexing and abstracting service, subject bibliographic service, photocopying service, electronic book / electronic journals services, CD-ROM database searching service, inter library loan / DDS service and Current Awareness Service/ Selective Dissemination of Information Service, online database searching service. It is observed that:

i. Majority of the respondents from the MKV library is noticed that they are not at all using some of the library services. The reason is that five colleges for under-graduates students are located in the same campus. These colleges are: i) College of Agriculture, ii) College of Home Science, iii) College of Food Science and Technology, iv) College of Horticulture and v) College of Agricultural Engineering, Parbhani. The students of these colleges are availing library facility from the university library.

ii. Lack of User Education Program in all the university libraries. This program is needs to be organized; conducted and trained their services, collection and other ICT based resources and services. Library professionals should implement this program effectively and efficiently to maximize the use of library resources and services.

6.17 Provision of Assistance to Users:

A respondent needs assistance from the library professionals as well as staff while rendering the various services. As users are very important component of the library system. Therefore, cooperation is solicited while availing the library services by respondents. Keeping this in view, this question was designed to seek the opinion about the assistance provided by the library professionals while operating their various kinds of services. The purpose of this question was to know the efficiency and effectiveness of library services. Here the satisfaction of respondents had elicited and analyzed. In this question various kinds of library services are evaluated. In order to evaluate the library services on the basis of assistance four parameters have provided. These are: a) Excellent b) Good c) Fair and d) Poor. Thus, the data were collected and presented in the following **Table 6.16.**

Table 6.16: Assistance Provided by the Library Professionals

Sr. No.	Library Assistance	Level of Satisfaction (%)			
		Excellent	Good	Fair	Poor
1	Reading Room Facility	133 (39.94)	155 (46.55)	29 (8.71)	16 (4.80)
2	Library Collection	121 (36.34)	162 (48.65)	35 (10.51)	15 (4.50)
3	Reference Service	96 (28.83)	159 (47.75)	64 (19.22)	14 (4.20)
4	Availability of e- Resource	69 (20.72)	143 (42.95)	80 (24.02)	41 (12.31)
5	Internet Service	116 (34.83)	144 (43.25)	40 (12.01)	33 (9.91)
6	Off-line database Searching	40 (12.01)	147 (44.14)	89 (26.73)	57 (17.12)
7	On-line database Searching	81 (24.33)	151 (45.34)	59 (17.71)	42 (12.61)
8	User Education / Orientation	59 (17.72)	155 (46.55)	71 (21.32)	48 (14.41)
9	Staff behavior / Co-operation	141 (42.34)	148 (44.44)	25 (7.51)	19 (5.71)

From the data as given in the table reveals that:

i. **Staff Behavior and Cooperation**, 141 (42.34 %) respondents rated this service as ‘Excellent’ followed by 148 (44.44 %) respondents rated it as ‘Good’, 25

(7.51 %) respondents rated it as 'Fair', 19 (5.71 %) respondents rated it as 'Poor'.

ii. **Reading Room Timing**, 133 (39.94 %) respondents rated this services as 'Excellent' followed by 155 (46.55 %) respondents rated it as 'Good', 29 (8.71 %) respondents rated it as 'Fair', 16 (4.80 %) respondents rated it as 'Poor'.

iii. **Library Collection**, 121 (36.34 %) respondents rated this services as 'Excellent' followed by 162 (48.65 %) respondents rated it as 'Good', 35 (10.51 %) respondents rated it as 'Fair', 15 (4.20 %) respondents rated it as 'Poor'.

iv. **The Internet Service**, 116 (34.84 %) respondents rated this services as 'Excellent' followed by 144 (43.25 %) respondents rated it as 'Good', 40 (12.01 %) respondents rated it as 'Fair', 33 (9.91 %) respondents rated it as 'Poor'.

v. **Reference Service**, 96 (28.83 %) respondents rated this services as 'Excellent' followed by 159 (47.75 %) respondents rated it as 'Good', 64 (19.22 %) respondents rated it as 'Fair', 14 (4.20 %) respondents rated it as 'Poor'.

vi. **Online Database service,** 81 (24.33 %) respondents rated this services as 'Excellent' followed by 151 (45.35 %) respondents rated it as 'Good', 59 (17.71 %) respondents rated it as 'Fair', 42 (12.61 %) respondents rated it as 'Poor'.

vii. **Availability of Electronic Information Resource service**, 69 (20.72 %) respondents rated this services as 'Excellent' followed by 143 (42.95 %) respondents rated it as 'Good', 80 (24.02 %) respondents rated it as 'Fair', 41 (12.31 %) respondents rated it as 'Poor'.

viii. **User Education Program / Orientation**, 59 (17.72 %) respondents rated this services as 'Excellent' followed by 155 (46.55 %) respondents rated it as 'Good', 71 (21.32 %) respondents rated it as 'Fair', 48 (14.41 %) respondents rated it as 'Poor'.

ix. **Off-line Database Searching service**, 40 (12.01 %) respondents rated this services as 'Excellent' followed by 147 (44.15 %) respondents rated it as

'Good', 89 (26.73 %) respondents rated it as 'Fair', 57 (17.12 %) respondents rated it as 'Poor'.

In view of the above, the observation made as under:

The assistance provided and rated by the respondents as 'excellent' 141 (42.34 %) in case of 'staff behavior and cooperation', 133 (39.94 %) reading room facility, library collection 121 (36.34 %), 116 (34.83 %) Internet Services, 96 (28.83 %) Reference service, 81 (24.33 %), Online database searching e-Resources reference services 69 (20.72 %), user education program / orientation 59 (17.72 %) and 40 (12.01 %). These services have placed under top most as rated by the respondents.

6.18 Utilization of Databases:

A database is an organized form of information. Information is nothing but a systematized body of a language. A conglomerate of bibliographic information can contain in a database. Now-a-days different array of online and offline databases are available in every subject. The field of agriculture is not lagging behind in the area of databases. Various international databases are being used by the user community. These databases are usually available on internet on the basis of pay and use. These databases are created, organized and uploaded by the Database Management System (DBMS). The types of databases are: a) Agro-Biological Medical b) Statically Information c) Bibliographic Reference and d) Full-text Information.

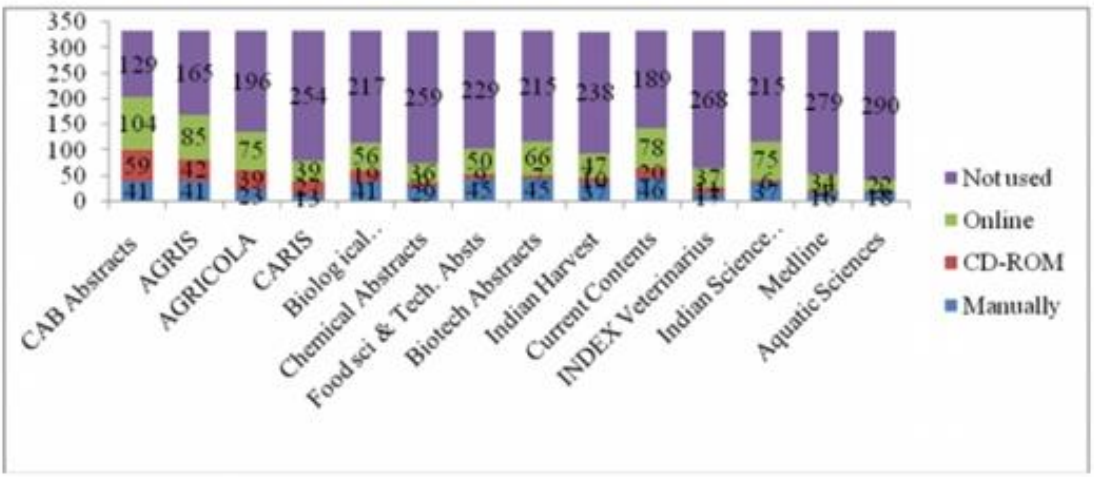
In this connection, this question was addressed to the respondents in order to know the internet of browsing the international databases manually, offline and online. In order to know the method of operating, browsing and downloading these databases, the data on the International databases were collected and presented in the following **Table 6.17** and **Figure 6.3**.

