

Agricultural Knowledge Management Initiatives by ICAR: An Overview

Aparna V. R. ¹

Abstract

Agriculture knowledge is a valuable asset for farmers and other stakeholders of any country. It plays a vital role in making them more progressive and helps in transforming society. This paper discusses the agriculture knowledge management initiatives developed by ICAR. The main objective is to raise farmers' understanding of using information and best practices to improve the production system and produce more food. Using these initiatives, farmers can uncover optimum farm practices in tasks that guide them chronologically through the growing season. These abilities can be used in various ways, including conversing with farmhands, tending crops, and fixing machinery. The ICAR has played a significant role in promoting higher education in agriculture excellence. It is engaged in cutting-edge science and technology development and its scientists are internationally acknowledged in their fields. This paper describes agricultural research information system of ICAR and discusses important knowledge management initiatives by ICAR.

Keywords: Knowledge Management, Mobile Apps, Agricultural Portal, Digital Resources, ICAR.

Introduction

Agriculture plays a vital role in the Indian economy by giving a living for more than 70 percent of the provincial families. It has a significant impact on the country's economic and social standing. The Indian agriculture sector has transitioned from traditional practices to newer technologies through the effective deployment of information and communication technologies over the last two decades. The processing and dissemination of knowledge have been critical in this transformation (Zhang et al., 2016).

¹ MANAGE Fellow, MANAGE, Hyderabad

To be successful in agriculture, a farmer must not only have a love for the land, practical experience, and plenty of courage and determination, but he/she must also have a thorough grounding in science. Farmers need access to accurate agriculture-based information on a timely basis to make way better choices in their agricultural fields, make continuous and scientific adjustments in their production systems and take advantage of market opportunities (Jain et al., 2015). This is where agriculture knowledge initiatives come into the role.

Keeping pace with the current knowledge diffusion trends in agriculture in India, many public and private organizations are committed to encouraging ICT-driven technology and data distribution system for fast, powerful, and profitable delivery of communications to all the stakeholders in agriculture. In this context, ICAR institutes have played a significant role in disseminating knowledge in agriculture.

About ICAR

The Indian Council of Agricultural Research (ICAR) is an autonomous body in India that coordinates agricultural education and research in India. The world's largest network of agricultural research and education institutes is coming under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India. It was founded on July 16, 1929, as a registered society under the Societies Registration Act, 1860, in response to the Royal Commission on Agriculture's report. The ICAR's headquarters is in New Delhi. This is one of the world's largest national agricultural systems, with 111 ICAR institutes and 71 agricultural universities spread across the country.

The ICAR was a pioneer in ushering in the Green Revolution and subsequent agricultural developments in India, allowing the country to increase the production of foodgrains by 5.6 times, horticultural crops by 10.5 times, fish by 16.8 times, milk by 10.4 times, and eggs by 52.9 times from 1950-51 to 2017-18, thereby having a visible impact on national food and nutritional security.

It has been instrumental in encouraging excellence in agricultural higher education. It is active in cutting-edge scientific and technological development, and its scientists are recognized internationally in their disciplines.

Objectives of ICAR

- Plan, carry out, coordinate, and promote agricultural research and technology development for long-term sustainability.
- Aid, provide and coordinate agricultural education to facilitate quality human resource development.
- Frontline Extension supports, agri-based rural development through the technological application, acceptance, knowledge management, and capacity building.
- Agricultural Research, Education and Extension Policy.

Knowledge Initiatives by ICAR

ICAR has developed a few knowledge initiatives, with each initiative aimed at disseminating information from agricultural research and extension to farmers and other stakeholders and encouraging information sharing across stakeholders.

KVK portals

In 1973, the Indian Council of Agricultural Research (ICAR) formed a committee chaired by Dr. Mohan Singh Mehta of Seva Mandir, Udaypur, to develop the institutional architecture of Krishi Vigyan Kendras (KVK) for vocational agricultural training. The first KVK was laid out in 1974 at Puducherry.

A Krishi Vigyan Kendra (KVK) is a rural extension center in India, typically connected with a nearby agrarian college. KVK is a crucial component of the National Agricultural Research System (NARS). All fall under the ward of one of the 11 Agricultural Technology Application Research Institutes

(ATARIs) throughout India. It serves as agricultural technology knowledge and resource enter, supporting governmental, commercial, and voluntary sector initiatives to improve the district's agricultural economy and connecting the NARS with the extension system and farmers.

The KVK scheme is fully funded by the Indian government, and KVKs are granted to agricultural universities, ICAR institutes, relevant government departments, and Non-Governmental Organizations (NGOs) engaged in agriculture. These institutes will observe the working of respective KVK at the public level and furnishing ideal data and material to the farmers.

