CHAPTER - 3

NATIONAL AND INTERNATIONAL ICT BASED AGRICULTURAL INFORMATION PRODUCTS / SERVICES
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AGRICULTURAL INFORMATION PRODUCTS/SERVICES

In this chapter, the International and National level ICT based Agricultural Information Products/ Services are presented followed by profiles of the eight libraries located at Hyderabad, which have been selected for the purpose of the study. Accordingly this chapter is divided into major sections: International level agricultural databases, National level agricultural databases, Agricultural information networks, Agricultural websites etc. and profiles of the eight libraries at Hyderabad selected for the study.

3.0 Introduction

There are many agricultural information databases and networks, websites, and search engines which emerged in the recent past on International and National levels which cater to the information needs of researchers, scientists, agribusiness industry and farmers.

3.1 International level Agricultural Databases

Large databases are regularly updated is files of digitized information. Primarily, databases were created capturing all relevant information. These are organized collections of different subject areas, which could be in bibliographic or full text forms. Bibliographic databases consist of citations or references of documents. Enhanced by computer capabilities, databases provide more access points than printed abstracting or indexing journals. Most of the databases are accessible through commercial vendors that load the databases in their large computers and provide software to retrieve information held by them.

Agricultural databases are being produced internationally by premier organizations in agriculture, and at the national level several databases on agriculture are available to users. The following are the major international and national data bases which have been contributing to agricultural information system and providing valuable
information to the users. The major international databases in agriculture include CABI, AGRIS, AGRICOLA, ScienceDirect, etc.

### 3.1.1 CABI Abstracts (Commonwealth Agricultural Bureau of International)

CABI is a non-profit oriented science-based development and information organization. CABI improves people’s lives by providing information and applying scientific expertise to solve problems in agriculture and environment. CABI produces key scientific publications, including CAB Abstract – the world-leading database covering agriculture and environment and also publishes multimedia compendia, books, e-books and full text electronic resources aiming to further science and its applications to real life. Each of CABI products is relevant and authoritative. CABI expertise includes agriculture, veterinary and environmental sciences, food and nutrition.

CABI uses ICTs to benefit farmers, researchers and policy makers, extension workers with the information they are in need of to make informed decisions and which in turn eradicate poverty of people. CABI uses scientific expertise to solve problems in agriculture and environment in the world. CABI produces the following main databases such as CAB Abstracts, CAB Direct, Global Health, Global Health Archive and also produces specialised databases on subjects such as crop science animal breeding, dairy science, horticulture, plant breeding, forestry, soil science sugar poultry, seed, rice. The following divisions are included in CABI.

CAB Abstracts is an applied life sciences bibliographic database emphasising agricultural literature, which is international in scope. It contains 6 million records, with coverage from 1973 to the present day, adding 300,000 abstracts per year. Subject coverage includes agriculture, environment, veterinary sciences, applied economics, food science and nutrition. The database covers international issues on agriculture, forestry, and allied disciplines in the life sciences. It indexes publications from 150 countries in 50 languages, including English abstracts for most articles. CABI covers literature such as journals, proceedings, books, and a large collection of agricultural serials. Other non-journal formats are also indexed.
CAB Abstracts Archive is a searchable database produced by CABI. It is created from 600 volumes of printed abstracts, which are the collected and published scientific research from 1910 to 1972, and then digitized to form the archive. This archive database contains more than 1.8 million records, which cover agriculture, veterinary science, nutrition and the environment. Subject coverage also includes biodiversity, pest control, environmental pollution, animal disease nutrition, and food production. Natural resource management includes plant and animal breeding. CAB Abstracts Archive is also indexed in other databases, which also serve as access points. These other databases are CAB Direct, Web of Knowledge, EBSCOhost, OvidSP, and Dialog.


CAB Direct is a source of references for the applied life sciences. It incorporates two bibliographic databases: CAB Abstracts and Global Health. CAB Direct is an access point for multiple bibliographic databases produced by CABI. This database contains 8.8 million bibliographic records, which include 85,000 full text articles. It also includes noteworthy literature reviews. News articles and reports are also part of this combined database. CABI full text repository is integrated into all CABI databases including CAB Abstracts, and Global Health. Both of these are online and print journals. Coverage includes 70,000 full text articles, through agreements with third party publishers. Eighty percent of the content is exclusive to CABI.

The full text repository is made up of fifty percent journal articles, and equal percentage of conference (proceeding) papers and other accessible literature is also
included. Eighty percent of the articles are in English and coverage includes 56 countries. Also included in this database are relevant but hard to find materials which cross disciplines consisting of agriculture, health and the life sciences. Mainstream literature and hard to find materials of equal relevance are given equal access. CABI full text repository is indexed in other databases, which also serve as access points, consisting of Web of Knowledge (Thomson Reuters), CAB Direct, OvidSP, Dialog, Dimdi, and EBSCO host. In addition, CABI produces a number of unique resources like: CABI eBooks, Internet Resources, Compendia, Full Text products.

CABI uses scientific expertise to solve problems in agriculture and the environment around the world. Compendia provides in depth information about protecting crops, aquaculture and forestry. Extension workers, researchers and quarantine officers find them an invaluable tool. CABI e-books focuses on topics like animal sciences, agricultural economics and rural studies, environmental sciences and plant sciences. They are well respected and widely read by university students, researchers and academics. It also develops Internet portals for funding organizations to disseminate information about their projects.

CABI produces full text products such as CAB e-Books, Reviews, CAB, text, Bacteria, Diseases, and Pests. Global CABI Database hosts are OVID, DIMDI, and EBSCO information services, STN, DIALOG. It offers a variety of CABI database user guides, arranged according to search interface, and product. The files can be viewed online, by clicking on the link, or they can be downloaded and saved locally CABI can browsed by all products (A-Z), by subject, Products, Bibliographic Databases, Full text resources, Compendia, Books and e-Books.
3.1.2 AGRIS (International Information System for Agricultural Sciences and Technology) (Source: http://www.agris.fao.org)

It is an International system working under Food and Agricultural Organisation (FAO) of the United Nations, providing access to world information in the field of agriculture and related fields to researchers, planners, extension workers and farmers. It is a cooperative and decentralized system covering both conventional and grey literature wherein 171 countries and 24 regional and international research centers participate. Its annual input is 1,30,000 items. AGRIS is a collection of more than 4 million bibliographic records and it is one of the most important worldwide information systems in the agricultural domain. AGRIS serves a million pages a month with more than two hundred fifty thousand users accessing the system every month. It has a strong and very important audience. The Library and Documentation Systems Division produces a regular electronic newsletter - "Agile" - which keeps the AGRIS, CARIS, and AGLINET participating centers (as well as any interested individuals or organisations) informed about new products, initiatives and updates.

AGRIS is a global public domain database with more than 4 million structured bibliographical records on agricultural science and technology. The database is maintained by the FAO, and its content is provided by more than 150 participating institutions from 65 countries. The AGRIS Search system, accessible at http://agris.fao.org, allows scientists, researchers and students to perform sophisticated searches using keywords from the AGROVOC thesaurus, specific journal titles or names of countries, institutions, and authors. AGRIS is a cooperative system in which participating countries input references to the literature/documents produced within their boundaries and, in return, draw on the information provided by the other participants.

The bibliographic references forwarded by participating countries are collected and processed in the AGRIS Processing Unit Vienna, which is hosted by the Division of Scientific and Technical Information of the IAEA where data is merged into main database. Such data so received is processed and bear copy in the form of AGRINDEX is produced for sale/distribution. In turn, each participating country / institute receives
AGRIS tapes thereby generating SDI service, Current Awareness Service or bringing out National Agricultural Bibliography, facilitating retrospective search equipped with database management system such as Micro CDS/ISIS. Contributors to AGRIS are to date 159 national and 31 international and intergovernmental centers participate and submit about 14,000 items per month. Subject fields covered under AGRIS deals with world literature/documents on all aspects of agriculture (including forestry, fisheries, human nutrition and environment) created by FAO to facilitate information exchange.

AGRIS identifies world literature dealing with all aspects of agriculture: plant and animal production and protection; post harvest processing of primary agricultural products; forestry; fisheries; agricultural engineering; natural resources and the environment as related to agriculture; food; human nutrition; agricultural economics; rural development; agricultural administration, legislation, information, education and extension, agriculture in general, plant science, production and protection, post harvest technology, forestry, animal science, production and protection, fisheries and aquaculture agricultural machinery and engineering, natural resources and environment (Including pollution, water management and climatology/meteorology), food and human nutrition, processing of agricultural products, agricultural economics.

AGRIS covers all types of documents (materials) which are included (referred) in the AGRIS databases, at analytical, monograph and/or serial levels: monographs (books), conferences, reports, theses and dissertations, drawings, maps and atlases, patents, summaries and literature reviews, bibliographies, multimedia (films/videos, sound recordings, photos, slides, and computer media, etc.) It includes other miscellaneous and non-conventional ("grey literature" not available through normal distribution channels).

Composition of the AGRIS database is 75% journal articles, 18% monographs, 6% conferences papers, 1% others, 16% non-conventional literature (not commercially available), - 21% abstracts. Each publication (document) is described by the most revealing and conclusive data: title in English and the original language, authors and their affiliation, publication source and identification, - language of original document,
primary and other subject category codes, descriptors (key words) in English, French and Spanish, abstracts in English, French or/and Spanish.

For indexing the input documents (associating the appropriate descriptors) in order to be easily retrieved, a structured and controlled thesaurus, AGROVOC, is used. Languages of Original Documents received by AGRIS: 58% English, 8% French, 7% German, 7% Spanish, 4% Japanese, 3% Italian, 3% Russian, 2% Portuguese, and 8% others.

The AGRIS repository exploits the advantages of both open source search platform (Solr), and structured XML. It facilitates the exchange of information among developing countries and between developing and developed countries. Furthermore, it contains records from national journals - especially from developing countries that are not always represented in commercial indexing services. AGRIS uses the Open Archives Initiative Protocol for Metadata Harvesting to retrieve metadata and "expose" otherwise invisible web resources to the AGRIS search engines.

3.1.2.1 AGRIS Products and Services

A CD-ROM (Compact Disk Read-Only-Memory) uses an electro-optical technology for storing and retrieving large amounts of data. The whole collected AGRIS information is distributed using a series of CD-ROMs:

AGRIS CD-ROMs contain all collected information, stored on archival CD-ROMs and one current CD-ROM, which contains the last collected information (quarterly updated). AGRIS FHN CD-ROM: contains information in the domains of Food and Human Nutrition extracted from all AGRIS CD-ROMs (semi-annually updated).

AGRIS FORESTRY CD-ROM: contains information in the domains of forestry and primary forest products extracted from all AGRIS CD-ROMs. AGRIS and AGRIS FHN CD-ROMs are produced by SilverPlatter Information Ltd., using data prepared by
AGRIS Processing Unit Vienna; the SilverPlatter's software WinSpirs is used for retrieving the information.