Table 6.17: Use Pattern of International Databases

Sr. No.	Name of the Databases	Method of Used of Databases (%)			
		Manually	CD - ROM	Online	Not Used
1	CAB Abstracts	41 (12.31)	59 (17.72)	104 (31.23)	129 (38.74)
2	AGRIS	41 (12.31)	42 (12.61)	85 (25.53)	165 (49.55)
3	AGRICOLA	23 (6.91)	39 (11.71)	75 (22.52)	196 (58.86)
4	CARIS	13	27	39	254

		(3.90)	(8.11)	(11.71)	(76.28)
5	Biological Abstracts	41 (12.31)	19 (5.70)	56 (16.82)	217 (65.17)
6	Chemical Abstracts	29 (8.71)	9 (2.70)	36 (10.81)	259 (77.78)
7	Food Sci. and Tech. Abstracts	45 (13.51)	9 (2.70)	50 (15.02)	229 (68.77)
8	Biotechnology Abstracts	45 (13.51)	7 (2.10)	66 (19.82)	215 (64.57)
9	Indian Harvest	37 (11.12)	10 (3.00)	47 (14.11)	239 (71.77)
10	Current Contents	46 (13.82)	20 (6.00)	78 (23.42)	189 (56.76)
11	INDEX Veterinarius	17 (5.11)	11 (3.30)	37 (11.11)	268 (80.48)
12	Indian Science Abstracts	37 (11.11)	6 (1.80)	75 (22.52)	215 (64.57)
13	Medline	16 (4.81)	4 (1.20)	34 (10.21)	279 (83.78)
14	Aquatic Sciences	18 (5.41)	3 (0.90)	22 (6.60)	290 (87.09)
15	Any Other				

Figure 6.3: Use Pattern of International Databases.



The above **Table 6.17** and **Figure 6.3** it is evident that:

i. **CAB Abstracts database**, 104 (31.23 %) respondents were interested, using and browsing 'Online' followed by 59 (17.72 %) in using CD-ROM and 41 (12.31 %) respondents were interested using the hardcopy 'Manually.

ii. **AGRIS** database, 85 (25.53 %) respondents were interested, using and browsing 'Online' followed by 42 (12.61 %) in using CD-ROM and 41 (12.31 %) respondents were interested, and using the hardcopy 'Manually.

iii. AGRICOLA database, 75 (22.52 %) respondents were interested, using and browsing 'Online' followed by 39 (11.71 %) in using CD-ROM and 23 (6.91 %) respondents were interested and using the hardcopy 'Manually.

iv. **CARIS** database, 39 (11.71 %) respondents were interested, using and browsing 'Online' followed by 27 (8.11 %) in using CD-ROM and 13 (3.90 %) respondents were interested and using the hardcopy 'Manually.

v. **Biological Abstracts** database, 56 (16.82 %) respondents were interested, using and browsing 'Online' followed by 41 (12.31 %) in using the hardcopy 'Manually', 19 (5.70 %) respondents were interested using the 'CD-ROM.

vi. **Chemical Abstracts** database, 36 (10.81 %) respondents were interested, using and browsing 'Online' followed by 29 (8.71 %) in using the hardcopy 'Manually', 9 (2.70 %) respondents were interested and using the 'CD-ROM.

vii. **Food Science and Technology Abstracts** database, 50 (15.02 %) respondents were interested, using and browsing 'Online' followed by 45 (13.51 %) in using the hardcopy 'Manually', 9 (2.70 %) respondents were interested and using the 'CD-ROM.

viii. Biotechnology **Abstracts** database, 66 (19.82 %) respondents are interested, using and browsing 'Online' followed by 45 (13.51 %) respondents are interested and using the hardcopy 'Manually', 7 (2.10 %) respondents are interested and using the 'CD-ROM.

ix. **Indian Harvest** database, 47 (14.11 %) respondents were interested, using and browsing 'Online' followed by 37 (11.12 %) in using the hardcopy 'Manually', 10 (3.00 %) respondents were interested and using the 'CD-ROM.

x. **Current** Contents database, 78 (23.42%) respondents were interested, using and browsing 'Online' followed by 46 (13.82 %) in using the hardcopy 'Manually', 20 (6.00 %) respondents were interested and using the 'CD-ROM.

xi. **INDEX Veterinarius** database, 37 (11.11 %) respondents were interested, using and browsing 'Online' followed by 17 (5.11 %) in using the hardcopy 'Manually', 11 (3.30 %) respondents were interested and using the 'CD-ROM.

xii. **Indian Science Abstracts** database, 75 (22.52 %) respondents were interested, using and browsing 'Online' followed by 37 (11.11 %) in using the hardcopy 'Manually', 6 (1.80 %) respondents were interested and using the 'CD-ROM.

xiii. **Medline database**, 34 (10.21 %) respondents were interested, using and browsing 'Online' followed by 16 (4.81 %) in using the hard copy 'Manually', 4 (1.20 %) respondents were interested and using the 'CD-ROM.

xiv. **Aquatic Sciences** database, 22 (6.60 %) respondents were interested, using and browsing 'Online' followed by 18 (5.41 %) in using the hardcopy 'Manually', 3 (0.90 %) respondents were interested and using the 'CD-ROM.

xv. **'Any other'** database, all the respondents expressed their silent for 'any other' means the option other than provided in the questionnaire.

6.19 Opinion about Change Due To ICT:

Drastic changes have been taken place in LIS due to the ICT applications from closed access to open access, from custodian to information analyst. Therefore, keeping in view of these changes, the question was designed and asked to the various respondents to seek their opinion and feelings. These feelings are a) **Exciting** b) **Welcome** and c) **Frustrated**. 250 (75.08 %) respondents expressed their opinion **'welcome'** the change taken place due to ICT applications, followed by 77 (23.12 %) as 'Exciting' and 5 (1.50 %) as 'Frustrated' and 1 (0.30 %) respondent is remained silent on this issue.

It is observed that the opinion about the changes due to ICT applications is **welcome** and **exciting.**

6.20 Assessment of Library Facilities:

The effectiveness and efficiency depend upon the assessment and evaluation by the respondents that they avail the facilities provided by university libraries in the field of agriculture. In order to improve the existing university library system it is possible to analyze the strength and weakness on every field of services and facilities. However, this question was designed to know the assessment of facilities available in the university library system. The data from the respondents were collected in this question seven categories were identified namely i) Computerization ii) Communication iii) Networking iv) Internet Connectivity v) CD-ROM / DVDROM Databases vi) Reprography / Xerox and vii) Any other. These data were presented in **Table 6.18** given below.

Table 6.18: Rating of Assessment of Library Facilities

Sr. No.	Library Facilities	Rating of Assessment of Library Facilities			
		Excellent	Good	Fair	Poor
1	Computerization	112 (33.63)	164 (49.25)	31 (9.31)	26 (7.81)
2	Communication	82 (24.62)	189 (56.76)	42 (12.61)	20 (6.01)
3	Networking	93 (27.93)	154 (46.25)	51 (15.31)	35 (10.51)
4	Internet Connectivity	101 (30.33)	152 (45.65)	49 (14.71)	31 (9.31)
5	CD-ROM / DVD-ROM Database	51 (15.32)	133 (39.94)	99 (29.73)	50 (15.01)
6	Reprography / Xerox	81 (24.32)	126 (37.84)	68 (20.42)	58 (17.42)

From the above **Table,** the following observations are made:

i. **Computerization** as library facility, 164 (49.25 %) respondents have rated it as 'Good', followed by 112 (33.63 %) as 'Excellent', 31 (9.31 %) as 'Fair' and 26 (7.81 %) respondent rated as 'Poor'.

ii. **Communication** as library facility, 189 (56.76 %) respondents have rated it as 'Good', followed by 82 (24.62 %) as 'Excellent', 42 (12.63 %) as 'Fair' and 20 (6.01 %) respondent rated as 'Poor'.

iii. **Networking** as library facility, 154 (46.25 %) respondents have rated it as 'Good', followed by 93 (27.93 %) as 'Excellent', 51 (15.32 %) as 'Fair' and 35 (10.51 %) respondent rated as 'Poor'.

iv. **Internet Connectivity** as library facility, 152 (45.65 %) respondents have rated it as 'Good', followed by 101 (30.33 %) as 'Excellent', 49 (14.71 %) as 'Fair' and 31 (9.31 %) respondent rated as 'Poor'.

v. **CD-ROM / DVD-ROM Databases** as library facility, 133 (39.94 %) respondents have rated it as 'Good', followed by 51 (15.32 %) as 'Excellent', 99 (29.73 %) as 'Fair' and 50 (15.01 %) respondent rated as 'Poor'.

vi. **Reprography / Xerox** as library facility, 126 (37.84 %) respondents have rated it as 'Good', followed by 81 (24.32 %) as 'Excellent', 68 (20.42 %) as 'Fair' and 58 (17.42 %) respondent rated as 'Poor'.

