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 stakeholders. 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.

NATIONAL AGRICULTURAL RESEARCH SYSTEM

ICAR

AGRICULTURAL UNIVERSITIES

All-India Co-ordinated Research

National Agricultural Research

Ad-hoc Schemes

Centers of Excellence

Regional Research Stations

Colleges
- Agriculture
- Vet. Sciences
- HomeScience
- Horticulture
- Agric. Engng

General Universities

Voluntary/Private Organization

Faculties/Colleges

Departments

Related Scientific Organizations CSIR, BARC, ICMR, etc

Government Departments
Science & Technology, Space, Environment, Ocean Development, etc

Other Ministries
Education, Labour, Irrigation & Power Defence, etc

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>
<thead>
<tr>
<th>Name of the University</th>
<th>Acronym</th>
<th>Year of Establishment</th>
<th>Address for Correspondence</th>
<th>Phone No.</th>
<th>Fax No.</th>
<th>Website / URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anand Agricultural University</td>
<td>AAU</td>
<td>2004</td>
<td>Anand - 388110. (Gujarat)</td>
<td>(02692) 261571</td>
<td>(02692) 261520</td>
<td><a href="http://www.aau.in">www.aau.in</a></td>
</tr>
<tr>
<td>Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth</td>
<td>BSKKV</td>
<td>1972</td>
<td>Dapoli, Dist. Ratnagiri - 415712 (MS)</td>
<td>(02358) 282064</td>
<td>(02358) 282074</td>
<td><a href="http://www.dbskkv.org">www.dbskkv.org</a></td>
</tr>
<tr>
<td>Junagadh Agricultural University</td>
<td>JAU</td>
<td>2004</td>
<td>Motibagh, Junagadh - 362001. (Gujarat)</td>
<td>(0285) 2670270</td>
<td>(0285) 2672004</td>
<td><a href="http://www.jau.in">www.jau.in</a></td>
</tr>
</tbody>
</table>
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 6 constituent 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 Vidyapeeth (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 questions 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.
References:


