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 of 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 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 that 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 Undergraduate 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, Kolkata, 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-square 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 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 examination 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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