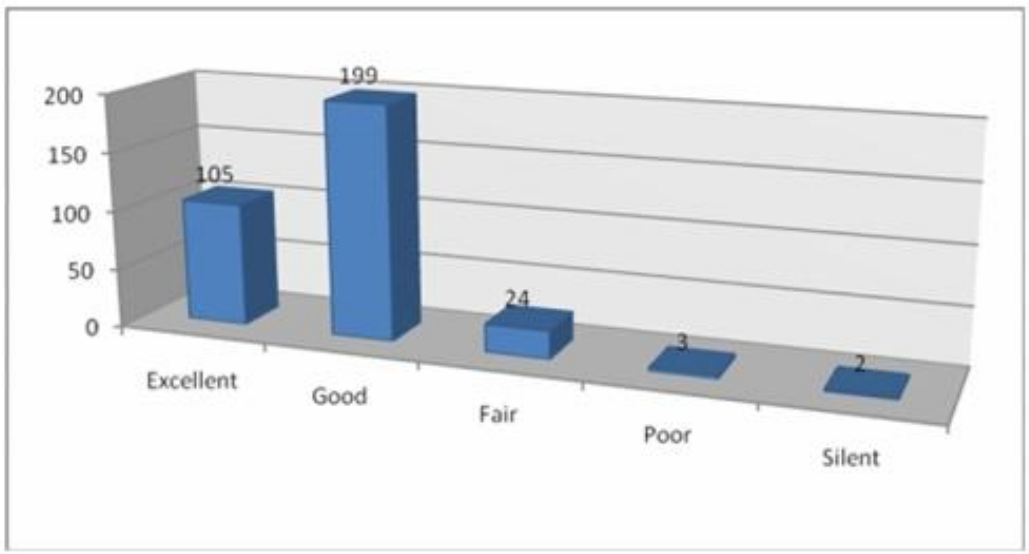
vii. **Any other** library facilities, all the respondents has expressed negatively. 'Any other' means the option other than the option provided in the questionnaire.

6.21 Assessment of Performance of Library: This question was addressed to the respondents to express their assessment the performance of their library. The four parameters used as: a) excellent b) good c) fair and d) poor. Thus, data were collected, tabulated and presented in **Table 6.19** and **Figure 6.4** given below.

Table 6.19: **Assessment of Library Performance**

Assessment	Number of Respondents (%)
Excellent	107 (32.13)
Good	199 (59.76)
Fair	24 (7.21)
Poor	3 (0.90)

Figure 6.4: Assessment of Library Performance



The above **Table 6.19** and **Figure 6.4** reveals that 60% of the respondents have assessed the library performance as 'Good' while 32% have rated as 'Excellent'.

6.22 Suggestions made by the Users:

User respondents have offered the suggestions are given in the **Table 6.20** given below.

Table 6.20: Suggestions by the Respondents

Sr. No.	Area of Suggestions	Number of Respondents	Percentage
1	Books, E-Journals / E-Books	72	21.62
2	Internet / Computer Facilities	136	40.84
3	Increase of Library Timing	49	14.72
4	Regular Power Supply	6	1.80
5	Reprographic Service (Xerox)	4	1.20
6	Special Collection of books for competitive Examination	61	18.32
7	User Education Program / Training	5	1.50

The above **Table** reveals that 136 (40.84 %) respondents suggested that internet/computer facilities be made available in the library. This followed by 72 (21.62%) respondents suggested for collection development of e-books/e-journals, 61 (18.32 %) respondents suggested for special collection of books for competitive examination, 49 (14.72 %) respondents expressed for increase of library timing, 6 (1.80 %) respondents suggested for regular power supply, 5 (1.50 %) respondents suggested that user education and training is necessary and 4 (1.20 %) respondents suggested that reprographic services should be provided with lower charges.

CHAPTER VII

FINDINGS, SUGGESTIONS AND CONCLUSION

Findings:

7.1 Libraries:

In order to study the use of ICT in the Agricultural Universities in western part of India, all the eight agricultural universities were selected. Eight Librarians and 400 users (50 each from eight universities) were fixed as sample size and 333 respondents have given their feedback.

1. First Agricultural University in India was established in 1960 at Pantnagar (UP) and latest one was established in 2011 at Bharsar (Uttarakhand). In western India, during the period 1973 to 2003, no agricultural university was established. Although it is expected to have agricultural university in each state, Goa State did not have any Agricultural University.

2. PDKV was having highest collection of 150531 whereas SDAU Library was having lowest collection of 36745.

3. Thirty-eight percent university librarians were managing by ex-cadre or non-professional in library and information science. 25% university libraries were managed by Assistant University Librarians. Sixty three percent university librarians were in the age range of above 55 years. Twenty five percent university librarians are having a post graduate degree in LIS. Fifty percent university librarians were having 30 years plus of working experience in the library. Whereas 37.5 % professionals were having experience of 20 years plus. 12.5 % professional was having 12 years of experience.

4. The courses offered by the university namely Bachelor of Science, Master of Science and Doctorate in Philosophy in the subject of agricultural and allied subjects are being offered in all the universities in the western India. The courses in fisheries discipline were existed in two universities.

5. Library Advisory Committee was in position in all the eight agricultural university libraries. All the eight agricultural university libraries are having independent and separate library building. All the librarians were satisfied with the present working hours.

6. The electronic gadgets like Compact Disk, Digital Video Disk (DVD), Audio-Video were available in all the university libraries. MPKV library was having highest collections of video cassettes and lowest in SDAU. NAU library was having more collection of audio visuals cassettes but SDAU has low.

7. The PDKV library has subscribed to the Ten International Databases. Seven university libraries were not acquiring these databases. These databases are; CAB Abstracts, AGRIS, AGRICOLA, Biological Abstracts, Biotechnology Abstracts, Agricultural Food Science and Technology Abstracts, Water Resources Abstracts, Agricultural and Natural Resources, Biological and Agricultural Index and Aquatic Sciences.

8. All the University libraries had acquired Commonwealth Agricultural Bureaux (CAB) Abstracts' database using comprehensively for the purpose of teaching, research and extension in the fields of Agricultural Sciences. 31 % user respondents were interested, used and browsed of CAB Abstracts database 'online'. 26 % user respondents were interested, used and browsed AGRIS Detabase online, 13 % respondents were interested and using CD-ROM and 12 % respondents were interested using the hard copy manually.

9. AGRICOLA database was used by 23 % respondents online followed by 12 % 'CD-ROM. 'CARIS' database was used by 12 % respondents online and. 'Biological database used by 17 % on line. '

10. 'The Dewey Decimal Classification (DDC) scheme was extensively used in seven agricultural university libraries except AAU library as it was using a Universal Decimal Classification (UDC) to organize their collection. Anglo-American Cataloguing Rules-II (AACR-II) was widely used in all the university libraries. Seven agricultural university libraries were using open access method.