AGRIS FORESTRY CD-ROMs are produced by WAICENT/FAOINFO of the Library and Documentation Systems Division (GIL) of FAO; the retrieving software, HEURISKO (CDS/ISIS based), is included. For information retrieval from AGRIS CD-ROMs, the existing software (WinSPIRS, HEURISKO) permits different searching operations to accommodate different searching needs of users: Searching by descriptors defined in the AGROVOC Thesaurus, Searching by subject category codes, authors, publication year, publication language etc. Searching free text in different description fields, Logical search operators (OR, AND, NOT), Limiting search operators (less than, greater than, range, etc.)-Truncation of words (to retrieve all variants) - Lateral searching (forward/backward) etc.

3.1.2.2 AGRIS Database Online

On-line access to the global AGRIS database is provided by: AGRIS Database Online (FAO/WAICENT, FAO Web Server) To access now the database DIALOG (Palo Alto, USA): non-USA portion only DIMDI (Cologne, Germany) AGROVOC Thesaurus (FAO/WAICENT, FAO Web Server).

3.1.2.2.1 Information Services on request

APU Vienna provides, the following if requested, in printed form or on magnetic media: Retrospective searches through the entire data base: Selective dissemination of information (SDI) service, by which users can request the AGRIS Processing Unit, to keep them informed of any new AGRIS entries on specific subjects of concern to them, National bibliographies, containing all entries generated in a country and those concerning this country and published outside, Master copies can be prepared on a high resolution laser printer in Agrindex format, ready for reproduction by offset or photocopy, and Subject bibliographies, can also be prepared upon request from specialised cooperating centers such as the CGIAR IARC's, or FAO divisions.
3.1.2.2 Data indexing in AGRIS: the AGROVOC thesaurus

AGRIS and multilingual indexing to make the system available to non-english speaking users, FAO and the European Community (EC) developed in the early 1980s a multilingual agricultural vocabulary, AGROVOC. The AGROVOC Thesaurus has been used by AGRIS for indexing and retrieval since 1986. AGROVOC.

In traditional libraries, finding works of interest is directly related to how well they are catalogued. However, complex and born-digital works require substantially more effort. AGROVOC is a comprehensive multilingual agriculture thesaurus that was developed with the cooperation of the FAO member countries. It is used for indexing data in agricultural information systems and it strives for continuous improvement and updating. The first version of AGROVOC was produced in 1982 and distributed to all AGRIS centers. Vocabulary updating is done by the FAO in collaboration with national AGRIS centers. Staff at the centers proposes new terms for the database to FAO subject specialists for consideration. The terms selected by the experts are added into AGROVOC.

In the past, an AGROVOC supplement was published and provided to the centers. Now the updated AGROVOC is available online. The proposing of new terms and corrections also can be done through the FAO/AGROVOC web site. AGROVOC, in English, French and Spanish, is available from FAO's - Publications and Sales, Sales & Marketing Group, Information Division (GI) Viale delle Terme di Caracalla, 00100 Rome.

3.1.2.3 Updates available:

The following products are now available through the AGRIS Processing unit's FTP server at the International Atomic Energy Agency in Vienna: Current monthly AGRIS output file latest version of AGROVOC most recent training materials.

India’s participation in July 1974 India formally decided to participate in AGRIS programme on a national basis through Agricultural Research Information Center of Indian Council of Agricultural Research (ICAR). After an initial experiment carried out
in November 1974, the Agricultural Research Center of ICAR has been participating in the AGRIS programme since 1975. From May 1975 the Agricultural Research Information Center (ARIC) began sending bibliographic data to AGRIS on a regular basis. The database is maintained in Vienna. On an average, India passes on about 4000 bibliographic entries to AGRIS every year. Previously the input was sent on Optical Character Recognition (OCR) sheets but now for economy and speed the input is being sent on Worksheet only. Agricultural Informatics Division of National Informatics Center is executing this Project.

In return, India receives every month updated AGRIS Magnetic Tape, and AGRINDEX- a printed monthly service. AGRIS can be accessed through a variety of interfaces, each with its own features and capabilities. Connect to AGRIS using the OvidSP interface, Connect to AGRIS directly from AGRIS-CIRIS homepage. AGRIS database collects from 117 national and international participating input centers from all over the world.

3.1.3 AGRICOLA (Agricultural Online Access Database) (Source: agricola.nal.usda.gov)

The United States National Agricultural Library (NAL) is one of the world's largest agricultural research libraries, and serves as a national library of the United States and as the library of the United States Department of Agriculture. Located in Beltsville, Maryland, it is one of four national libraries of the United States (along with the Library of Congress, the National Library of Medicine, and the National Library of Education). It is also the coordinator for the Agriculture Network Information Center, a national network of state land-grant institutions and coordinator for the U.S. Department of Agriculture (USDA) field libraries. The National Agricultural Library (NAL) provides reference and information services, document delivery, interlibrary loan and interlibrary borrowing services to a variety of audiences. Available services are based on eligibility.

AGRICOLA (Agricultural Online Access Database): This database is produced by National Agricultural Library (NAL) of United States department of agriculture which focuses more on information generated pertaining to the field of agriculture in USA. As
one of the most comprehensive sources of U.S. agricultural and life sciences information, the AGRICOLA database serves as the catalogue and index to the collections of the National Agricultural Library and the research of the U.S. Department of Agriculture (USDA). It is the best source for tracking publications by USDA, land grant universities and other associated agencies. The coverage in databases includes references to journal articles, government publications, technical reports, theses etc.

AGRICOLA has been available online since 1970 and contains more than 4.5 million citations to journal articles, book chapters, monographs, theses, patents, software, audiovisual materials, and technical reports related to agriculture. The database contains thousands of records with links to online full-text documents. AGRICOLA encompasses all aspects of agriculture and allied disciplines, including animal and veterinary sciences, entomology, plant sciences, forestry, aquaculture and fisheries, farming and farming systems, agricultural economics, extension and education, food and human nutrition, agricultural engineering and technology, and earth and environmental sciences. The NAL Agricultural Thesaurus (NALT) and Library of Congress Subject Headings (LCSH) serve as the controlled vocabularies for indexing and cataloguing records. The database covers materials from as far back as the 15th century. It covers subjects such as: Agriculture Products, Horticulture, Soil Sciences, Veterinary Medicine, Water Quality, Weather and Climate, Wildlife, Zoology Economics, Agricultural Education, Agricultural Energy, Agriculture Engineering, Agricultural Entomology Farm Management, Feed Science, Fertilizers, Fibers and Textiles, Food and Nutrition. AGRICOLA is available on CD-ROM covering from 1970 containing 3 million records in 3 CDs, and about 1, 00,000 records are added annually. Indexing is done using AGROVAC (thesaurus). Word list of Agricultural serials which is stored with NAL–USDA with support of CABI, FAO and cooperating agencies are published by Silver Plates covering about 54, 000 titles indicating which of three major database index titles eliminating likely duplication in each database.

ProQuest Deep Indexing: Agriculture supplements AGRICOLA with access to deep indexing for tables, figures, graphs, charts and other illustrations from the scholarly
research and technical literature for selected records. Records from the database appear with searches of AGRICOLA to provide an additional path for discovery. The data base supplier is National Agricultural Library Agricultural Research Service, USDA 10301 Baltimore Boulevard. The Database is available through several following commercial services that have lease agreements with NTIS.

- NERAC, Inc. http://www.nerac.com
- ProQuest Information and Learning http://www.il.proquest.com
- AGRICOLA can be accessed through a variety of interfaces, each with its own features and capabilities as follows
  - Connect to AGRICOLA using the OvidSP interface
  - Connect to AGRICOLA through NAL’s Web Gateway
  - Connect to List of Journals Indexed in AGRICOLA 1995 to present
  - Connect to the NAL Agricultural Thesaurus current version.

3.1.4 SCIENCE DIRECT (Source: http://www.sciencedirect.com)

ScienceDirect is operated by the Dutch publisher Elsevier containing (as of 2013) about 11 million articles from 2,500 journals and 6,000 e-books, reference works, book series and handbooks. The articles are grouped into four main sections: Physical Sciences and Engineering, Life Sciences, Health Sciences, and Social Sciences and Humanities. For most articles on the website, abstracts are freely available; access to the full text of the article (in PDF, and also HTML for newer publications) requires a subscription or pay-per-view purchase. ScienceDirect is a part of Elsevier. Headquartered in Amsterdam, The Netherlands, the company is the world's largest scientific, technical and medical information provider and publishes over 2,000 journals as well as books and secondary databases.
Elsevier is a member of the Reed Elsevier plc group, a world-leading publisher and information provider. Operating in the scientific, legal and business-to-business sectors, Reed Elsevier provides high-quality and flexible information solutions to professional users, with increasing emphasis on the Internet as means of delivery. ScienceDirect extensive and unique full text database covers authoritative titles from the core scientific literature, including high-impact factor titles such as The Lancet, Cell and Tetrahedron.

ScienceDirect is a leading full-text scientific database offering journal articles and book chapters from more than 2,500 peer-reviewed journals. Nine million full-text articles are available in Science Direct and more than 11,000 books are included. There are currently more than 11 million articles/chapters, a content base that is growing at a rate of almost 0.5 million additions per year. Elsevier has digitized as much of the pre-1995 journal owned-content as possible, bringing articles from as far back as 1823 (The Lancet) to the desktop. Never has in-depth literature searching been so comprehensive and easy to find.

This platform offers sophisticated search and retrieval functionality that enables the user to maximize the effectiveness of their knowledge discovery process. The web environment offers new ways to present information as well as enhancing it with other content sources based on semantic technologies like NextBio. In addition, since 2003, many authors have been submitting extra value-added content associated with the research, such as audio and video files, datasets and other supplementary content, effectively accelerating research beyond the print format.

3.1.4.1 Benefits of a ScienceDirect

There are many benefits to buying a primary agreement. They include: no concurrent user charge, unlimited downloads of subscribed content, and no unpredictable costs.

Primary agreements for journals are divided into:
Subscription-based agreements:

- ScienceDirect Complete
- ScienceDirect Standard

Access-based agreements:

- Science Direct College Edition
- Science Direct Government Edition
- Science Direct Corporate Edition

3.1.5 EBSCO (Source: www.ebsco.com; www.search.ebscohost.com)

Established in 1944, EBSCO is the world’s leading information agent providing consultative services and cutting-edge technology for managing and accessing quality content, including print and e-journals, e-packages, research databases, e-books and more. Now more than ever libraries and research organizations are looking for new ways to manage their collections more efficiently. EBSCO Information Services has developed “e” discovery solutions, including EBSCO A-to-Z and LinkSource, as well as management solutions such as EBSCONET, ERM Essentials and EBSCO MARC Updates. These services offer unparalleled integration to help librarians save time and money while empowering their users.