Activities of KVK systems

KVK's mandate is to assess technology and demonstrate its use and capacity development.

The following activities are planned for each KVK to carry out the mandate properly.

- On-farm testing to choose the area specificity of the country progresses in a few developing systems.
- On-the-ground demonstrations to demonstrate the productivity potential of technologies on farmers' farms.
- Capacity building for farmers and extension people to keep their knowledge and skills up to speed on contemporary agricultural technologies.
- To serve as a knowledge and resource center for agricultural innovations in order to promote governmental, corporate, and voluntary sector initiatives to enhance the district's agricultural economy.
- Disseminate farm advisories via ICT and other media channels on various topics of relevance to farmers.

Furthermore, KVKs produce high-quality technological products (seed, planting material, bio-agents, livestock, etc.) and make them available to

farmers, organize frontline extension activities, identify and document selected farm innovations, and converge with ongoing schemes and programs within the KVK's mandate.

The following table shows the distribution of KVKs among various institutions:

Agricultural Universities	493
ICAR Institutes	69
NGOs	102
State Governments	34
Other Educational Institutions	17
Total	715

Mobile Apps

A growing number of mobile apps provide access to agricultural and allied sector information. The primary benefits of mobile apps for farmers include easy access to information. Every day, brand new agri-apps, and service are designed and launched, available for download on the Google Play store.

These apps play an essential role in lowering the costs associated with agricultural production. It also enables farmers to cultivate better crops and, as a result, earn more money to improve their living standards. ICAR identifies a total of 113 mobile apps according to different agricultural fields.

Name of the Agricultural field	Name of the Mobile Apps
Crop Science	इक्षु केदार, Farm Tree, CTRI - FCV TOBACCO, CICR Cotton App, Groundnut-IPM, Groundnut-IFC, Fodder Kannada, ICAR IISR Black pepper. Seed Spices Info, Malwa Fasal, VNMKV, Emausamhau Krishi Mausam Seva, Weed Manager, PDKV Weed Manager, Soybean Gyan, Rice-IFC, RKMP Rice Vocs, Rice Expert, ICAR - MUSHROOM, Cane Adviser Tamil, Cane Adviser Hindi, Cane Adviser, Agriculture: FEM@Mobile
Horticultural Sciences	ICAR-Directorate of Onion and Garlic Research, OrchidoPedia, Cashew India, Banana Export and Value Addition, Arka Bagwani, Orchids Farming, Herbal Kisan, Fruit crops, ICAR DMAPR, हळद लागवड VNMKV Parbhani, e-kalpa, Oil Palm Pests English, Oil Palm Nutrients English, Oil Palm Cultivation English, Tomato Cultivation IIHR, CCRI-Citrus, लिंबुवर्गीय फळझाडांची लागवड (Citrus Cultivation), Ripe Mango Products, Aam Ki Suraksha-ICAR Patna, Mango Cultivation IIHR, GrapesDSS, ICAR-NRC L, Solapur Anar, ICAR IIOR Sunflower, ICAR-IIOR Castor, ICAR IIOR Safflower, ICAR IIOR Sesame, ICAR - IISR Black pepper, ICAR - IIOR, CCRI - CITRUS, GrapesDSS, E-Thilhan
Natural Resources Management	Saur Shakti ICAR, Fertilizer Calculator - Goa, VNMKV जलसंवर्धन व जलपुर्नभरण, PIS, GypCal-Sodic Soil Reclamation, Havaamaana- Krishi, LRIS GOA, PCZ Mapper, CAZRI KRISHI
Agricultural Engineering	Food Safety, AgroTech VNMKV

Animal Science	Bufelth, Buffalo Nutrition, Avimitra, Buffalo Reproduction (भैंस जनन एप्प) Dairy Kannada, Indigenous Dairy Products, Training Calendar, Feed Calculator, VetMicro, Hoof Care, Infoequine by ICAR-NRCE, IVRI-Pashu Prajanan (Animal Reproduction) App, Cover art IVRI-Shukar Palan(Pig Farming) App, CGKV APP, IVRI-Shukar Palan(Pig Farming) App, IVRI - Artificial Insemination App, IVRI - Pashu Prajanan (Animal Reproduction) App, Feed Guide: Multilingual App for Scientific Feeding for Dairy Animals
Fisheries Science	CIFT Lab Test, CIFTFISHPRO, mKRISHI Fisheries, Vanami Shrimpapp
Agricultural Education	CIFTraining, ICAR-CRIJAF
Agricultural Extension	Krishi Gyan, Kisan Mitra, KVK online AgriMart, Malda Krishi Vigyan Kendra, UBKV, Ratua, Malda, एकत्मिक तण व्यवस्थापन VNMKV, Kisan Sahayak Fatehgarh Sahib, Kisan Sahayak Ropar, Phule Krishidarshani, Farm Calculators, KhetiSewa, mAgIDS, Kheti-Gyan, Krishi Sparsham, Mobile Farm Solutions (Q&A), Micro Mitra, ICAR-IIOR Biocontrol, Chanamitra, GypCal -Sodic Soil Reclamation, GypCal -Sodic Soil Reclamation (Hindi), Genebank app, Fertilizer Calculator - Goa, e-kalpa, Chana Mitra