11. During the last 5 years (2005-10), out of total grants sanctioned by ICAR for agricultural university libraries of western India, NAU library had received Rs.393.94 lakh, which was maximum amongst all and the lowest grant of Rs. 25.92 lakh was received by the BSKKV library during the above period. It was observed that sanctioned budget was inadequate to meet their demand.

12. Eight agricultural university libraries faced acute shortage of human resource. 63% university libraries were managing without library professionals' head. 25% university libraries are executing their services at the Assistant Librarian level. 63 % librarians are lacked in professional computer training and also network related programmes. The existing staff was not sufficient to provide the ICT based services.

13. Workshop, short-term and long-term courses and the mode of training to staff using ICT was much lagging behind.

14. The survey significantly highlighted that the MKV library is having maximum total number of library users / respondents as compared to other libraries.

15. 50 % university libraries do not provide electronic access to their collection, such as Web OPAC, Online journals and online databases.

16. Two University libraries namely BSKKV and MKV (i.e 25 % university libraries in western India) had achieved 100% library automation. 50 % of the university libraries had achieved the 75 % and 25 % libraries had achieved 50 % library automation.

17. 50 % libraries were using and operating the LIBSYS library software in AAU, JAU, NAU and PDKV. 38 % University libraries were using SLIM++ in BSKKV, MKV and MPKV and 12 % University library namely SDAU using TLSS library software.

18. All the eight university libraries were library software modules. 38 % libraries upgraded and enhanced their software 'once' followed by 12 % upgraded 'twice', 25 % upgraded 'thrice' and the remaining 25 % never upgraded the software during the study period. 50 % respondents were satisfied for getting

after sale service of library software. 50 % respondents were satisfied with performance of library software.

19. With regard to availability of **infrastructure facilities (**Computers, printers, scanners, digital equipment security systems, operating systems, etc.), the SDAU library was having maximum to the some extent and BSKKV library was having minimum infrastructures. However, all the university libraries under the study lack these facilities to meet demand of the users.

20. The **Local Area Network** (LAN) was available with MPKV and LAN facility was the least with BSKKV library. 50 % libraries had the 'Broad Band' Internet connection, 38 % libraries were having Leased Line and remaining 12 % libraries had 'Cable Modem'.

21. 50 % libraries were subscribing Internet Services from the BSNL, 38 % of from VSNL, 25 % from ERNET India. 63 % libraries were using 'Shared Line', 38 % 'Dedicated Line'. 63 % libraries were having speed more than 1 mbps Internet Services, 25 % having 256 kbps and remaining 12 % libraries were utilizing a speed of 1 mbps Internet Services.

22. Almost all the libraries were having updated the Anti-Virus Software to protect their ICT programmes. All the university libraries were ready to share their resources to each other. 63% respondents had expressed to face problem of computer accessibility 'sometimes.

23. The use of Web 2.0 as a tool for scientific communication, 88 % respondents had expressed their inability to use the software, 12 % respondents used this facility rarely. 75 % libraries were having back up facilities of UPS, Inverters and Genset for restoring data in case of power failure.

24. All the libraries were having facilities of CD / DVD, 50 % libraries had LCD Projector, 38 % had Overhead Projector, 38 % had Television, 12 % Film Slide Projector and 13 % used Recorder and Players.

25. 88 % libraries had initiated for development / creation of **digital library** with the funds from the ICAR for digitization of their collection.

7.2 Library Users:

1. 58% users mostly male members in the age group of 18-25 years were involved n the field of teaching, research and extension activities.

2. 92% user groups were satisfied with the library working timings and 87% users satisfied with the reading room timings.

3. 80 % users were using 'internet' as a mode for the source of information. 79 % using books and monographs followed by 74% internet resources. 84% respondents were satisfied with the library collection. 70 % user categories such as research scholar, faculty members, scientist and agricultural staff are aware of using the digital information resources and. 47 % respondents were satisfied with existing e-resources training facilities provided by the libraries.

4. 74% respondents used the internet 'always' followed by 49% e-mail, 32% telephone, 24% television and 2% video conferencing.

5. 75 % respondents welcomed the change taken place in the university library system due to application of ICT.

7.3 Suggestions:

1. Although the states in western India have agrarian economy and prominence for development, establishment of new agricultural university need consideration the ICAR, an apex body at national level to plan and support for agricultural education, research in these states ICAR and State Governments may consider for establishing agricultural university.

2. ICAR and Govt. of Goa should take lead to set up Agricultural University in Goa State.

3. Qualified librarians should be appointed in university libraries to cater the need of teaching and research and supporting professional staff should be recruited for effective and efficient functioning of library and information services.

4. PhD degree in LIS should be mandatory for librarians to cope up with the advancement of new technologies in the university libraries.

5. Two university libraries namely AAU and SDAU need to be subscribed professional core journals and develop their collection at the regular interval in the subject of Agricultural and Allied Sciences. International journals needs to acquire and also encourage making use of online journals available in Consortium for Electronic Resources in Agriculture (CeRA). It is also recommended that three universities namely: BSKKV, MKV and SDAU should be provided adequate funds by ICAR for the aforesaid facilities.

6. For electronic journals and online full-text databases to make available to their users for browsing and searching, ICAR should provide more funds for subscribing these international databases.

7. Networking in other agricultural universities of India is to be introduced.

8. Taking into account the existing status and infrastructure of libraries, sufficient grants should be provided by the ICAR for development of libraries.

9. Upgrading the skills and technology, training plan for each library professional through workshop, short term and long term courses may be considered.

10. For use of ICT applications, user education programme is to be introduced, formulated and implemented in order to improve the proficiency, skills and knowledge.

11. RFID security system should be procured and installed in all the universities to protect and safeguard the library documents.

12. A consortia moment for the wide publicity of R & D activities is to be accelerated and development among the university libraries.

13. The activity of use of video conferencing as a library facility should be accelerated and effectively used. The ICT based services can be contributed towards knowledge sharing.

14. The international databases such as CAB abstracts, AGRIS, AGRICOLA and CARIS should be made available online and offline and sufficient funds be made available to the librarians.

15. Translation services are need to be introduced to the research communities in agriculture sector.

16. Hardware and software is to be regularly upgraded so as to improve additional features while delivering services.

17. The total ICT infrastructure should be developed in all the agricultural university libraries of western India.

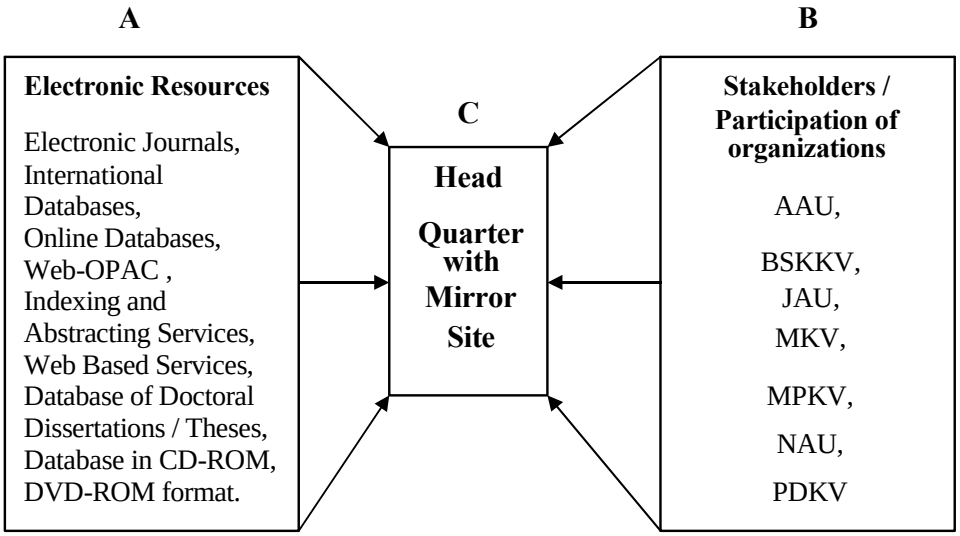
18. Broadband Internet connection having speed of more than 2 mbps be installed for delivering effective and efficient information services to the users.

