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Cyber Extension Role in Agriculture

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Abstract

A relatively new method of agricultural extension is known as "cyber extension," which makes use of cutting-edge communication tools to improve the sharing of agricultural information and knowledge. With this strategy, information and services are provided to farmers via a variety of digital platforms, including the Internet, social media, mobile phones, and other digital technologies, in an effort to overcome the drawbacks of conventional extension methods. Incorporating cyber extension into extension services can increase their efficacy, efficiency, and reach, which will boost livelihoods, sustainability, and agricultural productivity. The notion of cyber extension is explained in this abstract, along with some possible advantages for agriculture.

Introduction

Cyber extension, a modern approach to agricultural extension, provides timely and accurate information to farmers, enabling them to make informed decisions and increase productivity. It offers real-time data, market information, weather forecasts, and advisory services. Cyber extension can overcome the challenges of traditional extension services and enhance knowledge dissemination. This article highlights cyber extension's benefits and challenges in agriculture, along with successful models implemented globally.

Benefits of cyber extension in Agriculture and Farmers

- **Increased access to information:** Cyber extension aids farmers with crop management, pest control, and market prices. It's accessible via online resources, mobile apps, or digital tools, benefitting those in remote or underserved areas.

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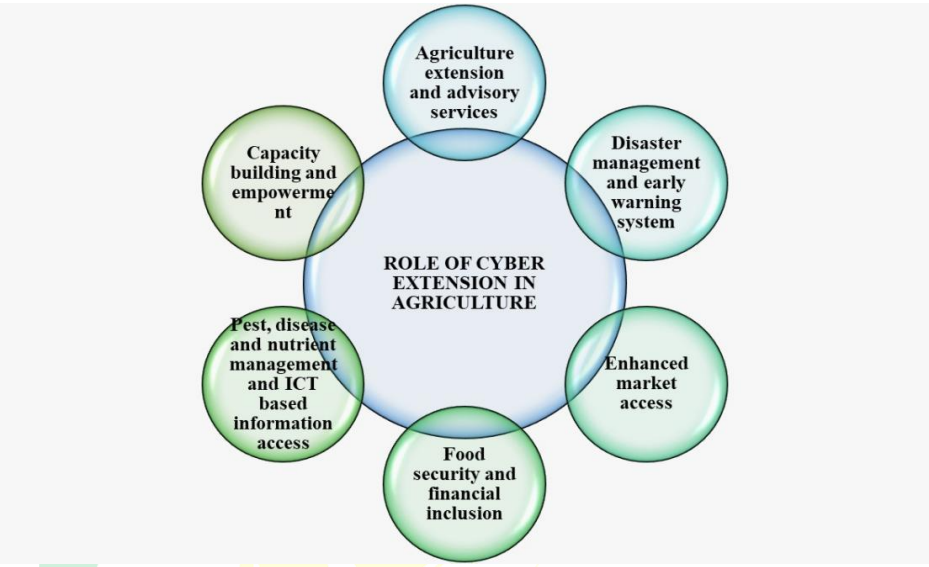
- **Improved decision-making:**Cyber extension aids farmers with precise data for planting, harvesting, and marketing decisions resulting in higher profits, improved quality, and better yields.



- **Enhanced productivity:** Tech tools aid farmers by optimizing resource use, increasing productivity, and reducing waste. Drones, sensors, and precision agriculture software are examples of such cyber extension tools.
- **Access to markets:** Cyber tech can aid farmers in reaching new markets & buyers. Web marketplaces & social media can be utilized to promote products & sell directly to consumers.
- **Increased resilience:** Cyber tech helps farmers adapt to climate change & risks. Tools for weather forecasting, crop insurance & risk management build resilience to floods & droughts.
- **Cost savings:** Tech tools can cut farmer costs by resource optimization and waste reduction. Precision ag software reduces pesticide and fertilizer use, while online resources help find better deals on equipment and seeds.

Cyber Extension Tools

Mobile apps:

Farmers have access to numerous mobile apps, such as KVK-net, AgriBus-NAVI, and m-Krishi, that offer weather forecasts, market prices, and pest management advice.

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Drones:

Drones aid agriculture by monitoring crops and collecting data on crop health, soil moisture, and precision spraying, leading to optimal resource utilization and reduced use of pesticides.

Precision agriculture software:

Precision ag software optimizes resource use with data analytics & machine learning. Better decisions on planting, harvesting & marketing increase yield & profitability. Examples: AgriTask, FarmX, Climate FieldView.

Internet of Things (IoT) sensors:

IoT sensors gather crop data, including soil moisture and plant health, for farmers to optimize resources and improve crop yields. Examples include soil moisture, plant health sensors, and weather stations.

Online Marketplaces and trading platforms:

Online platforms connect farmers to buyers & new markets, offering direct sales to consumers/wholesalers, real-time data & price transparency. AgriEx, FarmLink&Agribolo are examples.

Table 1: E-learning Tools and Portals used in Agriculture

Portal	Launched by	Purpose
CeRA (Consortium of e-resources in agriculture)	ICAR in 2007	New online access for agricultural journals is available 24/7 to researchers, students, policymakers, administrators, and extension specialists in NARS through IP authentication.
KVK Portal	ICAR-IASRI, 2016	Helps in availing details and information about various KVK's and facilities provided by them
AgriCat	NAIP project of ICAR	It is a union catalog of library resources of the Indian National Agricultural Research and Education System (INARES)
Krishi Kosh	ICAR-IARI, 2017	A digital repository of the Indian National Agricultural Research System (INARS) to preserve and provide open access to institutional intellectual assets

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JaivikKheti	MoA&FWalong with MSTC(E-commerce company) on 17th March 2018	This platform markets organic produce, promoting its benefits and facilitating sales for farmers - an all-in-one solution.
MKisan	Ministry of Agriculture and Farmers Welfare on may 25th 2018.	The platform which provides web-based mobile agro advisories to farmers with technological backstopping from KVK's and research institutes of SAU's
Farmers portal	Ministry of Agriculture and Farmers Welfare in 2021	One-stop-shop for farmers and stakeholders to access information on seed, farm machinery, inputs, and agromet advisory services.
SATHI (Seed Traceability, Authentication and Holistic Inventory)	Ministry of Agriculture and Farmers Welfare in 2023.	It is a portal to address the issues of seed production, quality identification and certification.