3.1.5.1 EBSCO Publishing

Together with EBSCO Information Services, EBSCO Publishing has served information needs for more than 65 years. By placing customers at the core of their business, they have tapped their ingenuity to assist them in developing the high quality products and services for which EBSCO is known. The providers of EBSCOhost, the most-used premium research service in libraries and other institutions worldwide, EBSCO offers a suite of more than 300 full-text and secondary research databases covering all subject areas, levels of research, and user communities - from schools, public libraries and universities, to hospitals, corporations and government agencies. EBSCO also offers e-Book and eAudioBook services (via e-Books on EBSCOhost) as well as
EBSCO Discovery Service, federated search services and a variety of partnership opportunities for publishers.

As the leading database and e-Book provider for libraries and other institutions - more than 375 full-text and secondary research databases and more than 300,000 e-Books and audio books available via the EBSCOhost platform. EBSCO provides unparalleled access to world-renowned content in all subject areas including magazine and journal articles available via EBSCOhost and H.W. Wilson, e-Books and audio books, Digital Archives as well as print books from Salem Press. EBSCO’s content services the research needs of tens of thousands of customers representing millions of end users from K-12 students to public library patrons, from academic, corporate and medical researchers to clinicians and governments around the world.

EBSCOhost, stands as one of the most-used for-fee sites on the Internet serving upwards of 100 million daily page views. EBSCOhost also powers resources such as DynaMed an evidence-based clinical reference tool as well as other Clinical Point-of-Care Resources designed to inform the clinical workflow for hospitals and other medical institutions. EBSCO’s NoveList division provides Readers’ Advisory and Library Services Resources, a variety of services to help empower libraries, engage readers and connect communities. Corporations and government agencies also benefit from EBSCO’s content specifically in the areas of Corporate Learning, Sustainability, Chemical Hazard Information, Employee Wellness and Pharmaceutical Resources.

3.1.5.2 EBSCO Services

EBSCO is also the provider of services designed to enable libraries and other institutions to better serve students and other researchers. EBSCO Discovery Service (EDS) provides a unified index of an institution’s resources within a single, customizable search box approach allowing researchers fast, simple access to the library’s full text content plus deeper indexing and more full-text searching of a higher number of journals and magazines than any other discovery service. Resources such as LinkSource and EBSCO A-to-Z help libraries link to and organize e-resources. OPAC on EBSCOhost
leverages EBSCO’s expertise in loading and enriching data along with the popularity of the EBSCOhost interface to enable libraries to use EBSCOhost as the front end of their online catalog. EBSCO also provides workflow integrations options to help corporations and other organizations integrate their electronic resources into the corporate workflow as needed.

Bringing together premium content that is not available anywhere else online with the innovative services libraries and other institutions need to deliver that content continues to drive EBSCO toward the next innovation. EBSCO Publishing (EBSCO) caters to the information needs of researchers at every level by providing libraries and other institutions with the content and services needed to bring the latest and best information to researchers.

3.1.6 Biological & Agriculture Index
(Source: www.ebscohost.com/government/biological-agricultural-index-plus)

Biological and Agricultural Index provides a thorough and reliable indexing of 258 periodicals along with a periodical, which includes a wide range of popular scientific journals that pertains to biology and agriculture. About 45% of the focus is on agriculture for the materials included in the index are feature articles, biographical sketches, reports of symposia and conferences, review articles, abstracts and summaries of papers, selected letters to the editor, special issues or monographic supplements, and book reviews.

3.1.6.1 Biological & Agricultural Index Plus

Biological & Agricultural Index Plus offers researchers convenient online access to the core literature of biology and agriculture much of it from peer-reviewed journals plus full text. Full text citations also link to PDF page images, featuring graphs, charts, diagrams, photos, and illustrations indispensable to science research.

3.1.7 Crop Science Abstracts

The Crop Science Database (formerly known as CROPCD) provides access to international scientific literature relating to field crops, fodder crops, and grasslands. It covers such diverse subject areas as agronomy, botany, physiology, biochemistry, field
production, and farming systems, Cereals, legumes, root crops, fibre plants, oilseed plants, tobacco, sugarcane and other items are covered in detail.

Compiled by subject specialists at CABI Publishing, the Crop Science Database contains more than 700,000 abstracts and citations, with 25,000 records added annually. Containing over 30 years of research from over 75 countries it provides an ideal source for professionals and students requiring an international perspective on the wealth of information available on crops. It contains Bibliographic with Abstracts and subject specialist at CABI compiles it. The Crop Science Database is available on CD-ROM (updated quarterly) and on the Internet. It utilizes the popular Silver Platter Information Retrieval System (SPIRS), providing the tools needed to obtain accurate and comprehensive search results.

### 3.1.8 Soil Science Abstracts

Soil Science Database formerly known as SOILCD. It is produced by CABI. It contains Bibliography with abstracts and includes information on soils, water, and fertilizer and land management. It covers such diverse subject areas as soil science, agricultural meteorology, irrigation, soil and water management, fertilizers and crop plant/water relationships.

This Soil Science Database is also compiled by subject specialists at CABI Publishing and contains more than 750,000 abstracts and citations, with 30,000 records added annually. It provides an ideal source for professionals and students requiring an international perspective on the wealth of information available on soils because it contains over 30 years of research from over 75 countries. The Soil Science Database includes over 30 years of information on: Soil science, Soil management, Crop management, Fertilizers and amendments, Agricultural meteorology, Pollution, Land reclamation, Irrigation and drainage, Plant nutrition, Plant water relations.
3.2 National Level Agricultural Databases

ICTs are emerging as an important tool for the development of societies and have becoming driving forces in the economies worldwide. ICTs are no more confined to assist high-end research and development; the new technologies have made significant improvements in the life-styles and the efficiency-levels of all sectors of economy. The positive impact of ICTs is most visible in service-sector, where the efficiency levels have gone very high.

In India Agriculture sector is gearing itself to make optimal use of the new ICTs. At the Government of India level, a number of important initiatives have been taken to provide IT hardware and connectivity to all organizations involved in agricultural education, research, development and dissemination. Simultaneously, agricultural content development initiatives have been take by the Ministry of Agriculture, in collaboration with National Informatics Centre (NIC), to provide marketing information of various agricultural commodities to the farming community. Knowledge Management Systems (KMS) in Agriculture, ICTs are thus emerging as very important tools for Agricultural Extension, and it is now a must for every agriculture information user to have a working knowledge of computers, communications, internet and world-wide-web. Following the advent of ICT in India, there emerged several databases on agriculture are emerged.

3.2.1 CeRA (Consortium for e-Resources in Agriculture) (ICAR, India)

National Agricultural Research system comprises 41 State agricultural universities, one Central university and ICAR which again comprises 49 ICAR institutes, five deemed universities, 5 national bureaus, 12 project directorates, 30 national research centers 77 all India coordinating projects and networks, 8 trainers training centers 562 Krishi Vignana Kendra (KVKs). Thus ICAR is a major agricultural, scientific autonomous organization in India with its head quarter at New Delhi.

The Indian Council of Agricultural Research (ICAR) is an autonomous organisation under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture, Government of India. Formerly known as Imperial Council of
Agricultural Research, it was established on 16 July 1929 as a registered society under the Societies Registration Act, 1860 in pursuance of the report of the Royal Commission on Agriculture.

The ICAR has played a pioneering role in ushering Green Revolution and subsequent developments in agriculture in India through its research and technology development that has enabled the country to increase the production of food grains by 4 times, horticultural crops by 6 times, fish by 9 times (marine 5 times and inland 17 times), milk 6 times and eggs 27 times since 1950-51, thus making a visible impact on the national food and nutritional security. It has played a major role in promoting excellence in higher education in agriculture. It is engaged in cutting edge areas of science and technology development and its scientists are internationally acknowledged in their fields.

ICAR has the mandate to plan, undertake, aid, promote and co-ordinate education, research and its application in agriculture, agro forestry, animal husbandry, fisheries, home science and allied sciences. It acts as clearing house of research and general information relating to agriculture, animal husbandry, home science and fisheries through its publications and information system, and instituting and promoting transfer of technology programmes. It has the following divisions: Crop Sciences, Horticulture, Natural Resource Management, Agricultural Engineering, Animal Science, Fisheries, Agricultural Education, Agricultural Extension, and Knowledge Management etc.

The Directorate of Information and Publications of Agriculture, (DIPA), New Delhi, is the official publication wing of the ICAR through which the research and other activities are revealed to the world. DIPA brings out a variety of publications in English and Hindi languages for the use of scientists, researchers, students, policy planners, extension personnel, farmers and the general public. The e-publications of DIPA include - “Handbook of Horticulture”, ICAR Research Projects Information - Research Project Files (RPF) Database, ICAR Vision 2020 Document etc.
Since ICAR is having network connectivity across the institutes and state agricultural universities, select journals could be made available over the network for the use of scientific community. Keeping this broad objective in mind, the National Agricultural Innovation Project (NAIP) has funded for establishing the Consortium for e-Resources in Agriculture (CeRA) at the Indian Agricultural Research Institute (IARI).

NAIP has constituted a Task Force of Webmasters of ICAR to review the status of websites of ICAR Institutes and to suggest guidelines and policy issues required for bringing uniformity and making websites more effective and useful. The first meeting was held on 29 June 2007 at NAIP, New Delhi. Representatives from IARI, New Delhi, NAARM, Hyderabad, NBPGR, New Delhi, NCIPM, New Delhi, CRIDA, Hyderabad, IIHR, Bangalore and CIBA, Chennai participated in the meeting.

The e-Journal Consortium Negotiations Committee in its meeting on February 15th, 2007, considered several names for the proposed ICAR Consortium for e-Knowledge Resources, received from the prospective users of the resources. The committee has adopted the name: Consortium for e-Resources for Agriculture with the acronym CeRA. It was launched in the year 2008.

3.2.1.1 JCCC@CeRA (Journal custom content consortium)

This is a platform developed by Informatics India Ltd to provide single point access to the Consortium of e-resources on Agriculture, journal custom content consortium of informatics and covers contents about 30,000 journals for all 123 libraries. These services are being covered from consortia journals, subscribed journals of member libraries and also open access journals of open j-gate.

Through CeRA, the user can find and download articles of choice, browse table of contents (TOC), request for articles not available online, create alerts for favorite journals. As many as 124 institutes are members of this consortia this consortia covers the journals on the subjects such as agriculture, veterinary science, fisheries crop science, soil science and animal science. The publishers like Springer Link, and Science Direct
CSRIO are publishers of these consortia. Users can access 1300+ full text journals from Springer Link on the subjects such as life sciences, agriculture, economics, maths, physics, and engineering.

Common Wealth Scientific Industrial organization of Australia is publishing agency. It publishes globally reputed journals on agriculture, plant science, and environmental management. CeRA is subscribing to 08 journals in agriculture and plant sciences with complete package. Science Direct is the world largest leading scientific full text data base of Elsevier developed articles from more than 2500 peer reviewed journals and more than 10,000 books. CeRA is subscribing to more than 300 journals from the field of agriculture.

3.2.2 Indian Harvest (CMIE) (renamed as Commodities)

The eminent economist Dr. Narottam Shah established Center for Monitoring Indian Economy Pvt. Ltd in 1976. It is a private sector economic research institution. CMIE is headquartered at Mumbai. It has 17 offices in India.

