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Research Paper

The Role of Libraries in Agricultural Development in the Digital Age: An Analytical Study of Information Technology-Based Knowledge Services in the Context of Uttar Pradesh

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ABSTRACT

Modern agriculture is increasingly reliant on scientific information, digital technologies, and timely access to knowledge. Libraries are playing an increasingly crucial role in connecting farmers, researchers, and extension workers with reliable information. The growing use of Information Technology (IT) and Information and Communication Technology (ICT) has significantly enhanced the efficiency, service quality, and reach of agricultural libraries. This research paper studies the use of IT in science and technology libraries, their digital infrastructure, and their role in disseminating information to farmers, with a specific focus on Uttar Pradesh. Approximately 86 percent of farmers in India are small and marginal (Agriculture Census, 2015–16), and according to the FAO (2020), 20–40 percent of crops are lost globally due to pests and diseases. In this scenario, IT-enabled libraries are providing crucial support to farmers in improving crop productivity, promoting sustainable agriculture, climate adaptation, post-harvest management, and livelihood enhancement. The study concludes that digital and community-based library services are instrumental in effectively disseminating agricultural knowledge and improving rural livelihoods.

1. Introduction

Agriculture plays a central role in the Indian economy. In 2023, approximately 54 percent of the country's working population was directly or indirectly dependent on agriculture (Ministry of Agriculture, 2023). Uttar Pradesh, the largest agricultural state in the country, contributes approximately 18 percent to national food grain production. Due to changing climate, dwindling natural resources, and market uncertainties, farmers' need for scientific and up-to-date information has increased more than ever before. Libraries have emerged as key knowledge centers fulfilling this need. Instead of being limited to traditional books, today's libraries function as digital information hubs, training centers, and community knowledge platforms. 1. The use of IT has made libraries a powerful link between farmers and research institutions.

2. Agricultural Productivity and Library Services

Scientific research plays a crucial role in increasing agricultural productivity. According to ICAR (2022), improved seeds, balanced nutrient management, and the use of modern agricultural techniques can increase the yield of major crops by 15–25 percent.

Libraries support farmers in the following ways:

- Research literature on crop varieties, biotechnology, and genetic improvement
- Soil health cards, nutrient databases, and crop calendars
- Digital Decision Support Systems

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A FAO (2020) report indicates that pests and diseases cause losses of approximately US$220 billion annually worldwide. Information on IPM and disease control, provided through libraries, helps farmers make timely decisions.

3. Sustainable Agriculture, Climate Change, and the Role of Information

Sustainable agriculture aims to maintain production while conserving natural resources. Libraries provide knowledge related to organic farming, conservation agriculture, micro-irrigation, and agroforestry. According to the IPCC (2021), temperature increases and changes in rainfall patterns in South Asia are expected to lead to a 10–15 percent decline in crop productivity by 2030. Weather forecasts and climate advisory platforms linked to digital libraries assist farmers in risk management.

4. Farmer Livelihoods, Market Information, and Value Addition

In addition to production, marketing and processing also play a significant role in increasing agricultural income. According to ICAR-CIPHET (2019), post-harvest losses in India are estimated at ₹92,651 crore annually. Libraries provide information to farmers on:

- Storage, cold chain, and packaging technologies
- Food processing and value addition
- Government schemes: PM-Kisan, PM-FME, e-NAM, MSP

More than 1,400 mandis (wholesale markets) across the country have been integrated with the e-NAM portal by 2024, providing farmers with access to better market price information.

5. Extensive Use of IT and ICT in Library Services

- **Housekeeping Operations:** Cataloging, circulation, serial control, and RFID-based services through ILMS.
- **Information Handling:** CeRA, KrishiKosh, AgriXiv, e-journals, and digital repositories.
- **Library Networking:** Resource sharing through INFLIBNET, DELNET, and AGRIS.
- **Office Automation:** E-records, online reporting, video conferencing, and digital training.

According to Sharma and Malik (2021), more than 70% of science and technology libraries in North India are automated, and 65% of libraries provide remote access facilities.

6. Special Perspective of Uttar Pradesh

Uttar Pradesh has 89 Krishi Vigyan Kendras (KVKs) (Agricultural Science Centers) functioning, the highest in the country. During 2022–2024, the state was included among the pilot states for the Digital Farmer Identity, Crop Survey, and Agricultural Data Mission.

In the state's agricultural universities and KVK libraries:

- Digital content in local languages
- Mobile libraries and ICT kiosks
- Farmer training and digital literacy programs

These efforts enhance farmers' access to information. Access and decision-making capabilities have improved.

7. Conclusion

This study demonstrates that IT-enabled libraries are strong pillars of knowledge-based development in the agricultural sector. They are providing farmers with scientific, timely, and useful information, contributing to improved crop productivity, sustainable farming, and enhanced livelihoods. In an agrarian state like Uttar Pradesh, digital library services are empowering farmers and giving a new direction to rural development. Future investments in digital infrastructure and community libraries can make the agricultural sector more sustainable and profitable.

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