19. For digital library project, free Web based open source repository software packages such as Greenstone and DSpace is to be installed and used for collection for digitizing their collection.

20. The networking system should be developed in three states i.e. Maharashtra, Gujarat and Goa.

21. A model for consortia based subscription to electronic resources in agricultural university libraries in western India is devised for application.

Figure 7.1: Model for Consortia-based Subscription to Electronic Resources.



It is very much possible to access from internet e-resources and web based services with the help of **c**onfiguration of proposed model depicted above consortia based program:

- Web based services: Web Browsers and World Wide Web
  E-mail services
  File Transfer Protocol
  Telnet
  Gopher
  Discussion Group / Forum
  New Groups
- Online Public Access Catalogue
- Document Delivery Services
- Contact Alert Services - SDI, List of Additional and current content - Access to Full Text e-journals and abstracting and indexing journals. - Database retrospective and prospective searches.

- Library websites and web portal and gateways -

Bibliographic databases.

The minimum ICT infrastructure facilities are required for the proposed consortium is as under**:**

a) Hardware and Software: Windows 2007 Professionals

b) Networking: Access to Internet.

c) CD-Server : CD-Mirroring software/Novel Netware/Any other.

Among eight agricultural university libraries and other related organizations, one university will be designated as a leader of the hub centre of the entire consortium activity. Other university libraries will be associated as the participating members of this consortium network. The proposed model, if implemented will be able to access all electronic resources and digital electronic resources and digital collection. Maximum delivery of services with minimum cost.

7.4 Conclusions:

The university and its role in national life, university stands for humanism, for tolerance, for reasons, for adventure of ideas and for search of truth. It stands for the onward march of human race towards even higher objectives. If the university discharges their duties adequately, then it is well with the nation and the people. These great words highlight the basic truth that universities have a crucial part to play in life, welfare and strength of nation. The universities are the dwelling places of ideas and idealism and expect high standard of conduct and integrity of all the members. While achieving these objectives of the agricultural university libraries have a great potential to help bridge the information gap between the haves' and have not. While keeping this view in mind, these objectives in general state agricultural universities being attempted to achieve these objectives specific mandates had been developed by the agricultural universities. These mandates are: a) train the man power needed for agriculture, animal husbandry and allied sectors for the development of the state (education). b) constantly improve and generate technologies for increasing production in agriculture, animal husbandry, home science and allied sectors and c) assist through the development departments of the government, in the process of

dissemination of the improved technologies to the farmers of the state (extension / transfer of technology). Thus, the use of ICT played a prominent place while discharging the library services.

Keeping this view in above, a total **seven objectives** formulated and **three hypotheses** were tested while carrying out the present research.

1. Objective One was designed to know the extent usage of ICT in agricultural university libraries of Western India.

Study revealed that fourteen international databases had been identified and used in the eight agricultural university libraries. The CAB Abstracts is ranked I, followed by AGRIS, AGRICOLA, Food and Science Technology Abstracts, Biotechnology Abstracts, Water Resources Abstracts, Agricultural and Natural Resource, Biological and Agricultural Index, Aquatic Science Abstracts and Chemical Abstracts. The study significantly notes that these international databases are used as a part of ICT application electronically and manually accessed. The four major databases i.e. CAB Abstracts, AGRIS, AGRICOLA and CARIS are frequently used by the respondents. At the same time 76% respondents **welcome** the dramatic change taken place in these libraries due to the ICT applications. The seven agricultural universities are using open access method.

In order to make use of the collection, the entire bibliographical detailed had been automated using a standard library management software under the program of use of ICT in these libraries.

As a part of ICT use these libraries have the electronic gadgets such as CD, DVD, modem, LCD projector, overhead projector, VCR/VCP, television, film slide projector, recorder / player, beamers, flash memory sticks.

The study also revealed from the user respondents group that 80% respondents are using ‘internet’ as a mode of major source of information. Books and monographs (79 %) and internet resources (74 %) are being used by the respondents. It revealed that **internet** is the indispensable part of the library system. Therefore, this first objective has been achieved by the present investigator.

2. **Objective Two** was concerned to find out the level of library automation, library management software, its modules, related services and constraints of automation in the library.

While achieving the above mentioned objectives two university libraries had achieved the automation 100 %. Where as four university libraries had achieved the prime objective of automation 75 % and two university libraries had achieved the automation 50 %. The detail is depicted from the **Table 5.26**.

The LIBSYS (50 %), SLIM++ (37.5 %) and TLSS (12.5 %) are being operated and used by the agricultural university libraries. So far as the modules of the software's are concerned, all the libraries are using all the modules covered in the study. 37.5 % libraries had upgraded and enhanced their software once in a while, 37.5 % libraries stated that they are satisfied while getting after sale service of library software as a 'very good'. As such over all libraries are welcoming the new change of technology while automating their activities. The opinion of the LIS professionals noted significantly as they are directly user of the same. Nevertheless, the above mentioned objectives are achieved satisfactorily.

3. **Objective Three** to examine the status of ICT infrastructure in respect of hardware and software, network connectivity use for library services. Similarly a hypothesis was designed to test the study i.e. the present agricultural university libraries are facing a problems while delivering library services in respect of infrastructure.

While fulfilling the objective and testing the hypothesis formulated during the course of research, it is revealed from the **Table 5.36** shows the availability of ICT infrastructure in eight agricultural university libraries of Western India. It is also depicted from the **Figure 5.16** availability of computers, availability of printers **Figure 5.17**, Scanners **Figure 5.18**, electronic surveillance system **Figure 5.19** shows that these are inadequate in the basic ICT infrastructure. Therefore, the hypothesis was tested against this data and found true at the same the objective mentioned above is fulfilled by the researcher.

4. Objective Four to find out the various aspects of library and information services offered by the agricultural university libraries while using ICT.

While achieving this specific objective, the data about the library and information services has been presented in the **Table 5.24** and the **Figure 5.5** the study revealed that all the services mentioned in the study are provided by the eight agricultural university libraries. The specific services are reference services, home lending, reading room facilities, audio visual, record player, reprographic, online databases, internet based services and CD-ROM databases services. So far as the translation services are concerned, it is suggested that the majority of scientific literature published in the languages of Chinese, Japanese, Korean, Spanish, German, and French are to be translated for benefit of researcher in the field of agricultural and allied subjects. As languages is a marvelous gift of human mankind. Therefore, this translation services are to be strengthened. Thus the forth objective had been achieved by the present researcher.

5. Objective Fifth to evaluate the Digital Library Initiation program adopted in agricultural university libraries.

In order to achieve the above objective, eleven questions were asked and data was elicited and presented. The study revealed that digital library initiation movement is gearing up its momentum in the field of agricultural and allied subjects especially in eight agricultural university libraries in Western India. It is seen from the data that the consortium for electronic resources in agriculture (CeRA) is a glaring example of digital library movement. The international repository (IR) is in also process of digitizing their collection. The 50 % of the agricultural university libraries needed support in the forms of major source of finance. At the same time 50 % of agricultural libraries needed technical support fro digitizing in respect of PhD theses and M.Sc dissertations. Digital resources are a comparatively theses libraries are also increasing getting involved in the very creation of digital resources. The present study revealed that eight agricultural university libraries are in the right direction moving towards digitizing their own collection of PhD and M.Sc. theses and dissertations. Therefore, the above objective had been fulfilled by the researchers.

6. Objective Sixth to know the training and orientation needs of library staff to cope up with new technologies, e-resources, and problems if any faced in adopting them.

Similarly, third hypothesis was formulated to test the study i.e. training and orientation for both library staff and user in relation to use of ICT in libraries are not up to the mark or insufficient.