Agriculture Education Portal

ICAR's Agricultural Education Division which promotes quality of higher education in India tries innovative teaching, research, and outreach activities. The Agricultural Education Division of the ICAR is concerned with

strengthening and streamlining the higher agricultural education system, improving the quality of human resources in the agri-supply chain, and preparing the country's agriculture production for future challenges. Through collaboration and efforts of the ICAR-Agricultural Universities (AUs) system, which includes 62 State Agricultural Universities, 5 Deemed-to-be Universities, two Central Agricultural Universities, and four Central Universities with Agriculture Faculty, the division works to maintain and improve the quality and relevance of higher agricultural education.

Objectives of Portal

- Strengthening and development of higher agricultural education in India.
- Development of human resources for positions of leadership in agricultural sciences.
- Refining the quality of agricultural education via Innovative Teaching, Research, and Outreach Activities.

Caneinfo

CaneInfo is an interactive and user-centered website on sugarcane production technologies developed for cane growers and cane development personnel, students, and scientists to share information and knowledge on sugarcane by the Sugar Breeding Institute of ICAR. The CaneInfo is a database-driven website that delivers timely information regarding sugarcane to be retrieved free of cost everywhere, anytime, by all involved in sugarcane cultivation.

Compendiums

The ICAR has created a compendium, a condensed collection of information about a specific area of agriculture knowledge. The following collection of compendiums are made available under ICAR Compendiums initiatives for agriculture stakeholders:

- Compendium of Agricultural Technologies
- State-specific Technological Interventions for Higher Agricultural Growth
- Agricultural Transformation through Public-Private Partnership: An Interface
- Selected Agricultural Technologies - A Compendium

Consortium for e-Resources in Agriculture (CeRA)

CeRA is an e-Consortium of agricultural libraries, founded in November 2007, under the Indian Council of Agricultural Research (ICAR) for National Agricultural Research and Education System (NARES) libraries. CeRA is the first of its kind to provide 24 X 7 online access to selected journals in agricultural and allied sciences to all teachers and students, policy planners, officers, and extension specialists in NARS through IP. Currently, scientists in NARS choose CeRA above others for the literature search on web platforms for their professional quest. In short, CeRA catalyzes the NARS institution's agricultural research, education, and extension operations.

Foreign Visit Management System of DARE-ICAR

The DARE-ICAR Foreign Visit Management System (FVMS DARE-ICAR) is an online system developed and implemented at DARE and ICAR to handle all ICAR personnel's foreign visit/training/fellowship activities. By applying the workflow method, this system has been designed to reduce delays in processing foreign visit bids. The FVMS technology allows the employee to apply online, which then goes through the online approval procedure, and the employee is notified of the application status. Email notification of application approval is also automated. Employees and other officials concerned will receive email notifications in their official email accounts.

KRISHI Portal

KRISHI (Knowledge-based Resources Information Systems Hub for Innovations in Agriculture) Portal is an initiative of the Indian Council of Agricultural Research (ICAR) that was designed as an ICAR centralized data repository system consisting of technology. This is a unique form of data inventories repository. The primary goal of this repository is to offer a single Metadata inventory of information relevant to agricultural and allied sectors that is available at multiple ICAR Institutes/SAUs and is to be easily accessible for researchers, farmers, and planners. The KRISHI portal provides access to the photo gallery, audio and video gallery, dashboard, etc.

Knowledge Innovation Repository of Agriculture in the North East (KIRAN)

KIRAN is an initiative on a user platform developed and hosted by the National Informatics Center Content, maintained and updated by ICAR Research Complex for the NEH Region. It is involved in harnessing the power of scientific knowledge and technological innovations to strengthen the agricultural system in the North East region through active partnership and merge with various stakeholders. KIRAN is intended to catalyze building institutional capabilities in the region through effective convergences and networking.

