

REPOSITORY OF INDIAN NATIONAL AGRICULTURAL RESEARCH & EDUCATION SYSTEM (NARES) - OPEN ACCESS TO INSTITUTIONAL KNOWLEDGE

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ABSTRACT

Indian National Agricultural Research & Education System (NARES) is a huge repository of knowledge and information on crop sciences, horticulture, resource management, animal sciences, agricultural engineering, fisheries, agricultural extension and agricultural education. Digital technologies and online access to information resources have brought increased expectation from library and information services. For researchers, fast access to existing scientific outputs and archived scholarly information on his topic of interest is as crucial as current scientific knowledge.

'KrishiKosh' is the institutional repository aiming to hold all the intellectual outputs of the Indian NARES system in the form of digitized institutional publications, technical reports, annual reports, lectures, authors collection in the form of preprints, reprints, old books etc. These contents to which one can easily have open access, essentially captures all the intellectual work being done under NARES. The same intellectual output when gets published in the form of research papers in the commercial journals become less accessible due to high cost. Thus institutional repository provides alternative source of scientific information to support quality research and teaching in line with objectives of open learning and OER.

'KrishiKosh' has been created under the National Agricultural Innovation Project (NAIP) and digitization of the valuable content was taken up by four major institutions of Indian NARES, namely, Acharya N G Ranga Agricultural University, Hyderabad; Indian Agricultural Research Institute, New Delhi; Indian Veterinary Research Institute, Izatnagar; and University of Agricultural Sciences, Bengaluru. Using Open Source software, the material in the repository was organized into Institution-wise collection of documents such as books, journals, theses, reports, articles etc. The process of digitization including scanning, cleaning, cropping, conversion to text (OCR), conversion to PDF/A (an open ISO standard). Finally, metadata tagging and uploading the fully searchable digital items in the repository has been done for about 9 million pages comprising about 20,000 documents. To make searches more relevant, 'Agrotags' which is a carefully selected subset of 'Agrovoc' of Food and Agriculture Organization (FAO) has been integrated with KrishiKosh.

Introduction

Indian National Agricultural Research and Education System (NARES) is one of the biggest academic systems in the world, effectively working in close association with agricultural research, education and extension. The contributions of NARES in meeting the challenges of the country's food problem and Green Revolution are well known. NARES comprises of mainly the research institutions under Indian Council of Agricultural Research (ICAR), State Agricultural Universities (SAUs) and Krishi Vigyan Kendra (KVK, Farm Science Center) and strives for agricultural growth and prosperity in the country. NARES has a huge repository of knowledge and information on crop sciences, horticulture, resource management, animal sciences, agricultural engineering, fisheries, agricultural extension and agricultural education. Digital technologies and online access to information resources have brought increased expectations from library and information services. For researchers, fast access to existing scientific outputs and archived scholarly information on their topic of interest is as crucial as current scientific knowledge.

In the present age of globalization, technology is changing at a very fast pace. Strengthening of libraries and capacity building in ICAR Research Institutes and SAUs is crucial for digitally sharing knowledge in a cost-effective manner. These libraries need updated infrastructure to face the technological challenges. There are more than 123 libraries in ICAR Institutions and SAUs. Some of these libraries are old having vast collections; whereas others have recently started building their collections and services. In the present case, a consortium of 12 libraries was formed as a pilot for implementation of the project "Strengthening of digital library and information management under NARES (eGranth)" funded by World Bank through National Agricultural Innovation Project (NAIP). Under this project centralized infrastructure has been created for hosting the Digital Repository and Integrated Library Management Software (ILMS) 'Koha' on SaaS model at Indian Agricultural Research Institute (IARI), New Delhi. After the pilot studies in 12 libraries, now the consortium has been extended to include 38 libraries.

Objectives of e-GRANTH

- To create combined Online Public Access Catalog (OPAC) of all 12 library resources with Online Computer Library Center (OCLC) partnership.
- To digitize important institutional repositories including rare books and old journals and make them open access under NARES.
- To strengthen capacity building and information management system in all libraries of NARES.

