Pathways to Opening Access to Agricultural Research Knowledge in India

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Abstract

New knowledge is created by analysing and processing data and information. Having access to data and information promotes the generation of science, the communication of science, and the creation and adoption of new knowledge. All Sustainable Development Goals (SDGs) include agriculture as an integral component, and agriculture should be prosperous and sustainable to achieve any SDG. Besides developing skilled and talented human resources, the Indian Agricultural Research System seeks to offer quality data and information to stakeholders to improve agricultural production, processing, and exports. However, access remains restricted despite the availability of data and information, making it impossible to achieve desired results. The purpose of this paper is to summarise how data, information and knowledge of NARS are available and accessible to various stakeholders during various phases of World Bank-supported projects and how the availability and accessibility to data and information exist in NARS.

Keywords: Open Access, Agricultural Research Information, Agricultural Knowledge Management, Open Access Policy, NARS

Introduction

The Agri-food sector is becoming more knowledge-intensive due to market-oriented Agri-food systems. Researchers and scientists are integrating Agri-food systems and ICTs innovations to meet the demands of a wide range of actors and stakeholders, ranging from government departments,

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researchers, scientists, agripreneurs, input suppliers, NGO functionaries and farmers to consumers.

In agricultural research systems, information technology and knowledge management are crucial for collecting, managing, sharing, and disseminating information for awareness, problem-solving, and making informed decisions. Organisations and governments are being forced to open up Access to Agricultural Information and Knowledge in the public domain thanks to the Open Access Movement and Linked Open Data Initiatives. Currently, the private sector is shifting its focus to providing value-added specific information around technologies, products, commodities, services, problem solving, financial, marketing, and information intermediation roles. Increasingly, farmer organisations, cooperatives, and NGOs provide data, manage locally relevant information, manage local networks, and enable effective use of information, knowledge, and skills.

India's National Agricultural Research System (NARS) is the World's most extensive system. It comprises the Indian Council of Agricultural Research (ICAR) established institutes, State Agricultural Universities (SAUs), faculties at Central Universities, and other establishments (Mruthyunjaya & Ranjitha, 1998). This largest network produces a tremendous wealth of data, information, and knowledge that contribute to knowledge discovery. Consortium projects funded by the World Bank continue to generate new knowledge and manage it. Access to NARS libraries' knowledge is possible through repository and catalogue software. The library collections viz., data, published books, journals, theses, and other materials are now being made available.

The Open Access movement is growing worldwide and in India. In recent months, UNESCO has made recommendations on Open Science (UNESCO, 2021). Before that, the Government of India has developed a draft policy of Science Technology and Innovation Policy [STIP2020] for Open Science Frameworks (Office of the Principal Scientific Adviser, 2020). Different

initiatives have been started in the NARS, opening access to agricultural research information and knowledge through different projects. This paper summarises how data, information and knowledge of NARS are available and accessible to various stakeholders during various phases of World Bank-supported projects and how the availability and accessibility to data and information exist in NARS.

National Agricultural Technology Project (NATP)

From 1998 to 2005, the National Agricultural Technology Project (ICAR, 2004) was in operation. Several ICT initiatives were undertaken during this project period at the ICAR institutes, including institutionalising Prioritisation, Monitoring, and Evaluation (PME), using computer-assisted instruction modules, redesigning the ICAR website, and developing crop databases expert systems, and spatial information systems. The intranet and internet connectivity in the NARS was improved during this period. The PME cells served as clearinghouses for information generated by the institutes and made the information available through their websites.

National Agricultural Innovation Project (NAIP)

As part of the National Agricultural Innovation Project, several consortium-based agricultural knowledge management projects were undertaken from 2005 to 2014 (NAIP, 2005). A great deal of emphasis was placed on ICT applications during the change of management (Component 1). As part of the project, a thesis repository was created at a centralised data centre, and access to peer-reviewed publications in journals was made available.

For all websites of NARS constituents, a uniform design using Content Management System (CMS) was recommended only to ensure smooth dissemination of information. AgroPedia was envisaged and hosted using CMS Drupal on similar lines to Wikipedia. ASHOKA, a supercomputer and data centre was built to meet the needs of scientists and knowledge management. In addition to flipping the ICAR journals online and hosting various other journals, the dialogue was started on opening data and

information. ICAR adopted its landmark Open Access Policy in September 2013 (Shah et al., 2016).