While achieving the above mentioned objective and hypothesis, Question 14 was designed in questionnaire-I addressed to library professionals to elicit to data almost that total experience, adequacy of the staff, staff deputed for training courses, (workshop, seminar, conference), mode of training and types of problem faced by the library professionals. The data was presented and analyzed in the **Table 5.14** and **Figure 5.2** additional staff requirement in (**Table 5.16**) undergone training in (**Table 5.17**) method of Training in (**Table 5.18**) and Mode of Training in (**Table 5.19**) and (**Table 5.20**) experiences in use of ICT finally problems encountered while using ICT in **Table 5.21**. The data shows that library professionals are lagging behind to set the training while discharging their day to day duties while using ICT services. Which needs to paid proper attention to make efforts to maximize the effectiveness of library system. At the same time user education program also introduce and implement. The study revealed that 139 additional staff is required by all the university libraries to deliver the ICT based services. The short-term and long-term courses are to be introduced to enhance the knowledge about ICT application.

In this respect, **hypothesis mentioned above tested and found to be true.** The above mentioned objective had been also achieved and fully justified.

7. Objective Seventh was concerned that to propose a conceptual model for library and information networking within agricultural university libraries in Western India. While achieving this objective, second hypothesis was designed and tested i.e. to lack of library networking is one of the major hurdles while evaluating these university libraries.

In this respect, question 19 was designed and addressed to the university librarians and sought their opinion on LAN Connections (**Table: 5.41**), Internet Service Providers (**Table: 5.42**), Internet Connectivity (**Table: 5.43**), Bandwidth (**Table: 5.44**), Internet Security / Anti-Virus (**Table: 5.45**) and Network Problems (**Table: 5.46**) and use of Web 2.0 tool for Scientific Communication (**Table: 5.49**).

Furthermore, the data was discussed at length, observed and suggestions made accordingly. The specific objectives mentioned above were achieved by the researcher. At the same time hypotheses which were designed, tested and found to be true. In this respect, conceptual Consortia based subscription MODEL is proposed for the eight agricultural university libraries while subscribing International databases and online journals.

In view of the above detailed discussions**,** in relation to the use and application of ICT, the present agricultural university libraries playing a very responsible role as knowledge information centre in the western part of India. These centers provide accessibility user focused services to obtain, evaluate scholarly information and knowledge available in various electronic formats and strives to create new knowledge to increase understanding and develop wisdom among students, research scholars, teaching faculties and extension staff as well. The university library provides not only access to specialized information resources and services but also to meet the academic and research information needs of the user community by developing specialized need based collections; organizing information resources; providing access to human and technologically moderated access and orienting users to locate, obtain and evaluate information. These libraries have a big responsibility and a very important role to play in shaping new generation while imparting learning and research activities or endeavors. However, the education, research and extension are the mandatory areas of activity of the university library system are observed by the researcher. The user community that is scientist of tomorrow must be oriented with new technology which delivers knowledge in different forms that needed today. The community will need more knowledge in the emerging disciplines in the field of agriculture. Thus, education and university library are two inseparable concepts both being fundamentally and qualitatively related to and co-existent with each other. The existence of one is impossible without the other. Both of them are ultimate aim. Therefore, it can be inferred that, the libraries are primarily responsible for the provision of academic information to support learning, teaching, research and extension.

With the advent of ICT, the nature of libraries has changed dramatically. The computers and electronic media prominently used for process, store, retrieve and

disseminate information. The internet, which includes websites, database and communication facilities provide remote access to a wide range of resources. Libraries have now completely changed into digital information centre. Today's libraries are not only as a main store-house of recorded document oriented information but also are playing the role of information dissemination centers surrounded by networked data connected to the vast ocean of internet based information sources and services.

India being an agrarian society and basically depends on agricultural output. It is therefore, essential that new ICT thrust shows greater emphasis on the transfer of scientific and technological information from the research institutes to its actual users. Thus, the success of university library system depends upon the effectiveness and efficiency of information services rendered to the users to meet their educational and research endeavor. The university libraries are expected to deliver the core services which are extremely useful to the research community.

Finally, the survey clearly indicated that agricultural librarian has a special and vital role to play in the rapidly changing and increasingly important information based agricultural fields of our society. In order to play this role, we must look in two directions one is to their users for guidance and for a statement of needs, problems and priorities and second one is to the world of information and ICT oriented for problems, solutions and resources. It is the librarian's special responsibilities to club together. The task is challengeable and opportunities in its ICT scope, urgency and open-endedness, but what is known about agricultural scientist / researchers and current ICT trends can help focus their effort. Therefore, if librarians are truly concerned with users they must examine users need, wants and perform their role.

7.5 Further Scope of Research:

The research work needs to be continued by the researcher who wants to continue their doctoral research in these areas. There is a scope for further micro level research. Hence, a couple of research topics have been suggested for their guidance :

1. The study may be conducted on training based ICT to users as well as working professionals so that more utilization will increase the use of new technology.

2. Analysis of secondary resources available in agricultural sciences

3. Review of agricultural university library performance.

4. Consortia movement while using ICT in various agricultural university library system.

5. Evaluation of user awareness of latest applications and implications of security system and digital technology.

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Annexure-I

Questionnaire I: Survey of Library

Title: Use of Information and Communication Technology [ICT] in Agricultural University Libraries of Western India: A survey.

1. **General Information**

   1.1 Name of the University: ……..

   1.2 Establishment year of the University: ……..

   1.3 Address:

   …….. …… ……

   PIN: ……. Telephone No.: ……

   Fax: ……E-mail:…..…….

   Website / URL: ……..……..

   1.4 Name of the Librarian:……

   1.5 Academic Qualifications:…….

   1.6 Scale of Pay: Rs. ……..

   1.7 Age. : …….

   1.8 Professional Experience: …… [Years]

2. Courses offered by the University. [Please tick]

   B.Sc. / M.Sc. [Agri.] [ ], M.Sc. [Hort] [ ], M.Sc. [Forestry] [ ], M. F.Sc. [Fishries Sc.] [ ], M.Sc. [Agri.Biotech] [ ], M.Sc.[Home Sc.] [ ], B. Tech / M. Tech [Agri. Engg.] [ ], M.Tech [Food. Sc.] [ ], B.V.Sc.& A.H. / M.V.Sc. [ ], M.B.A. (Agri.) [ ], Ph.D.(Agri. Sci.) [ ]

   Any other [please specify] : …….

3. Is there any Library Advisory Committee for your library ? **Yes/No**

4. Functions of the library Committee. [Please tick]

4.1 Formulating a development plan for the library. [ ]

4.2 Framing rules and regulations for the use of library. [ ]

4.3 Examining proper implementation of library policy. [ ]

4.4 Allotment of funds and checking of library expenditure. [ ]

4.5 Any other [Please specify] :

5. Do you have independent Library Building ? **Yes/No**

5.1 Total space available for the library : ……sq. / ft.

5.2 Stacking Area : …… Reading Area : …….

5.3 Availability of provision for future expansion. **Yes/No**

6. Library Timing : From …… To ……..

6.1 Reading Room Timing : From……. To ……..

6.2 Do you change the working hours during the Examination period ?

Yes/No

7. Library Collection

[Please mention only figures as on 31.3.2010]

Sr.No.	Collection type	Number
1.	Books & Other Documents	
2.	Bound Volumes of Journals	
3.	Current Journals : **a.** National	
	b. International	
4.	Newspapers & Magazines	
5.	Electronic - Collection	
6.	CDs / DVDs (Including Databases)	
7.	Video Cassettes	
8.	Audio Visuals	
9.	Any other:	

8. Does your library subscribe to any International Databases? **Yes/No**

If **yes,** please tick the appropriate Databases given below.

CAB Abstracts	[ ]	Current Contents	[ ]
AGRIS	[ ]	Water Resources Abstracts	[ ]

AGRICOLA	[ ]	Agric. & Natural Resources	[ ]
Biological Abstracts	[ ]	Chemical Abstracts	[ ]
Biotechnology Abstracts	[ ]	Biological & Agric. Index	[ ]
Food Sc. & Tech. Abstracts	[ ]	Indian Harvest	[ ]
Indian Science Abstracts	[ ]	Aquatic Sciences	[ ]

Any other: ……

9. Library Collection organized by using following Classification Scheme: (Pl. tick)

C C [ ] D D C [ ] U D C [ ]

Any Other: ……..