In the current paper we shall concentrate on second objective of creating digital repository named 'KrishiKosh', 'Krishi' is hindi word for agriculture and 'Kosh' for repository.

KrishiKosh - An Institutional Repository under National Agricultural Research & Education System (NARES)

ICAR Institutions and SAUs have many historical documents like reports, thesis, research & popular articles, extension literature, multimedia documents etc. In the present digital environment institutional repositories are becoming an indispensable component for information and knowledge sharing. Sharing of knowledge is very useful for research, development and extension in agricultural science. Therefore, it is most appropriate to develop a digital repository of knowledge in agriculture and allied sciences, having collection of old and valuable books, records and various documents spread all over the country in different libraries of Research Institutions of ICAR and SAUs.

Open source software DSpace has been used for development of Institutional Repository for ICAR Institutions and SAUs Libraries of NARES. Digitization work for development of the repository 'KrishiKosh' is going on at following libraries, however, contents from other libraries of NARES is also being digitized and included in the repository.

1. Indian Agricultural Research Institute, New Delhi
2. Indian Veterinary Research Institute, Izatnagar
3. University of Agricultural Sciences, Bangalore

4. Acharya N G Ranga Agricultural University, Hyderabad

KrishiKosh is a digital repository which captures, preserves, achieves and provide policy based access to the intellectual output of Indian NARES. It is a unique repository of Knowledge in agriculture and allied sciences, having collection of old and valuable books, institutional publications, technical bulletins, project reports, lectures, preprints, reprints, theses, old records and various documents spread all over the country in different libraries of Research Institutes of ICAR and SAUs. The KrishiKosh acts as digital platform to preserve institution's intellectual assets and help in providing and managing open access to institution's intellectual assets.

Open access to intellectual output is gaining momentum because the researchers and authors have realized that they give away their hard intellectual work in the form of research papers, technical bulletins, books etc. to commercial publishers in search of impact of their work. They have no commercial interest in such endeavor. Their interest is to widely disseminate the research output but publishers restrict the circulation often by putting high subscription prices to fulfill their commercial interests, thus, creating an impact barrier.

On the other hand, researchers and scientific workers look for easy access to scientific literature from others working in similar or related area. But most of the time, most of us do not have easy access to most of the literature created by our own community for lack of money required to be paid to publishers, creating an access barrier. These structural problems with scholarly publishing can be addressed to some extent by KrishiKosh a digital repository with Open Access mandate.

The KrishiKosh digital repository can be seen as complementary to the commercial publishing, it can help and advice on IPR issues as outputs are available in digital form for easy search can help and advice on research programme formulation and efficient management of institutional information assets.

Features of 'KrishiKosh' repository

The need for improving accessibility and preservation is behind the current initiative under eGranth project. To create dependable digital storage and an efficient Integrated Content Management System (ICMS), an open source software DSpace has been customized to meet the requirements. It provides following functionalities to KrishiKosh:

Improve Accessibility

The KrishiKosh makes the holdings more accessible to scholars, teachers, academics and general public, both within the premises as well as to those who cannot personally visit the NARES libraries but want to access the contents through the internet, under open access policy.

Enhanced Search Ability

All holdings are grouped in communities and collections based on institutions, subjects, themes or other criteria making large amount of information easily available on any subject matter for teaching, research and development. Any researcher looking for content on any subject or themes can has a unified access to content on all media types (manuscripts, photographs, audio-video etc.) thereby making the searching much easier and faster.

Agrotags

For making searches more meaningful and intelligent, a semantic search tool Agrotagger developed by IIT, Kanpur under Agropedia project has been integrated with KrishiKosh repository to generate agrotags which is a carefully selected subset of Agrovac which is developed by Food and Agriculture Organization (FAO).

Preservation

Preservation of all the rare documents in electronic form is an important objective. Also, once the documents are scanned and digitized, preservation of the originals can be ensured for a much longer period as the need to handle the physical

documents is eliminated or minimized to a great extent since document are made available through the digital repository.