National Agricultural Higher Education Project (NAHEP)

The National Agricultural Higher Education Project (ICAR, 2017) has been under implementation since 2017. The emphasis made during NAIP on computer-based instruction modules is now being taken up more significantly, reaching out to all the students online and offline under NARS. Apart from physical infrastructure, huge ICT based infrastructure is also made available to the institutes & universities to continue the teaching even during the pandemic. New undergraduate and postgraduate education syllabuses were designed under the New Education Policy.

ICAR Open Access Policy

During the late phase of the NAIP, the ICAR had adopted an Open Access policy for all its research publications (ICAR, 2013). The policy states that each institute shall have its own repository and a central harvester would harvest the meta-data and would be the one stop portal to access the published literature by the ICAR institutes. However, instead of establishing institutional repositories for various ICAR institutes, a repository (KRISHI) was established to host all the institutes' research and scholarly outputs at the central repository. Before the ICAR Open Access Policy and KRISHI, there were attempts made to establish institutes' repositories at Indian Agricultural Research Institute (IARI), Central Marine Fisheries (CMFRI), Indian Institute of Spices Research (IISR), and Indian Institute of Horticultural Research (IIHR). However, only the CMFRI could successfully build and populate its repository. It stands now as the world's most prominent publications repository on marine fisheries. In addition to the ICAR Open Access Policy, the KRISHI repository has adopted the ICAR data licence.

Krishikosh

Krishikosh is a thesis repository for the NARS system (Gutam, 2013). It was initially hosted by the Haryana Agricultural University under the NAIP project and was merged with the e-Granth project hosted at the IARI. As a mandatory policy adopted for NARS by the ICAR, the thesis produced by the universities are digitised (scanned), and along with the born, the librarians deposit digital copies of the thesis in the Krishikosh repository. In addition to the thesis, annual reports, rare books & journals, monographs, and many more are available within the library and deposited into the repository. Even during NAHEP, support is extended to all the NARS libraries to populate the repository and share the collections openly via AgriCart using Koha software. As the thesis repository is hosted with DSpace repository software, its content's meta-data is made available to various harvesters to harvest following the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH). The National Digital Library of India harvests the meta-data and makes the records to be fetched from the source repository.

ICAR e-Publication Platform

The ICAR e-Publication platform built on the Open Journal Systems of Public Knowledge Project is hosting its flagship peer-review journals and other journals published by the Universities and Societies in NARS (ICAR, 2013b). All the journal's meta-data is harvested into FAO AGRIS. With the software upgrade from OJS 2.0 to OJS 3.0, another beta version of the ICAR e-publication platform is under testing.

Consortium for e-Resources in Agriculture

The Consortium for e-Resources in Agriculture (CeRA) is the project intended to bring access to published literature in the world's peer-reviewed journals related to agriculture and its allied sciences. Under Internet Protocol address authentication and or with remote login, the access to commercial databases of full-text availability is made available to the NARS constituents (ICAR, 2014).

KRISHI

The KRISHI - Agricultural Knowledge Resources and Information System Hub for Innovations , is an initiative of ICAR aimed at making the research & scholarly outputs of ICAR institutes available publicly (KRISHI Project Team, 2015). However, with the adoption of the ICAR data licence, sharing the deposits under Open Access is limited and restricted. The KRISHI portal houses scholarly works and is a repository of all data, information, and research outputs. Moreover, ICAR Interportal Harvester harvests various other sources' meta-data related to agriculture and makes it available for the users. The contents of KRISHI are available under the ICAR Data licence.

Conclusions

Several of NARS' knowledge management initiatives are powered by open-source software. However, these initiatives are more conservatism-based rather than openness-based. For instance, many outputs have an 'All Rights Reserved' licence. The repositories claim their content is openly available, but not all can be accessed, downloaded, saved, read, or shared. Users are only allowed to use the resource for personal use and are not encouraged to save and share with others; therefore, it does not qualify as Open Access. Content built and shared under Creative Commons licensing would be archived, re-used, and shared by a large audience and machines. Because search engines can filter content according to a creative commons licence, licensing repositories and their contents under Creative Commons licensing is highly recommended.

Additionally, efforts should be made to make journals hosted by the ICAR e-Publication platform open access (Guttikonda & Gutam, 2009). They would benefit from inclusion in the Directory of Open Access Journals. The repository content should be open to Data Mining to explore the vast treasure of knowledge in new ways. Under the NAHEP, there should be increased focus and effort on building Open Educational Resources in Agriculture. NARS Agriculture Knowledge Portal should be established similarly to the ICAR Interportal Harvester, which would serve as a one-stop shop for agriculture data, information, and knowledge.

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