10. Cataloguing Code used : (Please tick)

C C C [ ] A L A [ ] A A C R I [ ] A A C R II [ ]

Any other: ……

11. Method of Access allowed to the Users. [Please tick]

Open Access [ ] Closed Access [ ]

12. Total Grants received for the Library during the last five years [in Lakhs).

Year	State	ICAR	Other	Total
2005 - 06				
2006 - 07				
2007 - 08				
2008 - 09				
2009 - 10				

13. Do you have a separate budget for ICT? **Yes / No**

If **yes**, Please specify Number of times and Amount in Rs. :……

14. Library Personnel

14.1 Number of library staff:		**No.**	**Total Experience /Years**
a.	Professionals	……	…….
b.	Among Professionals No. of Computer literates / trained	……	…….
c.	Semi-Professionals	…...	…….
d.	Among Semi-Professionals No. of		

	Computer literates / trained	……	..……
e.	Administrative staff	……	……..
f.	Others	……	……..

14.2 Is your library staff adequate ? **Yes / No**

If **no**, how many additional staff do you require ? ……..

14.3 Number of library Staff deputed for special ICT Training /Course/ Workshop/ Seminar/Conference during last three years: …….

14.4 What kind of training do you provide to your staff while using ICT in your library.?

In house training [ ] Outside training [ ] Other [ ]

14.5 Mode of Training schedule:

a. Conference / Seminars / Hands on experience Courses
b. Workshop
c. Short term courses
d. Long term courses
e. Any other : ……..

14.6 Would you like to share your experiences in the use of ICT application with other users or potential users ? **Yes / No**

14.7 Type of **problems** faced by librarian. [Please tick in appropriate box]

[A=Rarely, **B**=sometimes, **C**=Often, **D**= Very frequently]

No	Types of Problem	A	B	C	D
1	Lack of knowledge of LISc among Computer Professional				
2	Communication gap between LISc Professionals & Computer Professionals				
3	Lack of Staff Training				
4	Staff unwilling to use it				
5	Lack of awareness about the ICT in the University				

15. Library Users

15.1 User Category: (please tick)

a. Dean / Directors [ ] **g.** Research scholars [ ]

b. Associate Dean	[ ]	**h.** Students UG / PG	[ ]
c. Head of Department	[ ]	**i.** Agricultural staff	[ ]
d. Faculty Members **e.**	[ ]	**j.** Administrative Staff	[ ]
Scientists	[ ]	**k.** Any other	[ ]
f. Extension Specialists	[ ]		

15.2 Total number of registered Users in the Library: …….

16. Library Services

16.1 Whether the following services provided by your library ?

a. Lending Services **Yes / No**

b. Reference services **Yes / No**

c. ILL **Yes / No**

d. Reading Room **Yes / No**

e. Book Bank **Yes / No**

f. Photocopying Service **Yes / No**

g. Bibliographic service **Yes / No**

h. Current Awareness Service (CAS) **Yes / No**

1. Monthly list of additions **Yes / No**

2. Display of books / periodicals **Yes / No**

3. Book talk **Yes / No**

4. Book exhibition **Yes / No**

i. SDI service **Yes / No**

j. Online Database Searches **Yes / No**

k. Translation Service **Yes / No**

l. Indexing / Abstracting Services **Yes / No**

m. Internet based Services **Yes / No**

n. CD-ROM database Search **Yes / No**

o. Any other (please specify): ……

16.2 Do you have User Education Program to encourage your users to enhance the ICT use? **Yes / No**

a. If **yes,** [please tick]

1. Training from time to time [ ]
2. Awareness to new database [ ]
3. Addition of any new ICT [ ]
4. Feedback from the Users to evaluate your ICT based services [ ]

16.3 Reprographic Facilities

1. How many Xerox Machines do you have? [Please tick]

Number: 1 [ ] 2 [ ] 3 [ ] 4 [ ] 5 [ ]

16.4 Does your library provide access to e-Resources from outside your library / Home?

Regularly [ ] Occasionally [ ] Rarely [ ] Never [ ]

17. Library Computerization

17.1 Is your library automated? **Yes / No**

If **yes,** what level has your library achieved the objectives of Automation?

100% [ ] 75% [ ] 50% [ ] 25% [ ] below 25% [ ]

17.2 Name of the Library Management Software: (Please tick)

CDS / ISIS [ ] MINISIS [ ] WINSYS [ ] LIBSYS [ ]

LIBSUITE [ ] SLIM ++ [ ] SOUL [ ] Any other :……

17.3 Which Module do you use? [Please tick]

Acquisition ( ) Cataloguing ( ) Serial Control [ ]

Circulation Control [ ] OPAC / Web OPAC [ ] All [ ]

Any special Module available, Pl. specify: ……

17.4 Have you ever replaced & upgraded your Library Software? [Pl. tick]

Once [ ] Twice [ ] Thrice [ ] ...……Times Never [ ]

17.5 Performance of Library Software used.

100% [ ] 75% [ ] 50% [ ] 25% [ ] below 25% [ ]

17.6 After the purchase of Library Software have you ever faced any technical problems in it.? **Yes / No**

If **yes,** what steps have you taken to address the problem? (Please tick)

a. By approaching the Vendor / Consultant. [ ]

b. By Upgrading the Software. [ ]

e. By Upgrading the Hardware. [ ]

17.7 Do you get after sale service? **Yes / No**

If **yes**, how do you assess after sale service?

Excellent [ ] Very Good [ ] Good [ ] Fair [ ] Poor [ ]

17.8 Problems encountered while implementing library computerization:

(Please tick the rank number constraints by 1,2,3 (1 being **top** and8 being **low**.)

Sr. No	Constraints	Rank							
		1	2	3	4	5	6	7	8
1	Low priority to the library								
2	Lack of management support								
3	Lack of policy guidelines								
4	Inadequate library budget								
5	Non-availability of standard software								
6	Under-trained library staff								
7	Resistance from the staff								
8	Any other (please specify) :								

17.9 Due to epoch-making change in technology, how do asses your library automation?

Excellent [ ] Very Good [ ] Good [ ] Fair [ ] Poor [ ]

18. ICT Infrastructure

18.1 Hardware & Software

Sr. No.	Category	Name of the Item	No. of Items
1	Computers	Servers / CD-servers	
		PCs / Desktops / Workstations	

		Laptops	
2	Printers	Dot matrix	
		Inkjet	
		Laser / Color laser	
		Barcode Printer	
		Identity card Printer	
3	Scanners	Scanners	
		Barcode Readers	
		Scanner for Digitization	
4	Digital Equipments	Digital Camera	
		Digital Video Camera	
		Web Camera	
5	Security System	Electronic Surveillance System (EAS)	
		Radio Frequency Identification (RFID)	

18.2 Operating System being used while using ICT : [Please tick]

Windows 95 / 98 / 2000 [ ] Windows-NT [ ] Windows-XP [ ]

Windows-7 [ ] Lunix [ ] UNIX [ ] Sun Solaris [ ]

Novell Netware [ ]

Any other : …..

19. Network / Internet Connectivity.

19.1 Does the library have Local Area Network (LAN) ? **Yes / No**

If **yes,** please mention the number of LAN connections available in the library **:**……..

19.2 Does the library have Internet connection? **Yes / No**

If **yes,** please mention type of Internet connection.

Dial-up [ ] Broadband [ ] Leased line [ ] ISDN [ ]

V SAT [ ] RF Tech.[Wireless] [ ] Cable Modem [ ]

Any other: …….

19.3 Internet Service Provider: (Please tick)

ERNET INDIA [ ] BSNL [ ] VSNL [ ]

TATA [ ] Reliance [ ] Sify [ ]

Any other : …….

19.4 How is the library connected to the Internet?

Shared [ ] Dedicated [ ] Any other :……

19.5 Please mention the Bandwidth.

256 kbps [ ] 512kbps [ ] 1 Mbps [ ] More than 1 Mbps [ ]

19.6 Is there an Antivirus security for the Network ? **Yes / No**

If **yes,** Is this software always upto date on every PC? **Yes / No**

1**.** Name of Antivirus Software: ……

2**.** Is your library a part of any library network to share the resources with other libraries? **Yes / No**

3**.** If **yes**, please mention the name of library Network:……

19.7 If **no**, Is your library interested in taking part in a library network to share the Resources which will be of interest to other Agricultural University libraries? **Yes / No**

19.8 Internet Services: [please tick]

Fully opened [ ] Fully closed [ ] Partial [ ]

Are outsiders allowed to use the library ICT services? **Yes / No**

19.9 If **yes**, do they need prior permission? **Yes / No**

19.10 Have you faced any **Network Problems**? [Please tick]

[A=Rarely, **B**=sometimes, **C**=Often, **D**= Very frequently]

No.	Type	A	B	C	D
1	Access Control				

2	Computer Viruses				
3	Low Bandwidth				
4	Others				

19.11 Are you using Web 2.0 tools for Scientific Communication? **Yes/No**

19.12 Which is the back- up system in case of power failure, please state ?

20. Availability of Electronic Gadgets / Multimedia Resources: [Please tick]

Sr. No.	**Category**	**Yes**	**No**
1	CD / DVD Drive, CD / DVD Writer		
2	Modem / Networking Equipment		
3	LCD Projector		
4	Overhead Projector		
5	VCR / VCP		
6	Television		
7	Film Slide Projector		
8	Recorder / Player		
9	Beamers (Data Projector)		
10	Flash Memory Sticks		
11	Any other (Pl. specify) :		

21. Telecommunication

Telecommunication media available in the library: [Please tick]

Sr.No.	Item	Yes	No
1	E-mail		
2	Modem		
3	Wireless Network		
4	Any other (pl. specify) :		

22. Digital Library Initiation

22.1 Have your library taken any initiative for developing a digital library?

Yes / No

22.2 Do you get funds from ICAR for Initializations of digitizing your collection?

Yes/ No

22.3 Please mention the software used for developing the digital library …….

22.4 Nature of documents included in the digital library.

…..……

22.5 Please mention the collections, subjects and number of documents covered in the digital library.

22.6 Do you provide access to the digital library on your library website?

Yes/No

22.7. Is your library planning to create an Institutional Repository? **Yes/No**

22.8. If **yes,** please outline the plans and objectives of the Institutional Repository:

…….……

……..……

……..

……..

22.9 Do you subscribe to E- books? **Yes / No**

22.10 Do you subscribe to E- Journals? **Yes / No**

22.11 Is your library a part of any Consortium ? **Yes / No**

If **yes,** please mention the name of the Consortium:

……..

If **no,** is your library interested in taking part in a consortium,

Which may be of interest to the Agricultural University libraries ?

Yes / No

23. Please give your future plan regarding the introduction / development of ICT at your library, if any:

24. Would like to share any other valuable information thought? Kindly give your expert comments. [Please attach additional sheet if space is inadequate]

Date: **Signature**

Annexure-II

Questionnaire II: For User

Title: Use of Information & Communication Technology [ICT] in Agricultural University Libraries of Western India: A survey.

PART - A

1. General Information

1.1 Name of the User [Optional] : ……

1.2 Age : ……... ……..

1.3 Gender : Male [ ] Female [ ]

1.4 Qualifications :……..

2. Please state your position: [Please tick]

2.1 Student UG / PG [ ]

2.2 Research Scholar [ ]

2.3 Faculty Member [ ]

2.4 Scientist [ ]

2.5 Extension Specialist [ ]

2.6 Agricultural staff [ ]

2.7 Others [ ]

3. Department : …….

4. University :……

5. Area of your Specialization :…….

6. Area of your Interest : …….

7. How often do you use the library ? [Please tick]

Daily	[ ]	Twice a week	[ ]	Weekly	[ ]
Fortnightly	[ ]	Monthly	[ ]	Occasionally	[ ]

8. Are you satisfied with the library Working Timing ? **Yes / No**

9. Are you satisfied with the Reading Room Timing ? **Yes / No**

PART - B

10. From where do you get the most prominent information for your Study/Research? [Please tick]

10.1 Library [ ]

10.2 Internet [ ]

10.3 Personal discussions / Colleagues [ ]

10.4 Other organization / Library [ ]

10.5 Any other (Please specify) : …….

11. Which Resources do you consult regularly? (Please tick more than one)

11.1 Books / Monographs [ ]

11.2 Current Journals [ ]

11.3 Indexing / Abstracting Journals [ ]

11.4 Government Reports [ ]

11.5 Conference Proceedings [ ]

11.6 Manuals & Handbooks [ ]

11.7 Theses / Dissertations [ ]

11.8 CD-ROM Databases [ ]

11.9 Online Databases [ ]

11.10 Internet Resources [ ]

11.11 E-books / E-journals [ ]

11.12 Any other : ……..

12. Are you satisfied with the library collection/ resources ? **Yes / No**

13. Do you aware of using digital information resources ? **Yes / No**

14. Does your library provide training for using e-resources ? **Yes / No**

15. Apart from print and digital, how many times you make use of the following Facilities to collect the information ? (Please tick)

Sr. No.	Item	Always	Some-Times	Rarely
1	Telephone			
2	Television			
3	Internet			
4	E-mail			
5	Video Conferencing			

16. Do you avail the following library services? (Please tick)

Sr. No.	Type of information services	Level of satisfaction				Not Used
		Excellent	Good	Fair	Poor	
1	Reading Room Service					
2	Home lending service					
3	Inter Library Loan / DDS					
4	Reference Service					
5	Photo-copying Service					
6	Subject Bibliographic					
7	CAS / SDI Service					
8	Abstracting / Indexing					
9	Newspaper Clippings					
10	Internet Usage					
11	Online Searching of Database					
12	CD-ROM Database Searches					

13	E-books / E-journals					
14	Any other services required other than above, please specify :					

17. What is your opinion about the assistance provided to you by the library?

Professionals? [Please tick]

Sr. No.	Services / Facilities	Assistance			
		Excellent	Good	Fair	Poor
1	Reading Room facility				
2	Library Collection				
3	Reference Service				
4	Availability of Electronic Information Resources				
5	Internet Service				
6	Offline Database Searching				
7	Online Searching				
8	User education / Orientation				
9	Staff behavior and cooperation				

18. Which of the following International Databases are of your interest? [Pl. tick]

Sr. No	Database	Method of using			Not Used
		Manually	CD- ROM	Online	
1.	CAB Abstracts				
2.	AGRIS				
3.	AGRICOLA				
4.	CARIS				
5.	Biological Abstracts				

6.	Chemical Abstracts				
7.	Food Sc. & Tech. Abstracts				
8.	Biotechnology Abstracts				
9.	Indian Harvest				
10.	Current Contents				
11.	INDEX Veterinarius				
12.	Indian Science Abstracts				
13.	Medline				
14.	Aquatic Sciences				
15.	Any other of your interest:				

19. Opinion about the change due to ICT. [Please tick]

19.1 Exciting [ ]

19.2 Welcome [ ]

19.3 Frustrated [ ]

20. Kindly assess the following facilities in your library as a user. [Please tick]

Sr. No.	Category	Excellent	Good	Fair	Poor
1	Computerization				
2	Communication				
3	Networking				
4	Internet Connectivity				
5	CD / DVD-ROM Databases				
6	Reprography / Xerox				
7	Any other suggestions (please specify) :				

21. How would you assess the performance of your Library? (Please tick)

21.1	Excellent	[ ]
21.2	Good	[ ]
21.3	Fair	[ ]
21.4	Poor	[ ]

22. Suggestions, if any for the improvement of the library and its services:

Date: **Signature**