Communities in KrishiKosh

Each institution of NARES has been included in the KrishiKosh with their separate community with their own logo and collections. Presently following communities are included and more are in pipeline.

Acharya NG Ranga Agricultural University
Central Institute of Fishery Education
Central Marine Fisheries Research Institute
Central Rice Research Institute
G.B. Pant University of Agriculture & Technology
Indian Agricultural Research Institute
Indian Council of Agricultural Research
Indian Institute of Horticultural Research
Indian Veterinary Research Institute
KrishiPrabha : Indian Agricultural Doctoral Dissertations Repository
National Bureau of Agriculturally Important Insects
National Bureau of Plant Genetic Resources
National Bureau of Soil Survey and Land Use Planning
National Research Centre on Coldwater Fisheries
Tamilnadu Agricultural University
University of Agricultural Sciences

An Overview of Digitization process

Digital Repository System provides a centralized repository for the Knowledge for an Enterprise. A complete Digital Repository Life Cycle can be segregated into three parts:

- Information Acquisition
- Scan and Import documents to the system
- Document life cycle Management
- Archive and Storage of documents
- Index and Organize documents

- Document Retrieval and Distribution
- Retrieve and Distribute documents

Process of digitization of documents under KrishiKosh

The content to be digitized for the repository is not limited to the project partner's libraries but it is obtained from all the libraries under NARES. The detailed workflow of digitization process followed is as follows:

Review of the type and condition of the holdings to be digitized.

- Preparation of detailed action plan for digitization of each category of material with detailed workflow.
- Setup fully equipped digitization centre for carrying out the scanning and indexing work for different kinds of material.
- Scanning and digitization of the documents including image enhancement and OCR etc.)
- Metadata creation and indexing of the documents
- Quality Control
- Implementation of ICMS solution on Intranet and Internet and populating the database in the Integrated Content Management System (ICMS).

The ICMS solution for this i.e. Dspace is maintained at IARI, New Delhi - the Lead Center. Content selection was done by preparing a list of documents to be digitized by librarians from holdings of their library. The list is then reviewed by local committee of subject matter experts and recommended for digitization. The list is then send to the lead center to check for the duplicity. The already digitized material from any center is not digitized again as digital copy is available to all. The filtered list is then sent back to the library, it belongs to. From there the list is then sent to the one of the four digitization center that is nearby to the library. The Digitization Center, then co-ordinates with the library and ask for the physical documents to be digitized at their place. The digitization process is not just scanning of the documents, a step by step process is followed that involves, Scanning, Cropping, Cleaning, OCRing and PDF/A conversion of the documents. After the PDF/A is converted, the metadata of that document is entered. Both the PDF/A file and metadata is verified by the library staff and then finally uploaded in KrishiKosh, the

Institutional Repository. The permissions to access documents are set as per the decided access policy.

CONCLUSIONS

The Indian National Agricultural Research & Education System (NARES) is a comprehensive source of knowledge in agriculture and allied sciences consisting of vast collection of rare and valuable books, reports, theses, surveys, statistical data, maps, bulletins, newsletters, journal back volumes and other documents held by libraries of different Agricultural Research Institutes and State Agricultural Universities spread all over the country. In order to provide online access to this valuable resource to researchers and scientists all over the world, the Digital Repository named - 'KrishiKosh' has been created under 'eGranth' project of the National Agricultural Innovation Project (NAIP). The 'eGranth' is a collaborative project which envisages strengthening of libraries by implementing data standards, standardized Integrated Library Management Software for smooth day to day operation and enhanced user experience, effortless cataloging and OPAC for individual libraries, Union catalogue for sharing resources, Digital Repository including Electronic Theses & Dissertations (ETD) and enhanced capacity building into the system. It aims to be a **Gateway to Indian agricultural knowledge** accessible over the Internet and sharing its research information with the rest of the world using latest Information and Communication Technologies.

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12. National Agriculture Innovation Project, <http://www.naip.icar.org.in>
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