CMIE has collated the statistics on Indian agriculture from a large range of sources. It has standardized the information for easy comprehension. Indian Harvest is a database of the wide variety of crops cultivated in India. It provides detailed data on agricultural inputs and output. a database to discover opportunities in agriculture.

Indian Harvest (commodities) is a database on Indian agriculture with a longer time series. It covers crop-wise details on area, production, and yield, farm harvest price disaggregated by districts, mandi prices, rainfall, and inputs like fertilizers, tractors, pump sets, foreign trade and news abstracts. Indian Harvest brings to the user detailed statistics on acreage, production, yield, prices and trade. It also provides detailed data on inputs - land, rainfall, fertilizer consumption, etc. Prices include daily quotes from over 500 markets for over 500 crop varieties.
It is of immense use to professionals in their study of India's regional markets as the databases are detailed up to the district level. It provides daily market prices of a range of crops and their varieties. It offers a large database, which covers information on area production yield farm-harvest prices, value of output of crops and use of fertilizers or other inputs. Thus Indian Harvest provides detailed information on rainfall and abstracts of news relating to Indian agriculture. Indian Harvest is agricultural statistics packaged into user-friendly software.

3.2.3 Prowess (CMIE)

Prowess is a database of large and medium Indian firms. It contains detailed information on over 9,300 firms. These comprise all companies traded on India's major stock exchanges and several others including the central public sector enterprises. The database covers most of the organized industrial activities, banking, and organized financial and other services sectors in India. Collectively, the companies covered in Prowess account for 75 per cent of all corporate taxes and over 95 per cent of excise duty collected by the Government of India.

It provides detailed information on each company. This includes a normalized database of the financials covering 1,500 data items and ratios per company. Besides, it provides quantitative information on production, sales, consumption of raw material and energy. Totally, the number of indicators per company is close to two thousand. Such information is usually available for over ten years. The user will also find useful contact information, share holding pattern, list of bankers, auditors, news abstracts, etc. Prowess also provides daily time series of share prices, computed returns that include dividends and other gains, P/E based on the profits of the last four quarters and a host of other useful ratios and values.

Prowess has found useful applications in places where trust matters the most - in commercial banks, investment companies and researchers, among others. It packages a normalized database in versatile and amazingly powerful software. The software permits unlimited querying power to the user in the following way. The Prowess database is
accessed using a powerful Querying system. This is essential in finding the appropriately comparable but unrelated parties. Prowess is uniquely versatile in this respect.

Prowess is time-tested in Transfer Pricing cases. For several years, Prowess has been the principal database used by companies, by transfer pricing consultants, practitioners and most importantly by the tax authorities. Prowess is an indispensable source to understand the performance of active business enterprises in India. The Prowess database is built from Annual Reports, quarterly financial statements, Stock Exchange feeds and other reliable sources. There are over 3,400 data fields per company in Prowess. The database is normalized to enable inter-company and inter-temporal comparisons. This enhances the usefulness of the database in decision-making. Centre for Monitoring Indian Economy Pvt. Ltd. India's leading business and economic database and Research Company

3.2.3.1 Other Databases

Apart from above mentioned international and national databases, there are other databases mentioned below which are catering to the information users to a great extent.

- Agricultural Market Access Database (AMAD)
- AGRIGATE
- PAN Pesticide Database
- Agroforestry Database of the International Center for Research in Agroforestry (ICRAF)
- ELDIS
- Global Association of Online Foresters (GAOF)

3.3 Agricultural Information Networks

There are a large number of agricultural networks are catering to the information needs of the agriculture users by sharing information and resources. An information network is “a systematic organization of separate units, interconnected for the purpose of achieving some goal that is more than any one of the units can achieve individually”(Duchesne, 1982,) More specially, an information network refers to a formal
association among libraries, documentation centers, archives and global and regional information systems created with the aim of coordinating their efforts and sharing resources to satisfy information needs of users in a subject area and or geographic region of mutual concern to network members. There are National level networks such as ARISNET, DACNET etc and at International level AgNIC, CGIAR, and AGRISNET etc.

3.3.1 Agricultural Information Networks at International level

Access Agricultural Networks are specialized services to the agricultural information users. The networks are formal associations among libraries, documentation centers, archives etc with the aim of sharing resources by coordinating efforts. There are several Agricultural information networks available at global level to share the information on agriculture related aspects. The major agricultural networks such as AgNIC, AGRIS, AGLINET, CGIAR, AGMARKNET etc., are operating around the world. The following paragraphs give details about major Agricultural Informational Networks.

3.3.1.1 Agriculture Network Information Center (AgNIC) (Source: www.agnic.org)

AgNIC is an Internet based network of public and private agricultural libraries and information centers, coordinated by the National Agriculture Library (NAL), USA. The network aims to provide global access to agricultural information. AgNIC Members represent 40 land-grant universities and other national and international partners including universities and research institutions, government agencies, and a non-profit organization. This alliance is to provide agricultural information and specialized information services. Through its website the network provides access to a network of electronic sources on research and teaching in agriculture, food, renewable natural resources, forestry, and physical and social sciences. AgNIC is a distributed discipline-oriented source of agricultural information in electronic form on the Internet. NAL is the secretariat.
AgNIC facilitates and participates in partnerships and cooperation among institutions and organizations worldwide that are committed to the identification delivery and preservation of reliable, freely available, evaluated digital content and quality services for agriculture, food and natural resources information. The goals are to: identify major collections of agriculture-related information; to provide mechanisms to facilitate access/retrieval from these information resources; and to create mechanisms to encourage organizations to collaborate in creating/using AgNIC.

AgNIC partners select important information sources for inclusion in the system. The Services include Resource database with web sites, image collections, lists of publications, documents, databases, and other resources; Calendar of events which includes meetings, seminars, national and international symposia and conferences, conventions, and workshops in agricultural and related sciences; News items; Specialized Services – such as Plant Disease Announcements; discussions on emerging plant diseases around the world; and Expertise where specialists respond to individual questions (NAL, 2006).

There are partnerships between libraries and United States Department of Agriculture (USDA) and Cooperative Extension programs; between libraries and academic departments within colleges; and between states and between technologists and librarians. Member participants take responsibility for small segments of agricultural information and develop web sites and reference services in their specific subject areas. Nearly all participating AgNIC institutions have developed partnership relationships with a variety of internal and external institutions, groups, and agencies to develop content and tools for their respective web sites. AgNIC provides information on animal science, animal products, farms, farming, food nutrition, insect’s, plant diseases rural and agriculture sociology.

3.3.1.2 AGLINET Agricultural Libraries Network (Source: http://www.fao.org/library/library-aglinet)

AGLINET is a voluntary network of agricultural libraries around the world with strong regional/country coverage and other comprehensive or very specialized subject resource collections. Coordinated by the Food and Agriculture Organization of the United
Nation (FAO), this voluntary co-operative library network was founded in 1971 within the framework of the International Association of Agriculture Librarians and Documentalists (IAALD).

AGLINET libraries achieve comprehensive resource coverage as well as mutual and rational use of library resources, not only for the benefit of members' own constituencies, but also in support of other libraries within their country/region. The structure, tasks, principles, procedures and changes in membership are guided by the AGLINET Statutes, which were formulated and are periodically reviewed by members.

The material may also be obtained from the David Lubin Memorial Library, which acts as the International Co-coordinating Center. All member libraries provide, upon request, access to the literature originating in the country or region or for a given specialization. AGLINET aims at combining resources for mutual and rational use through delivery of primary documents, by means of interlibrary loan provision of reproductions, bibliographic information; with appropriate regional and subject specialization. Member libraries include Agricultural libraries of national or regional importance with comprehensive collections and strong regional coverage; libraries in special subject fields within the broad domain of agriculture with worldwide coverage. AGLINET Network members include Libraries from Argentina, Australia, Belarus, Belgium, Benin, Botswana, Brazil, Bulgaria, Brazil, Canada, China Costa Rica, Czech republic, Denmark, Egypt, Estonia, Ethiopia, Finland, France, Germany, Hungary, India, Indonesia, Italy, Japan, Jordan, Kenya, Korea, Latvia, Lithuania Malawi Malaysia, Mexico, Netherlands, Nigeria, Norway the Philippines, Poland Portugal, Russia, Slovenia, south Korea, Spain, Sri Lanka, Sweden, Syria, Thailand, UK, Uruguay, USA, The West Indies and Zambia.

3.3.1.3 International Information System for Agricultural Sciences and Technology (AGRIS) Network (FAO Rome) (Source: http://agris.fao.org)

The Food and Agriculture Organization of the United Nations (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger.
Serving both developed and developing countries, FAO acts as a neutral forum where all nations meet as equals to negotiate agreements and debate policies. FAO is also a source of knowledge and information, and helps developing countries and countries in transition to modernize and improve agriculture, forestry and fisheries practices, ensuring good nutrition and food security for all. Its Latin motto is fiat panis, which means in English "let there be bread". As of 8 August 2008, FAO has 191 member states along with the European Union, Faroe Islands and Tokelau, which are associate members. It is also a member of the United Nations Development Group.

The Food and Agriculture Organization (FAO) of the United Nations initiated agricultural information networking through AGRIS. Established in 1974, AGRIS facilitates information exchange and brings together world literature dealing with all aspects of agriculture and related subjects. AGRIS is a cooperative system in which 240 national, international and intergovernmental centers in participating countries input references to the literature produced within their countries and draw on the information provided by the other participants. The new vision of AGRIS, in response to the needs includes: a decentralized approach with greater emphasis on national partnerships, improved linkages between the AGRIS network and other FAO initiatives; focus on management of documents in agricultural science and technology in full texts; information about activities, organizations, and people in agricultural science and technology; etc.

3.3.1.4 AGREN (Agricultural Research and Extension Network) ODI, UK (Source: http://www.odi.org.uk)

Managed by the Overseas Development Institute (ODI), Britain's leading independent think-tank on international development and humanitarian issues, AgREN is a network of policy-makers, practitioners and researchers in the agriculture sector of developing countries. The network is linked to the broader research of the ODI's Rural Policy and Environment Group. AgREN Membership is free to individuals and organisations worldwide. Network members receive a Newsletter, a set of Network Papers treating one or more themes (twice a year) and a Register of Members (bi-
annually), giving contact details and professional interests of all members, intended to facilitate direct contact among members.

ODI's Agricultural Research and Extension Network (AGREN) was established in the mid-1980s to link policy-makers, practitioners and researchers in the agriculture sector of developing countries. It was founded on a strong belief in the importance of information exchange and learning from both positive and negative experience. It aims to provide its members with up-to-date information and the opportunity to maintain a dialogue with others who have similar professional interests.