National Innovations on Climate Resilient Agriculture (NICRA)

National Initiative on Climate Resilient Agriculture was launched as a flagship network project by the Indian Council of Agricultural Research (ICAR) in 2011. It intends to conduct a strategic study on adaptation and moderation, demonstrate technologies on farmers' fields, and raise awareness among farmers and other stakeholders about the effects of climate change on agriculture.

The project involves four major components of the initiative, which are Strategic Research, Technology Demonstration, Capacity Building, and

Sponsored/Competitive Grants. Climate change is a major worry for the entire world, including India. To assist the climate change research, ICAR has constructed cutting-edge infrastructural facilities around the country in the National Agricultural Research and Education System (NARES). The NICRA website www.nicra-icar.in offers information on climate - resilient technologies, research and success stories.

The Agricultural Research Management System (ARMS)

The Agricultural Research Management System (ARMS) is a critical tool created and deployed by ICAR to track and evaluate scientific progress. Based on the information given by scientists in this system, this system will be used for information management and evaluation of the Council's scientific research. On completion, achievements are to be uploaded on the system every month. The information given by the scientist will be verified by the Reporting Officer, PME In-charge, and Reviewing Officer at various stages throughout the specified period. Scientists would be able to link their research to the Government, Council, Region, and Institute priorities, which would be mapped by a proposed Standing Committee on Research in the Council. The system includes a technique for scoring individual scientists' performance based on achievements uploaded.

All scientists will be prompted to input data into the system only once, saving the scientist the difficulty of giving data multiple times for different requirements. The system will give a variety of information in report forms (Monthly Division/Institute/SMD progress report/Annual Institute report material). In the future, the information generated by this program will be linked to the many dashboards maintained by the Government of India.

Other Knowledge Initiatives

Apart from these, to highlight the need of imparting knowledge to farmers and other major stakeholders in a comprehensible and manageable manner, the ICAR has initiated the Technologies and Knowledge Resources, under which various digital resources of the agriculture field have been made

assessable. The list of other knowledge initiatives initiated (Digital Resources) by ICAR are as follows:

- National Initiative on Climate Resilient Agriculture (NICRA)
- Design of Micro Irrigation Systems (DOMIS)
- Rice Knowledge Management Portal
- Edalhan Gyan Manch
- Knowledge Innovation Repository of Agriculture in the North East
- Rohu Database
- Expert System for Maize
- Expert System on Wheat Crop Management
- Expert System on Seed Spices
- CaneInfo
- Technologies & Products for Commercialization -Animal Science
- Design Resources
- Statistical Computing for NARS

Conclusion

The ICAR Knowledge Initiative on Agricultural Education, Teaching, Research and Service initiated will offer the impetus required to re-energize our long-standing legacy of knowledge exchange. This activity may be a step to empowering farmers and other stakeholders to be self-reliant to create the future we all want to live in.

References

- Zhang, Y., Wang, L., & Duan, Y. (2016). Agricultural information dissemination using ICTs: A review and analysis of information dissemination models in China. *Information Processing in Agriculture*, 3(1), 17-29. <https://doi.org/10.1016/j.inpa.2015.11.002>

- Jain, A. K., Kumar, A., & Kapur, S. (2016). Reference Manual on Krishikosh-A Repository for NARES. ICAR- Indian Agriculture Research Institute.
- Chandrasekharan, H., Patle, S., Pandey, P. S., Mishra, A. K., Jain, A. K., Goyal, S., Pandey, A., Khemchandani, U., & Kasrija, R. (2012). CeRA - the e-Journal Consortium for National Agricultural Research System. *Current Science*, 102(6), 847-851.
- Jain, A. K., & Veeranjanyulu, K. (2013). Repository Of Indian National Agricultural Research & Education System (NARES): Open Access To Institutional Knowledge [Working Paper]. <http://oasis.col.org/handle/11599/1830>
- Welcome to ICAR | भारतीय कृषि अनुसंधान परिषद. (n.d.). Retrieved February 6, 2022, from <https://icar.org.in/>
- National Agricultural Innovation Project | भारतीय कृषि अनुसंधान परिषद. (n.d.). Retrieved January 30, 2022, from <https://icar.org.in/node/1890>
- Mobile Apps | भारतीय कृषि अनुसंधान परिषद. (n.d.). Retrieved February 6, 2022, from <https://icar.org.in/mobile-apps>
- Krishi Vigyan Kendra Knowledge Network. (n.d.). Retrieved February 6, 2022, from <https://kvk.icar.gov.in/>