Challenges for implementing cyber extension in agriculture:

- **Access to technology**: Not all farmers have access to the necessary technology, such as smartphones, computers, or internet connectivity, to take advantage of cyber extension services.
- **Data privacy**: Farmers may be concerned about the security and privacy of their data, especially when sharing sensitive information such as crop yields, sales data, or financial information.
- **Digital literacy**: Many farmers may lack the necessary skills and knowledge to effectively use digital technologies, such as navigating mobile apps, interpreting data, or troubleshooting technical issues.
- **Language barriers**: Cyber extension services may not be available in local languages, making it difficult for farmers to access and understand the information.
- **Cost**: Some cyber extension tools and technologies may be costly for farmers, especially for those who operate on a small scale or have limited financial resources.

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- **Infrastructure**: In some areas, the lack of digital infrastructure, such as reliable internet connectivity or electricity, may make it difficult to implement cyber extension services.
- **Sustainability:** Maintaining and updating cyber extension services can be challenging, especially in rural areas where access to technical support may be limited.

The role of government and private in improving cyber extension in agriculture

- **Government initiatives:** Governments can promote cyber extension via investment in infrastructure, financial incentives for farmers, and digital literacy programs.
- **Public-private partnerships:** Public-private collaboration fosters innovation, creating sustainable cyber solutions. Private firms fund and provide expertise, while governments offer policy support and regulations.
- **Policy solutions:** Governments can back Agri-cyber extension by providing tax incentives for innovative digital solutions, data privacy regulations, and research to improve the impact of tech on farming.
- **Awareness campaigns:** Governments and the private sector can promote cyber extension for farmers by educating and training them on its benefits and effective use, using existing networks and organizations.
- **Funding mechanisms:** Governments and private sectors can fund farmers with grants or low-interest loans to promote digital tech adoption.

Emerging technologies and trends of cyber extension in agriculture

Artificial Intelligence (AI):

AI revolutionizes cyber extension by analysing data for farmers' personalized recommendations. AI-powered platforms suggest optimal planting times and crops by analysing soil data and weather forecasts.

Internet of Things (IoT):

IoT aids farmers in collecting crop, soil, and environmental data via sensors and drones. This enables monitoring of crop health and early detection of problems.

Blockchain:

Blockchain secures agri-data storage and sharing, enabling transparency in supply chains and privacy protection.

Big Data Analytics:

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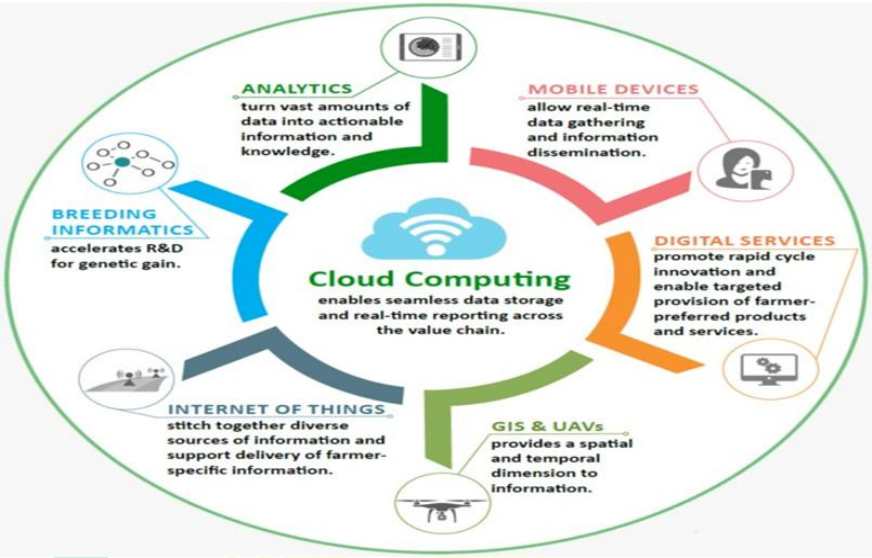
Big data analytics aid farmers to optimize crop yields, minimize waste, and enhance profitability by analyzing large datasets and detecting patterns and trends.

Cloud Computing: Cloud computing helps farmers access powerful computing tools and reduce the digital divide.



Mobile-based solutions:

Mobile-based solutions, such as SMS and mobile apps, are likely to continue to play a key role in cyber extension, especially in areas with limited internet connectivity.

Precision agriculture:

Precision agriculture, which uses data and technology to optimize crop yields and reduce waste, is likely to become increasingly important as global demand for food continues to grow.

Collaboration:

Stakeholder collaboration, including farmers, researchers, and the private sector, is vital to shaping cyber extension's future, enabling tailored services and innovation.

Conclusion

In conclusion, cyber extension offers significant potential for improving agricultural extension services, reaching a wider audience, and providing real-time information and feedback. However, it also faces several challenges, such as the digital divide and the need for reliable and relevant information. To ensure that cyber extension services are effective, there is a need for adequate infrastructure, technical support, quality assurance mechanisms,

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and stakeholder engagement. By addressing these challenges, cyber extension can contribute to sustainable agricultural development and improve the livelihoods of millions of farmers worldwide.

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