3.3.1.5 CGIAR Network (Source: http://www.cgiar.org)

It was formed in the year 1971. Head quarter at Montpellier, France CGIAR (formerly the Consultative Group on International Agricultural Research) is a strategic alliance that unites organizations involved in agricultural research for sustainable development with the donors that fund such work. These donors include governments of developing and industrialized countries, foundations and international and regional organizations. The work they support is carried out by 15 members of the CGIAR Consortium of International Agricultural Research Centres in close collaboration with hundreds of partner organizations including national and regional agricultural research institutes, civil society organizations, academia and the private sector. The CGIAR now has 64 governmental and nongovernmental members and supports 14 research centers and one intergovernmental research center (Africa Rice).

The CGIAR is sponsored by the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD), the United Nations Development Programme (UNDP) and the World Bank. The CGIAR Consortium develops and carries out research programs to address complex development issues related to agriculture. Donors fund these strategic research programs by contributing to the CGIAR Fund. The CGIAR Consortium allocates funds from the CGIAR Fund according to research priorities, and is accountable financially and operationally for how the funds are used. The CGIAR Consortium also provides services
to make research centers, which are members of the CGIAR Consortium in a cost efficient manner.

The CGIAR Consortium coordinates CGIAR Research Programs across Research Centres, which are members of the CGIAR Consortium and partners. The CGIAR Consortium is an international organization that, together with the CGIAR Fund, advances international agricultural research for a food secure future by integrating and coordinating the efforts of those who fund research and those who do the research initially concentrating on breeding better staple food crops, expanded to cover natural resource management, food production, and eco regions.

The CGIAR Consortium is made up of: The Consortium Board; The Consortium Chief Executive Officer and Consortium Office; and Research Centres which are members of the CGIAR Consortium. CGIAR research is dedicated to reducing rural poverty, increasing food security, improving human health and nutrition, and ensuring more sustainable management of natural resources. It is carried out by 15 Centers, that are members of the CGIAR Consortium, in close collaboration with hundreds of partner organizations, including national and regional research institutes, civil society organizations, academia, and the private sector.

3.3.1.5.1 History of CGIAR

The Rockefeller Foundation and the Mexican Government laid the Foundation for the Green Revolution when they established the Office of Special Studies, which became the International Maize and Wheat Improvement Centre (CIMMYT) in 1963. CIMMYT and the International Rice Research Institute, were established in 1960 with support from the Rockefeller Foundation and Ford Foundation,. In 1969, the Pearson urged the international community to undertake "intensive international effort" to support "research specializing in food supplies and tropical agriculture".

In 1970, the Rockefeller Foundation proposed a worldwide network of agricultural research centers under a permanent secretariat. This was further supported
and developed by the World Bank, FAO and UNDP, and the CGIAR was established on May 19, 1971, to coordinate international agricultural research efforts aimed at reducing poverty and achieving food security in developing countries.

The CGIAR was originally supported four centers: CIMMYT, IRRI, the International Centers for Tropical Agriculture (CIAT) and the International Institute of Tropical Agriculture (IITA). The initial focus was on the staple cereals, rice, wheat and maize, widened during the 1970s to include cassava, chickpea, sorghum, potato, millet and other food crops, and then encompassed livestock, farming systems, the conservation of genetic resources, plant nutrition, water management, policy research, and services to national agricultural research centers in developing countries. By 1983 there were 13 research centers around the world under its umbrella.

3.3.1.5.2 Expansion and consolidation

By the 1990s the number of centers supported by the CGIAR had grown to 18. Mergers took place between the two livestock centers (the International Laboratory for Research on Animal Diseases (ILRAD) and the International Livestock centers for Africa (ILCA) and the absorption of work on bananas and plantains into the program of the International Plant Genetic Resources Institute (IPGRI; now Biodiversity International)

The CGIAR website gives access to a Virtual Information Center and Library. One can tap agricultural information databases, including online libraries of the CGIAR Centres and the Core Collection Database. The CG Library gives access to databases and e-journals and facility to go directly to the full text of publications. One can search CGIAR libraries/other agricultural libraries/by specific topics. The Virtual Information Center provides information on various topics mentioning the source against each topic. Each institutional library is the source for/and responsible for providing information on specific subject areas viz., Agriculture in the Dry Areas- ICARDA library; Agriculture in semi arid tropics- ICRISAT library; Agro-forestry- ICRAF library; Aquaculture and fisheries - WFC library; Food policy- IFPRI library, Agricultural biodiversity – IPGRI
library; Water Management-IWMI library; Wheat - CIMMYT library, etc. The research programmes on world fish, climate change, maize, wheat, rice science etc have been conducted at different centers located in the world by CGIAR. ICRISAT is the center in India for CGIAR.

### 3.3.2 Indian Agricultural Information Networks

Today, in fact, there is no national or regional network of agricultural libraries. However, ICAR, New Delhi, has taken initiatives in this direction. First of all, Indian Agriculture Research Institute (IARI) library made a beginning of computer-based activities in 1993 and had computer connectivity with DELNET through a modern telephone line. In 1995, IARI management started a project of campus networking through CMC Ltd, and in just one year, a powerful network having 100MB fiber optic backbone was installed and commissioned in February 1996. This electronic information network of star topology on IARI campus connects over 50 computers housed in 17 buildings remotely located within the radius of two kilometers. It is further being strengthened speedily and it will have more than 100 connections.

IARI (Indian Agriculture Research Institute) library has installed a 28 drive CD – Net consisting of 11 network terminals providing simultaneous access to different CD – ROM databases search and retrieval, downloading and printing facility. The CD – Net housed in the library has also been made accessible from various divisions of the institute on this network. Agricultural libraries can join INFLIBINET of UGC as well as ERNET of NICNET for global access to information to serve their users. The IARI network has its V-SAT based main hub housed in the library and thus, it has access to global information for library catalogues, full text journal databases, magazines, newspapers etc. through World Wide Web. The libraries of SAUs and ICAR and the work of computer network are progressing fast under the expert technical leadership of CMC Ltd.

Under the ARIS programme most of the ICAR and SAUs were provided with suitable servers and modes. Six institutes are already having VSAT connectivity for more than two years and 11 more have been provided with VSATS during March 1997. The E-
mail connectivity has been provided to 73 ICAR institutes (47 Institutes 9 PDS and 17 NRCS) out of 86 by linking these institutes through dial-up, including 17 institutes with VSAT connectivity, to the nearest National Information Centers (NIC), a government owned national service provider. It was expected that all of the ICAR institutes and SAUs will have Local Area Network and access to the Internet either by VSAT or by dial-up facility by the end of 1998 to provide effective satellite connectivity 1401 will be added to the network during next three years.

3.3.2.1 AGMARKNET (Source: www.agmarknet.nic.in)

Directorate of Marketing and Inspection (DMI) of the central Government of India at Faridabad has liaison with the State Agricultural Marketing Boards and Directorates for Agricultural Marketing Development in the country. Dissemination of market information is a common function of Agricultural Produce Market Committee (APMC), which is performed through displaying of the prices prevailing in the market on the notice boards and through broadcasting them on All India Radio etc. This information is also supplied to State and Central Government from important markets.

AGMARKNET envisages transmitting price and market arrivals to State Agricultural Marketing Boards/Directorates for analysis and local dissemination as well as for onward transmission to DMI headquarters at Faridabad. To start with, 810 AGMARKNET nodes have been established in the country during ninth plan period. This number includes 735 agriculture produce wholesale markets, 48 State Marketing Boards/Directorates and 27 DMI offices spread all over the country. AGMARKNET has to be expanded to further 2000 markets during the tenth plan period. The Directorate of Marketing and Inspection (DMI) have prioritized about 735 Wholesale Markets, 48 State Agricultural Marketing Boards and Directorates and 27 DMI offices to implement AGMARKNET Scheme. The major components of AGMARKNET are establishment of Computing Facilities and Networking, Development of Human Resource Information Transmission, Development of Database and Portal on Market Information. NIC has tied up with Bharat Sanchar Nigam Ltd. (BSNL) to provide Internet facilities at the AGMARKNET nodes.
In India almost a majority of the state owned State Agricultural Marketing Boards established websites that work in tandem with AGMARKNET and also provide price information in local languages besides state-specific information on commodities. Some of the state marketing boards started offering very useful information services to farming community on various aspects of agricultural marketing opportunities, export opportunities, expert advice to farmers, government schemes, marketing reforms, and post harvesting technologies.

### 3.3.2.2 Agricultural Informatics & Communication Network (ARISNET)

The National Department of Agriculture and Cooperation (DAC) formulates policy at the national level for sustainable development of agriculture and for achieving the development targets. To fulfill the same, the Department plans, implements and monitors central sector and centrally sponsored schemes/projects. A State Agriculture Department with its offices at District and Block level provides wide range of pre harvest and post harvest services to farmers in the areas of agriculture, horticulture, animal husbandry, fisheries and other allied sectors. Soil Health Card based Balance and Integrated use of Nutrients, Integrated Pest Management, Quality Control and Distribution of Inputs, Registration of Dealers/Service Providers and Issue of License, Risk Management, Artificial Insemination Centres, Infrastructure and Resource development, and subsidies are some of the important services.

Planning and delivery of each service involves development of a comprehensive database and a sound information management system to facilitate access of information by respective departments, government officials, beneficiaries and service providers. Digital Opportunities are emerging as a positive force for fostering agricultural growth, poverty reduction and sustainable resource use. To facilitate "Information Access" for efficient and effective planning and decision making by the stakeholders, Agricultural Informatics Division of National Informatics Centre has been working to promote informatics in agriculture, in close collaboration with the Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India.
Agricultural Research Information System (ARIS) OF ICAR: It is essential that scientists in the Indian National Agricultural Research System (NARS) should have a quick access to and free exchange of information at local, national and international levels. NARS through its vast network of 30,000 scientists working at ICAR's 49 Central Institutes, 10 Project Directorates (PDs), 27 National Research Centres (NRCs), 86 All India Coordinated Research Projects (AICRP), 261 Krishi Vigyan Kendras (KVKs), 29 State Agricultural Universities (SAUs), 120 Zonal Research Stations (ZRS), one Central Agricultural University (CAU), numerous (1000 plus) regional stations and other research centers has been catering to the agricultural research and information needs of the farming community in India. The ICAR during eighth Five Year Plan embarked upon a project called Agricultural Research Information System (ARIS) to bring the power of information technology to the NARS. Its implementation started with the financial aid from the World Bank under National Agricultural Research Project (NARP).

To exploit the potential of modem computing power in planning and management of agricultural research and scientific communication, ICAR started an Agricultural Research Information System Network (ARISNET). Basic guidelines to implement this project were provided by a team of experts from ICAR and International Service for National Agricultural Research (ISNAR). A phased implementation is recommended to create infrastructure for ARISNET, a national wide Area Network for agricultural research with its headquarters at ICAR, New Delhi.

3.3.2.3 DACNET (Source: http://www.dacnet.net)

DACNET was co-developed by Agricultural Informatics Division, National Informatics Centre, Department of Information Technology, and Ministry of Information and Communication Technology, Government of India.

