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Rural Farmers Benefit from Digital Extension Services

Govind Mall

Assistant Professor, Buddha P. G. College Ratsia Kothi Deoria

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*Corresponding Author
Govind Mall*

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INTRODUCTION

Agricultural extension functions as the main channel for scientists to transfer their research findings to practical agricultural applications. The traditional extension service delivery system used field demonstrations training sessions and direct contact between extension personnel and farmers to deliver its services. The methods are effective, yet they face delivery issues because of insufficient staff and difficulties in reaching remote areas and their expensive operational needs.

Digital technology advances have transformed the extension system during the past few years. Farmers now receive agricultural information through digital platforms which include mobile phones and internet access and data-driven technology solutions that enable them to access information. The new technologies help rural farmers because they need information which is both timely and reliable for their agricultural work.

2. Concept of Digital Extension Services

The process of Digital Extension Services begins with agricultural advisory work which farmers receive through ICT-based tools that deliver technical guidance and knowledge to them in a way that enables timely and efficient and scalable service delivery. The extension system operates through real-time information delivery which enables farmers to access critical information. The system provides location-specific advisories which use local weather data and soil information and crop needs to create customized solutions.

Key Features

- ✓ The system provides farmers with immediate access to agricultural knowledge.
- ✓ The system delivers personalized agricultural guidelines based on local conditions.
- ✓ The system provides customers with budget-friendly solutions that can expand to meet their needs.
- ✓ Farmers and experts can interact with each other through the system

Digital extension services provide better service to farmers because they use modern technology which offers more flexible solutions than traditional methods.

3. Major Digital Tools and Platforms

3.1 Mobile-Based Services

Farmers use mobile phones because these devices serve as the most common digital technology which they can easily access. Through SMS and voice messages and mobile applications agricultural information gets delivered to users.

Farmers receive alerts related to weather forecasts and pest outbreaks and crop management practices and market prices. Mobile applications deliver complete advisory solutions which cover crop planning and fertilizer recommendations and disease diagnosis.

Kisan Suvidha and Pusa Krishi provide users with multiple services which include weather updates and plant protection measures and expert advice.

3.2 Web Portals

Web-based platforms serve as centralized repositories of agricultural information. The portals enable farmers and traders and stakeholders to access market prices and crop statistics and advisory services.

The e-NAM system enables farmers to access a national agricultural market while AGMARKNET delivers market intelligence and price data.

3.3 Call Centers and Helplines

Farmers can directly connect with agricultural experts through call centers. Farmers can request crop management advice and pest control help and other agricultural support through telephone services. Farmers can use Kisan Call Center to obtain expert assistance in their native language.

3.4 Social Media Platforms

WhatsApp and YouTube and online forums function as main channels for agricultural extension work within social media platforms. The platforms enable farmers and experts to share knowledge and learn from each other while communicating in real time.

Farmers can enhance their collective learning and innovation through instructional videos and discussion participation and experience sharing.

3.5 Advanced Technologies

Digital extension services are becoming more effective through the implementation of advanced technologies. Artificial Intelligence (AI) enables automated pest and disease diagnosis based on image recognition.

Farmers use remote sensing and Geographic Information Systems (GIS) for crop monitoring and yield estimation and weather forecasting. Drones conduct field surveillance while providing precision advisory services that empower farmers to make informed choices.

4. Benefits of Digital Extension Services

Digital extension services provide multiple benefits which enhance agricultural productivity and operational efficiency. The system delivers information at the correct times with precise content which helps farmers to adapt to emerging environmental changes.

The services enable remote access to their offerings through their ability to serve distant areas which lack proper access to basic services. The system decreases extension service expenses because it decreases the requirement for agents to make physical field visits.

Farmers achieve enhanced decision-making skills through better access to information which results in improved crop management methods and higher agricultural output and better financial results. Digital platforms enable farmers to access markets more effectively while achieving better price outcomes.

5. Role in Sustainable Agriculture

Digital extension services provide essential support to sustainable agricultural development. The system enables efficient resource management through system recommendations which deliver precise resource usage information for water usage and fertilizer application and pesticide usage.

The system provides weather information together with risk management solutions to enable climate-friendly agricultural techniques. Pest and disease outbreak early warning systems enable farmers

to execute preventive actions which decrease their crop losses.

Digital extension systems support environmentally sustainable technology adoption which helps preserve natural resources and ensures long-term agricultural development.

6. Challenges

Digital extension services encounter multiple obstacles which prevent them from delivering their many advantages. The primary challenge which exists within this field stems from farmers who lack digital skills because they cannot operate digital tools.

Online services become unreachable for users in rural areas because of their insufficient internet connection and digital infrastructure development. Digital platforms become unusable for users because of their language barriers and low literacy levels.

The existence of two main obstacles which hinder progress includes limited public knowledge about digital services and the substantial costs needed to implement advanced technology.

7. Strategies for Improvement

Digital extension services require the implementation of multiple strategies which will help increase their operational efficiency. Digital literacy training programs should be established to educate farmers on basic digital skills.

Local communities need access to user-friendly applications which should be developed in their native languages. The completion of rural digital infrastructure projects requires building internet connections to all areas.

The establishment of public-private partnerships allows organizations to work together for both digital service expansion and digital solution development. Digital extension programs which combine modern technology with traditional practices will develop a mixed approach which generates maximum program reach and operational success.

8. Future Prospects

Digital extension services will experience significant future growth because technological advancements continue to progress. AI-based personalized advisory services will provide farmers with tailored recommendations based on their specific needs.

Big data analytics will enable precision farming by analyzing large volumes of agricultural data. Smart farming technologies will create better efficiency and productivity because of their integration with existing systems.

The establishment of farmer-focused digital ecosystems which contain e-extension networks and digital cooperatives will improve agricultural communication and collaboration.

CONCLUSION

Digital extension services have created a new way for farmers to communicate which operates at greater speed and higher efficiency while remaining accessible to all users. They empower farmers with knowledge, improve decision-making, and enhance productivity and profitability.

Digital extension services can strengthen the agricultural sector when organizations establish necessary infrastructure and provide training and develop suitable policy frameworks. Agricultural development and food security will receive protection through their implementation of sustainable farming methods.

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