The Vision 2020 document of the Department of Agriculture and Co-operation envisages that "the tools of ICT will provide networking of agriculture sector not only in the country but also globally and the Center and State Government Departments will
have a reservoir of databases" and also "bring farmers, researchers, scientists and administrators together by establishing "Agriculture Online" through exchange of ideas and information". The National Conference on Informatics for Sustainable Agriculture Development (ISDA) organised by the Ministry of Agriculture and National Informatics Center (NIC), in India in May 1995, has given much-needed "roadmap" to usher in "ICT led agriculture development" in the country. The National Agricultural Policy (2000) lays emphasis on the use of ICT for achieving a more rapid development of a agriculture sector.

Memorandum of Understanding (MoU) for DACNET, a Central Sector Scheme in India has been signed by, NIC and DAC for strengthening informatics to bring e-governance in 40 Directorates / Attached / Subordinates offices of DAC and their 200 Field Units. The scheme is being executed by NIC with a timeframe of 18 months. The aim of the project is to strengthen the infrastructure of Information Technology in all the Directorates, Regional Directorates and their Field Units.

NIC provides infrastructure facilities and training. A powerful e-business infrastructure is the foundation for success and it enables the decision makers to make quick decisions reducing the cost and increasing the productivity. The goal of NIC is to deliver coherent and integrated solutions (such as best practices, experiences and global solutions) that enable the Department to succeed, and establish online Agricultural Information to farmers using ICT in order to bring e-governance and to establish an Intranet for all the offices of DAC. NIC will facilitate the Directorates and their field units to be connected and have access to information like: Messaging and Workflow Solutions, Portal Services, Decision Support System.

DACNET was designed easy access to the publishable information with minimum administrative intervention, with proper query and request features, which include the following.

- Faster and reliable information dissemination and exchange across the Ministry and their Directorates and Field Units.
• Greater integration and use of the data from variety of data sources.
• Optimal utilisation of available resources including office stationary and thereby helping to inch towards the paper-less office.
• Intranet to Internet capability to provide telecommuting features and thus providing geography-independent working.
• Better communication among the officers of the organisation using E-mail/messaging to enhance better coordination, knowledge sharing and research.

DACNET is an e-governance project executed by NIC to facilitate Indian ‘Agriculture-on-line’. It is built using the key criteria such as ease of use, speed of delivery, SLAs, simplicity of procedure, single window access, low incidence of errors, reduction of corruption and affordable services. DACNET project has reduced time taken to deliver services while making information available online.

The Department of Agriculture envisages that tools of ICT will provide networking of the agriculture sector not only within the country but also globally. The Department also facilitates exchange of ideas and information among the farmers, researchers, scientists and administrators through its knowledge portal. DACNET is an e-Governance Project. It is a portal (http://dacnet.nic.in) to facilitate dissemination of information, Decision support for planners, IT Empowerment of the officials of the Directorates/Attached/Subordinate and Field Units, Usher in e-governance which could even eventually facilitate Agriculture-on-line.

3.3.2.4 Other Agricultural Information Networks

• DAINet-German Agricultural Information Network
• ELIN-Entomology Library and Information Network
• Information Network on Post-harvest Operations (INPhO)
• Philippine Agricultural Libraries and Information Services Network (PhilAgriNet).
• Virtual Extension Research Communication Network (VERCON)
3.4 Agricultural Websites

A large number of websites are available in the world on agriculture. These websites provide recent information with links with other sources. Websites contain web pages, which store a large amount of data, which would be useful to the users. The major websites, which are available in the agriculture, are www.fao.org, www.agnic.org, www.kisan.net, www.agrisnet.com, www.krishiwrd.com, www.agriwatch.com, www.agricultureinformation.com, etc.

3.4.1 www.agrisnet.com

AGRISNET is a Mission Mode Project under National e-Governance Plan of Government of India, Department of Agriculture & Co-operation, and Ministry of Agriculture has decided to launch a Central Sector Scheme titled, “Strengthening / Promoting Agricultural Informatics & Communications” of which one component is AGRISNET. Every state government has own portal of AGRISNET.

This portal provides relevant information and services to the farming community and private sector through the use of ICTs, to supplement the existing delivery channels provided by the department. The portal provides the end users with the ability to access services through an online platform at their doorstep.

The objective of AGRISNET project is to create a sustainable data bank of all Agricultural Inputs in the State of West Bengal containing entries for all relevant information pertaining to agriculture and its related activities and to access the same through a secured network further it s objectives includes development of citizen centric applications and making the services available. Establishment of network among all agricultural offices up to Block level of State Department of Agriculture for improving information access and to provide advisory services to the farming community through use of ICTs.
The offices of Agriculture Department including the District/Sub-Division/Block level offices need to be connected through a Network based on WBSWAN / NICNET, officers at the Department & Directorate at Head Quarter, District, Sub Division and Block level Departments of Government of the West Bengal Department of Agriculture & Co-operation, Government of India KPS / Farmers / Citizen Research Center NGOs All Manufacturers /Dealers / Agencies of Fertiliser & Manures / Seed / Pesticide in West Bengal.

It has improved information access and effective delivery of services to the farming community by establishing agriculture on-line faster and efficient redressal of Farmers’ Grievances Efficient and improved communication system among all the offices of the department of Agriculture in the state through the use of e-mails services Improved transparency and accountability of the department direct feedback from farming community to the decision makers in the state. It aimed at better monitoring of Government schemes, which directly impact the farmers Efficient management (development, conservation, allocation and utilization) of resources Improved productivity and profitability of farmers through better advisory systems efficient & increased utilization of information by stakeholders for their decision-making Foundation for development of e-business in Agriculture For better organizational efficiency and productivity four citizen centric applications and one portal have been developed and implemented under this project. Citizen centric applications are as follows:

- Fertiliser control & Management System
- Certificate and Quality control of Integrated Seed Management Information System
- Project Monitoring System
- Generation of Soil Health Card
- Agri-Portal (a Portal in Agriculture & allied sectors)
- Information System on Plant Protection & Quality Control of Pesticides
- Weather Watch Information System
3.4.2 www.fao.org

As a knowledge organization, FAO creates and shares critical information about food, agriculture and natural resources in the form of global public goods. But this is not a one-way flow. FAO plays a connector role, through identifying and working with different partners with established expertise, and facilitating a dialogue between those who have the knowledge and those who need it. By turning knowledge into action, FAO links the field to national, regional and global initiatives in a mutually reinforcing cycle.

FAO's thematic knowledge networks and communities are virtual communities of professional staff and collaborating centers with common interests and objectives related to sustainable agriculture and food security built around twelve priority areas. This online space provides resources one can use to develop and maintain a knowledge network or community. It was created to support FAO's integrating of knowledge sharing networks and communities into the work of the organization.

Getting started: This page lists recommendations for how to get started enabling a network or a community at FAO. The recommendations are based on an early 2009 FAO Thematic Knowledge Network Review.

Resources: This page leads the user to a collection of resources and links discussing the design, development and evolution of a knowledge-sharing network or community. The topics these resources cover range from planning the user network or community, to facilitating it and monitoring it, as well as examples of approaches, methods and tool the user can use in these processes.

FAQs: Here the user will find some questions and answers related to starting a knowledge network, helping the network to succeed, in motivation, support and other practical issues useful to the beneficiary.

3.4.3 www.agnic.org

AgNIC at University of Hawaii at Manoa is collaboration between the Library and the Agricultural Development in the American Pacific (ADAP) Project. The
Agriculture Network Information Center (AgNIC) is a voluntary alliance of members based on the concept of “Centers of Excellence”. The member institutions are dedicated to enhancing collective information and services among the members and their partners for all those seeking agricultural information over the Internet. By joining forces to enhance impact and deliver increasing access to information and expertise, it enables partner institutions to make the most of available resources and increase impact. Collectively the Alliance harnesses: More than 80 information and subject specialists, Over 60 topics covered comprehensively, full-text and web-based resources, participation from five countries with collaborative contributions from many more.

3.4.3.1 Mission

AgNIC facilitates and participates in partnerships and cooperation among institutions and organizations world-wide that are committed to the identification, delivery and preservation of reliable, freely-available, evaluated, digital content and quality services for agriculture, food, and natural resources information. For over a decade, AgNIC partners have worked to build reliable and needed content, and to provide useful services to Internet users. The unique nature of AgNIC is recognized across disciplines worldwide, and particularly in the agricultural sciences. AgNIC continues to grow membership and coverage. Through AgNIC one can search the world of agriculture or stay up-to-date with the latest agricultural news and events taking place around the world.

Subjects Covered: Traditional Pacific Island Crops, Bananas and Plantains, Betel Nut, Bread Fruit, Coconut, Kava, Noni, Pandanus, Sugarcane, Sweet Potato, Taro and other Edible Aroids, Yam, Hawaii Rangelands, and Cassava etc

3.4.4 www.kisan.net

www.kisaan.net is a web portal designed for Indian sugarcane farmers, by AKS Software Limited, New Delhi, India. It maintains up-to-date sugarcane area, bonding, calendar, supply tickets, cane receipts, and payments information of millions of these farmers, with help from Sugar Factories as well as 'Department of Sugarcane,
Government of Uttar Pradesh. Apart from live database it also has useful articles, links, and knowledge base useful for sugar sector.

3.4.5 www.agriwatch.com

www.agriwatch.com is the site of Indian Agribusiness Systems Pvt. Ltd. (IASL), a company started by a group of young technocrats and trade professionals who have had a long association (cumulatively more than 150 years) with the Indian Agribusiness Sector. The agribusiness sector is characterized by multi-layered channels on a Agricultural Input and Output side, poor quality of information and analysis about demand, supply, prices, and market trends for various agri-commodities. The promoters of this organization, coming from an agricultural background felt the need to address these anomalies in this sector and therefore have come together to create a professional team and an organization to deliver valuable information to the participants at all the levels in this sector.

3.4.5.1 Objectives of the Company

The company primarily aims at filling out the information and communication gap that exists in various sub-sectors of the agricultural economy in general and agricultural commodities trade in particular. For achieving this, the company is making use of the latest developments in information technology. The ultimate objective of the company is to reach the highest level of sophistication in the Agribusiness sector so as to achieve a perfect flow of information, analyses, communication and e-commerce. The specific objectives of the company are as follows:

- Information to -enable various participants in the Agribusiness sector such as the farmers, traders, processors of agricultural outputs, and suppliers of agricultural inputs etc. by providing latest and accurate information.
- Providing valuable analyses to the trade participants that will enhance their decision taking abilities in trade.
- Enabling e-commerce in agricultural products through this vertical portal.
3.4.6 www.agricultureinformation.com

www.agricultureinformation.com is an online community comprising of buyers, sellers and technical experts in agriculture. It provides access to post topics, communicate privately with other members, responds to polls, uploads to our gallery, adds links to our directory, and provides access to many other features. Registration is fast, simple, and absolutely free.

This website covers agri-services, crops, education and research, farm inputs, livestock, organizations, processing industries and useful resources like books, conferences, consumer information, databases, discussion forums, journals, magazines, market news, market research, newspapers.

The user can search the following subjects and agriservices: agri-tourism, auctions, certification, classifieds, commodity trading, consultancy, contract farming, e-Commerce, economics and employment.

**Crops:** Cereals, Fibre Crops, Field Crops, Floriculture, Forestry, Gardening, Grassland & Pastures, Horticulture, Legume Crops, and Medicinal plants & herbs.

**Education & Research:** Aquaculture & Fisheries, Agribusiness, Agricultural Extension, Agricultural Economics, Agricultural Engineering, Agronomy, Animal Biology, Animal Science, Bio Science and Bioinformatics.

**Farm Inputs:** Biological Inputs, Crop Nutrients, Crop Protection, Farm Equipment, Farm Technology, and Seeds & Planting Material.

**Livestock:** Aquaculture, Animal Feed & Supplements, Animal Welfare, Associations, Auction Facilities, Beef Cattle, Buffalo (Bison), Came lids, Dairy Cattle, and Donkeys & Mules.
Organisations: Cooperatives, Government, International Organisations, Museums, NGOs, Non Profit Organizations, Political Parties, Professional Associations, Super Markets and Trade bodies.

Processing Industry: Additives, Baby Food, Baked Food, Beverages, Brokers, Canned Food, Condiments and Seasonings, Confectionary, Dairy products, and De-hydrated items.

3.4.7 www.krishiworld.com

www.krishiworld.com is the best portal on agricultural information in India. It covers information about agriculture and agriculture products. Through this website one can get details about crops fertilizers floriculture vegetables and fruits. This website covers many areas in the field of agriculture in India, like Agricultural Extension Education, Agricultural Marketing, Biotechnology & Indian Agriculture, Biotechnology in Agriculture, Cardamom Condiments & Spices, Cropping double-cropping, expanding industry, Extension education, Farm management, Forage Crops & Grasses Fruit Crops, Tropical And Sub-Tropical Fruits, Fungal Biotechnology, Fungi ground nuts, healthful herb, Horticulture Crops, human & livestock, consumption hydro-electric power generation, indigenous livestock products, Marketing functionaries, metamorphic rocks, mono cropping, multiple cropping, Oilseed crops, Pesticides, Plantation Crops, Plant disease management Plant nutrition, sedimentary rocks, soil forming.

3.4.8 Other Indian Agricultural Websites

3.5 Agricultural Search Engines

The World Wide Web has thousands of millions of pages on the net. One may wonder how one’s search engines browses through each of them and how it returns the information in such a little time. Secondly, one may ask different search engines return different information for the same given key words? For example a search for the key words “Agricultural Extension, India” returned 2,660,000 search results in 0.87 seconds on www.yahoo.co.in and the same search returned 2,120,000 search results in 0.15 seconds on www.google.com. Further only six out of first 1-10 of the results were common in both the lists. These questions will be answered once we understand how search engines work. A search engine is a web-based application programme, which acts on keywords/phrases submitted by the user. The search engines are supported by a well-developed database on keywords of web content. The keywords are indexed and classified. When a user submits the keywords/phrases, the search engine submits them to the database as query. The keywords will be searched in the database and the list matched will be returned to computer browser as search results. The search results will contain a brief description of the word or phrase where it was found, web site address and a URL is hyper linked so that the user can jump to that particular page.

There are basically two search methodologies the search engines use. These are (a) crawler based search methodology-example www.google.com and (b) human-powered directory based search methodology-example www.yahoo.com. There are two more categories of search engines (c) combination search results have (a) and (b) (crawler based and also supported by human-powered dictionaries), example www.msn.com and Meta search engines-which query other search engines and return their top results.

Almost all the above agricultural search engines are developed by US based companies and their focus is accordingly to serve their clientele. Hence, most of the information they search is US based/hosted. In India as well as in other developing countries, a majority of the agricultural scientists, extension officials use generic search engines like Yahoo, Google, AltaVista, and Khoj.

3.6 Profiles of the Agricultural Libraries in Hyderabad

As stated in the introductory chapter (Chapter 1), eight libraries located in Hyderabad (India) were selected for the purpose of the present research study. In this section the profiles of these eight libraries are briefly presented in terms of the services they deliver for the brief of their users.

3.6.1 Directorate of Oilseeds Research (DOR)

The Directorate of Oilseeds Research (DOR) formerly operating as All India Coordinated Research Project on Oilseeds (AICORPO) came into existence on August 1, 1977 with its headquarters at Rajendranagar, Hyderabad. It operated with a Project Director as its administrative head and seven Project Coordinators for groundnut, rapeseed-mustard, sesame, linseed, castor, safflower, sunflower and niger. Subsequently groundnut and rapeseed-mustard were delinked from the Directorate with the establishment of National Research Center for each of these crops during 1979 and 1993.
respectively. In April 2000, the AICRP on Sesame & Niger and Linseed have been separated from the administrative control of DOR. The Directorate has in its fold the mandate of working on castor, safflower and sunflower.

3.6.1.1 Library Resources

The specialized library facility started functioning at DOR in 1977. The library has a collection of over 10,000 books and bound volumes of periodicals and subscribes to 74 periodicals including 18 foreign periodicals. The library also receives on a complimentary basis several annual reports, newsletters and periodicals. It has CD-ROM databases, technical reports, and annual progress reports on oilseeds crops, proceedings of annual oilseed workshops/group meetings and a good collection of reprints. An amount of Rs.16 lakh is spent per annum for acquiring books, journals and other CD-ROM databases. Limited funds are also allocated under other adhoc projects for the purchase of books and journals.

3.6.1.2 Library CD-ROM Databases and Online Journals

The following Electronic databases are available in the library

- Crop Science Database (CABI)
- AGRI
- AGRICOLA
- Wilson’s Biological Agriculture Index
- Fertilizer Statistics
- Crop Protection Compendium
- India Patents
- Indiaagristat.com (Online)
- Online Journals through CeRA (Taylor & Francis (1184), CSIRO (8), IndianJournals.com (91), ScienceDirect (351), SpringerLink (71) and Annual Reviews (22).
3.6.1.3 Library Services:

- Access to books, periodicals, CD-Rom databases and online e-journals
- On-Demand Information Search and Document delivery in Oilseeds
- Reference and information services
- Photocopying and document delivery
- Bibliographic service
- Current Awareness Service
- Data Compilation and Market Intelligence on oilseeds.
- Notification of career information
- Inter Library Lending

3.6.1.4 Documentation Bulletins

The library is producing documentation bulletins for the user community to needs interest of the institution as follows are:

3.6.1.3.1 Current Oilseeds Literature Alerts (COLA):

It is a fortnightly in-house documentation bulletin based on current periodicals received in the library. Articles on nine oilseeds, viz., groundnut, rapeseed & mustard, sunflower, sesame, niger, safflower, linseed, castor and soybean minor oilseeds and indexed in LIBRIS database. This bulletin is regularly sent to selected and interested oilseeds research workers /members by e-mail.

3.6.1.3.2 OSDOC Press Gleanings:

It is quarterly news clipping service and development news on oilseeds collected from the newspapers received in the library. Important news items, popular articles on topical interest in agriculture with specific reference to oilseeds are collected and organized and published. The issues are circulated to AICRP centers, project coordinators, policy makers and scientists.
3.6.1.3.3 Photocopying and Document Delivery Services:

DOR library provides paid photocopying service. The service is limited to a few articles, chapters in books etc., meant for research purpose only Rs.1.00 will be charged per page towards photocopying.

3.6.1.3.4 Library Timings:

The library remains open from 9-00AM to 4.00PM Monday through Saturday except on Second Saturday and on all Public and National Holidays.

3.6.2 Directorate of Rice Research (DRR)

Directorate of Rice Research (DRR), formerly knows All India coordinated Rice Improvement Project (AICRIP), was established by the Indian Council of Agricultural Research (ICAR) in 1965 with its national headquarters at Hyderabad to organize and coordinate multi-location testing of genetic lines and technologies for crop production and protection available across the country. The Project was elevated to Directorate of Rice Research in 1975 with an added mandate of research in the thrust areas of irrigated rice. The Directorate continues its multi-location All India Coordinated Rice
Improvement Programme (AICRIP) with the active partnership of 47 funded cooperating centers affiliated to State Agricultural Universities (SAUs), State Department of Agriculture and other Research Institutes of ICAR. Besides, over 50 voluntary centers participate in this multi-location testing program. DRR in its 40th year of useful existence has contributed significantly in overall rice production front, which has ensured food security for the country.

3.6.2.1 Goal:

Welfare of the present and future generations of Indian rice farmers and consumers by ensuring food and nutritional security.

3.6.2.2 Mission:

Develop technologies to enhance rice productivity, resource and input use efficiency and profitability of rice cultivation without adversely affecting the environment.

3.6.2.3 Mandate:

- To coordinate multi-location testing at the national level to identify appropriate varietal and management technologies for all the rice ecosystems.
- To conduct strategic and applied research in the major thrust areas of irrigated rice aimed at enhancement of production, productivity and profitability and at preserving environmental quality.
- To initiate and coordinate research networks relating to problems of national and regional importance.
- To serve as a major center for exchange of research material and information.
- To accelerate the pace of technology transfer through frontline demonstrations, training programmes and ICTs.
- To develop linkages with national, international and private organizations for collaborative research programmes.
- To provide consultancy services and undertake contractual research.

The DRR library is well furnished and equipped with computers and Internet facility. The library has 4,500 books and 5,300 bound volumes of journals specializing in
rice and allied subjects. It subscribes to 100 Indian and 17 foreign journals pertaining to various disciplines with special reference to rice. It also provides CD-ROM database search & retrieval services by providing the databases - CROP SCIENCE, PEST MANAGEMENT, SOIL SCIENCE, AGRIS and AGRICOLA.

Library automation to enhance the utility of facilities at library through advanced software namely, LIBSYS.4 is in progress. The library also works as repository center. All the publications such as Bulletins, Annual Reports, and Technical Reports etc., published by the institute are stocked and supplied on request.

3.6.2.4 Other Databases

Varieties:
1. High Yielding Varieties
2. Released Rice Varieties in India
3. DRR Varieties

Rice Statistics:
1. Rice area, production and productivity - state
2. Rice area, production and productivity - district
3. Rice area, Yield state-district wise -1990-2010

3.6.3 National Academy of Agricultural Research Management (NAARM)
The Indian Council of Agricultural Research (ICAR) established the National Academy of Agricultural Research Management (NAARM) at Hyderabad, in 1976, to address issues related to agricultural research and education management. In the initial years, the Academy primarily imparted foundation training to the new entrants of the Agricultural Research Service of ICAR. Subsequently, its role expanded to include research, capacity building of senior professionals of national and international NARS (National Agricultural Research Systems) in agricultural research and education management, and policy and consultancy support to NARS. The Academy also renders services for building IP portfolios like patents and geographical indications to various stakeholders including farmers and scientists. Keeping in view the increasing national and global need to integrate agriculture with agribusiness for raising rural incomes, and the increased emphasis on the creation, dissemination, application and exchange of knowledge in this vital area, the Academy has recently initiated postgraduate education programmes and set up an Agribusiness Knowledge Center.

3.6.3.1 Library and Documentation Center:

The Library and Documentation Center of the Academy has around 26,000 books and it subscribes to around 200 journals, including a few on-line journal databases and CD-ROM databases. The library is rich with its unique collections on management, which is extensively used by trainees, faculty members and other staff from a number of neighboring institutions. NAARM also has a digital library, which has many publications in the digital format.

3.6.3.2 Electronic Journals

NAARM has direct access to a number of online journals such as CeRA, EBSCO, Open J-Gate, Proquest, ScienceDirect and ISI Web of Knowledge.
3.6.4 Central Research Institute of Dryland Agriculture (CRIDA)

CRIDA is a National Research Institute under the Indian Council of Agricultural Research (ICAR) established in 1985 with a mandate to carry out basic and applied research in rainfed farming. The Institute also undertakes National/International Collaborations and Consultancy Projects. All India Coordinated Research Programmes (AICRPs) of ICAR on Dryland Agriculture and Agrometeorology with 25 partners each are in CRIDA. This is the lead Institute and the National Nodal point for the National Initiative on Climate Resilient Agriculture (NICRA), which is being implemented at a large number of Research Institutes of ICAR, State Agricultural Universities and 100 Krishi Vignana Kendras (KVKs).

CRIDA was established during 1985 by upgrading the All India Coordinated Research Project for Dryland Agriculture (AICRPDA), Hyderabad center, to work on development of suitable technologies to enhance the productivity in rain fed areas. CRIDA, along with two All India Coordinated Research Projects namely on Dryland Agriculture and Agrometeorology with about 25 centers each located in different parts of the country, strives towards development and popularization of location specific rain fed technologies for productivity enhancement. This is an autonomous body of Ministry of Agriculture, Government of India.
The institute established a specialized library in 1972. Scientists and technicians working in different research farms use the library quite extensively. At present, the library holds about 6000 publications and subscribes to about 60 journals pertaining to various disciplines having relevance to dryland agriculture and allied subjects. The library has established an effective storage and information retrieval system. It provides photocopy facility for the benefit of the scientific and technical users of the institute. Library also provides current awareness service (monthly) besides bringing out necessary catalogues for references as and when required.

Efforts are made to bring out ‘Current Content Mirror’, ‘Current Book Review’ and selective bibliographies on specific topics on demand for the institute staff. The scientists are exposed to all the current scientific information on their research by gathering information from the periodicals acquired.

3.6.5 National Institute of Plant Health Management (NIPHM) (formerly known as The National Plant Protection Training Institute (NPPTI))

The National Plant Protection Training Institute (NPPTI) was established in 1966 for Human Resource Development in Plant Protection Technology under the Directorate of Plant Protection, to create qualified pest management personnel in adequate numbers.
both in the Central Government and in the Departments of Agriculture of States/Union Territories (UTs) to impart training to farmers. The Institute has been entrusted with the responsibility of organizing both long and short duration training courses for Human Resource Development on different aspects of Plant Protection. The activities of the Institute received a fillip in 1974, when international support from the United Nations under a UNDP project with a financial assistance of $1.3 million was received from the year 1974 to 1980 to develop the Institute for providing more effective training programmes. Over the years the Institute has been recognized as a Regional Training Center for Plant Protection by the FAO of the United Nations and also as a Center of Excellence for Training in Plant Protection Technology under the World Bank aided National Agricultural Extension Project - III. NPPTI was one of the components of the ongoing scheme, "Strengthening and Modernization of Pest Management Approach in the Country", which is continuing in the XI Five Year Plan.

In order to bestow greater functional flexibility, and broader reach in delivery against the emerging challenges in the field of Plant Health Management, a very crucial area for enhancing our country's agricultural production, the Department of Agriculture & Cooperation of the Ministry of Agriculture, Govt. of India took a decision for transforming this Institute into an autonomous body vide resolution F. No. 20-62/2007-PP I dated 13th October, 2008.

3.6.5.1 Registration of NIPHM

Consequently, the Institute has been registered as an Autonomous Society under the Ministry of Agriculture, Govt. of India, in the Office of the Registrar of Societies, Rangareddy District, Hyderabad, Andhra Pradesh on 24th October, 2008 under the name, National Institute of Plant Health Management with Registration No. 1444 of 2008 under the Andhra Pradesh Societies Registration Act, 2001 (Act No.35 of 2001).

The library of this institute provides access to the trainees and staff members for consulting current references in Plant Protection and Plant Health Management subjects. Thus library of provides free access to the trainees for consulting current references in
Plant Protection subjects. The institute has a stock of over 8000 technical books and subscribes to 50 reputed journals, which include seven international journals.

3.6.6 National Institute of Agricultural Extension Management (MANAGE)

A novel concept and a new center of learning is the Cyberary, which integrates the services of Information Technology and the Library to provide a single point access to information irrespective of the form in which it exists. Aptly named after Chaudhury Charan Singh, a farmers’ friend who struggled for the uplift of the farmers and the rural economy, the Cyberary is a point for information access and connectivity for the literate, semi-literate and illiterate alike.

The Cyberary integrates state-of-the-art information technology with traditional services bringing together all the modes of the information system available in MANAGE into one integrated system. The focus is on providing a gateway for clients, to access information resources as well as network with the whole world on the Internet and through Videonet.

The Cyberary is open from 9am to 5.30 pm on all days. The Center renders a wide range of facilities using the latest information technology for access to and use of information in the conduct of professional work.
3.6.6.1 Information Access and Delivery services

Information resources include a collection of 10,000 Books, 170 journals, 300 CDs and 375 videos on various aspects of agriculture and management. With online information becoming the preferred means to access information, the center has also been subscribing to a number of databases and multimedia management packages. Electronic databases include AGRIS from FAO, AGRICOLA of the US National Agricultural Library, TROPAG & RURAL from Royal Tropical Institute, CABSAC from CABI, EXIM, PROWESS, IBID India Trades and a number of Multimedia CDs on management aspects. Many activities of the Cyberary have been automated. The catalogue of books, journals and a database of articles of interest are available over the institute LAN.

Services include provision of training, educational and research material in a variety of formats; access to information and assistance in the use of information resources; reference services, literature search services, bibliographic services for retrieving information from in-house database, database on CDs and Internet, loans of materials, interlibrary loan services and personalized information services. Development of a database of books and articles scanned from current literature is an on-going activity of this center. Articles, of interest to research and training activities at MANAGE, are abstracted and made available to Faculty through the OPAC. The centre also offers literature search services, and bibliographic services.

3.6.6.2 Information Technology Services

A well equipped information technology center with a 100 systems connected to 128 kbps leased lines with 24 hrs connectivity and a videoconferencing facility is available in the Cyberary providing a gateway to access information resources as well as to network with the whole world on the Internet and the Videonet. The videoconferencing network facilitates communication with nodal centers under the NATP (National Agriculture Technology Project), Agriclinics and Agribusiness centers scheme and other institutions.
3.6.6.3 Publications

As a part of information dissemination and publication activity a number of publications are brought out, on aspects such as Natural Resource Management, Agribusiness management, Public Extension management, Agripreneurship, Cyber Extension, and related areas on a regular basis. These publications are circulated among policy makers, senior administrators, and scientists of central and state governments, district, state, national and international organizations connected with agriculture and extension management. Many of these are available in full text on the website at www.manage.gov.in.

3.6.6.4 Website Management

The MANAGE website at www.manage.gov.in provide an interface to all collections and services. The site has registered over 3.00 lakh clicks in the last one year. Internet-based Library Services include links to important web sites, databases, Electronic journals, Library catalogues, discussion forums etc. In addition to the MANAGE website, the center has also hosted websites of over 22 other institutions including the livelihood options site of the Overseas Development Institute (ODI) which also hosts a discussion Forum on the site.

3.6.6.5 Training

The center organizes training programmes for library managers, and information scientists on new technology applications for information management, networking through information systems, Internet for information and communication where participants are given an orientation to information technology applications. The center also conducts training programmes organized for farmers and rural women from self-help groups to orient them to the use of new technology to meet their information needs.

3.6.6.6 Networking with Agricultural Information Centers

The center is making attempts to establish linkages with agricultural research, extension and training institutions to enable information sharing. A number of agricultural research, extension and training organisations have their home pages on the
MANAGE site. The Cyberary is a point for access to information and a facilitating platform for communication and information exchange, bringing together policy makers, extension managers, scientists and farmers

3.6.7 Directorate of Sorghum Research (DSR) (formerly known as National Research Center for Sorghum (NRCS))

The Directorate of Sorghum Research (DSR) formerly, National Research Center for Sorghum (NRCS), is the central agency to work on all aspects of sorghum research and development under the auspices of Indian Council of Agricultural Research (ICAR). While the main center at Hyderabad campus is principally engaged in both basic and strategic research on sorghum, region-specific research and services are organized through two other centers - Solapur and Jalna in Maharashtra. It was earlier a multi-crop center, and its pioneering work in hybrid and varietal development has created indelible impact with its contributions in developing superior varieties of groundnut, red-gram and castor in addition to sorghum hybrids and varieties. Sorghum being mainly a rainfed crop, is grown with limited inputs. Therefore, varietals improvement leading to high yielding hybrids and varieties forms the core of major research achievements. Its impact can be best illustrated by the fact that even rupee spent by the government, the national
income increase by 40-fold. Through its network centers located across the country in various geographical zones, 26 hybrids (CSH 1 to CSH 26) and 26 varieties.

3.6.7.1 Mandate of DSR

To conduct basic and strategic research leading to technology development for increased productivity of sorghum, its diversified utilization, to promote profitability from sorghum based cropping systems and to serve as national repository of sorghum germplasm.

To serve as a national center for training and consultancy on all aspects of sorghum production, utilization and foster collaborative research with other national and international agencies in view to achieve the set objectives. Orient sorghum research towards market and export promotion and to coordinate and conduct multi-location AICSIP programmes at national level.

3.6.7.2 Library Services

NRCS library was established in the year 1989 with an aim to provide information services in support of research activities and goals of the institute. The library holdings include popular monographs, research and technical reports and journals. Journal collection includes Indian and as well as foreign journals.
3.6.8 National Bureau of Plant Genetics Resources (NBPGR)

The library was established in the year 1985. NBPGR library maintained its designated activities of acquisition of books and journals, exchange of literature, cataloguing and documentation. This library is procuring 166 journals including 72 foreign and 94 Indian through subscription / gifts and exchange for the use of headquarters and different regional stations. News clipping services related to plant genetic resources and agriculture is provided to the readers regularly. The library provides reprography service to its internal as well as external users. The Bureaus publications were supplied to over 500 different organizations / institutes in India and aboard. In return 250 publications were received as gratis from various organizations. About 800 reference queries were attended to assist the scientists.

3.7 Chapter Summary

The information collected from eight national institutions under ICAR and autonomous organisation through brochures, databases, websites and networks of the related topics of the chapter. The information collected is related to different ICTs such as databases, networks and website based services usage in agriculture information systems for the benefit of the users.
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