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A comprehensive analysis of stakeholder suggestions for improving digital agricultural communication and services implementation

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Abstract

The integration of digital technologies in agriculture has emerged as a transformative force, offering unprecedented opportunities for efficiency, sustainability and informed decision-making. This study investigates the suggestions provided by farmers, input dealers, extension agents and scientists to enhance the digital agricultural communication and services ecosystem in Telangana, India. Through a comprehensive analysis of primary data collected from diverse stakeholders, including farmers, input dealers, extension agents and scientists, valuable insights are gleaned regarding the constraints and potential solutions within the digital agricultural landscape. Key recommendations include the establishment of more digital services centers, provision of services in local languages, prioritization of location-specific services, subsidy in mobile phone costs, improvement of internet connectivity, and comprehensive training initiatives. Additionally, stakeholders advocate for synchronized digital services, budget provisions for digital gadgets, image and video-based content development and the establishment of state-level monitoring cells. These findings underscore the importance of accessibility, inclusivity, affordability and infrastructure development in optimizing digital agricultural communication and services to meet the evolving needs of farmers effectively. By addressing these recommendations, policymakers and practitioners can harness the full potential of digital technologies to drive agricultural growth and empower stakeholders in Telangana and beyond.

Keywords: Digital communication and services, stakeholder suggestions, interview method and strategies

Introduction

The advent of digital technologies has ushered in an era of unprecedented transformation across communication, media, journalism, and culture. Digital communication represents a paradigm shift in the transmission and reception of information, characterized by the use of binary code and computer-based technologies. Contrasting analogue systems, digital communication offers advantages such as fidelity, speed, and ease of duplication, revolutionizing interpersonal interactions, media dissemination, and information exchange (Polyushkin *et al*., 2020) [5]. Digital journalism represents a paradigm shift in news production, dissemination, and consumption, enabled by the proliferation of digital technologies and online platforms (Bashir, 2019) [6]. Digital culture encompasses the myriad ways in which digital technologies influence societal norms, behaviors, and cultural practices (Li, 2012) [3]. Digitalization has emerged as a transformative force, catalyzing innovation, job creation, and economic growth (Shallu *et al*., 2019) [8]. Leveraging Information and Communication Technology (ICT), including Artificial Intelligence (AI), Internet of Things (IoT), and the fourth industrial revolution (Morley *et al*., 2018) [4], digitalization empowers industries and societies worldwide. Research by Dutta and Jeerh (2023) [2] emphasizes that digital empowerment accelerates development by optimizing human resource utilization.

In particular, the integration of digital technologies in Indian agriculture holds immense significance, presenting opportunities for revolutionary change. As highlighted by Dutta and Devi (2015) [1], digitalization offers real-time information, access to expert advice, and e-services, facilitating efficient government service delivery while reducing corruption and enhancing transparency. This digital transformation not only enhances convenience but also empowers citizens by providing them with access to valuable resources and services.

Digital agricultural communications and services have emerged as transformative pillars within the contemporary agricultural landscape, offering unprecedented opportunities for efficiency, sustainability, and informed decision-making. As the global population burgeons, reaching an estimated 9.7 billion by 2050 according to the United Nations (2019) [9], the need to enhance agricultural productivity becomes paramount. In this context, the fusion of cutting-edge technologies with agricultural practices has given rise to a new era, marked by real-time insights, adoption of scientific farming, and sustainable resource management. Digital agricultural communication and services have the capacity

to deliver immediate insights, expert guidance, and market dynamics, empowering farmers while fostering sustainability (Sandeep *et al.,* 2024) [7].

In India, initiatives like "Digital India" and digital agricultural platforms are transforming agricultural development. Telangana leads in digitalizing its agricultural operations, revolutionizing communication and services. Platforms like "Mee-Seva" offer convenient access to government services, while "Dharani Integrated Land Records" modernizes land registration. "Rythu Bandhu" and "Rythu Bheema Portals" aid farmers with investment registration and life insurance. The "Integrated Information Dissemination System (IIDS)" provides valuable advisory services, and the "Online License Management System (OLMS)" simplifies licensing. Platforms like "OSSDS" and "WBAAS" enhance seed distribution and offer weather intelligence. Social media and mobile apps are leveraged for information dissemination and department management. These digital initiatives empower stakeholders, streamline operations, and foster transparency, driving agricultural growth in Telangana.

Stakeholders such as farmers, agricultural extension agents, and scientists should collaborate to develop user-friendly digital tools, provide comprehensive training and support, ensure data security and privacy, and address any digital divide issues. Given the significant impact of digitalization in agriculture, it becomes imperative to consider suggestions from various stakeholders for better implementation of digital communication and services.

Materials and Methods

The study was purposefully conducted in Telangana state from March to June 2023, aiming to encompass diverse agricultural settings. Two districts were randomly chosen from each Agro-Climatic Zone (ACZ), ensuring representation, with at least one Krishi Vigyan Kendra (KVK) in each district. Employing a simple random sampling approach, thirty farmers, five input dealers, five extension personnel, and five scientists were selected from each district, resulting in a comprehensive sample size of 270 respondents. Within each ACZ, the sample included 60 farmers, 10 input dealers, 10 extension officers, and 10 scientists engaged in extension work. By involving stakeholders from various sectors, the study sought to gain a comprehensive understanding of suggestions for implementing digital communication and services in agriculture. Primary data collection was conducted through individual interviews with each respondent. Statistical methods, including frequency, percentage, ranks and cross-tabulation, were employed to analyze and interpret the results.

Results and Dissuasion

The results from Table 1. gathered valuable insights from farmers regarding enhancements to the digital agricultural communication and services ecosystem. It was found that the majority of respondents, accounting for 89.44%, advocated for the establishment of more digital services centers, particularly in rural areas, such as Mee Seva. Additionally, 83.33% emphasized the necessity for digital platforms to offer services and communication interfaces in Telugu, the local language. Prioritizing location-specific services was deemed important by 80.56% of respondents, while 75.56% suggested a reduction or subsidy in mobile phone costs by 20-30%. Furthermore, 71.11% highlighted the need for better internet connectivity in rural regions. Other significant suggestions included providing training on digital gadget usage (70.00%), creating awareness about the benefits of digital services (67.78%), and offering low-cost data packages (61.11%). Overall, these recommendations underscore the importance of accessibility, linguistic inclusivity, affordability, and infrastructure development in optimizing the digital agricultural communication and services landscape to meet the needs of farmers effectively.

Table 1: Suggestions given by farmers to overcome constraints in digital agricultural communication and services ecosystem (n=180)

Sl. No	Suggestions	f	%	Rank
1.	More number of digital services centers (Mee Seva) in rural areas	161	89.44	I
2.	Digital platforms providing services and communication should provide interface in Telugu language	150	83.33	II
3.	Location specific services and information should give more priority	145	80.56	III
4.	Reduction or subsidy in cost of mobile phone about 20 to 30 percent	136	75.56	IV
5.	Better internet connectivity in rural areas	128	71.11	V
6.	Training should be provided to farmers on basic and required skills in handling of digital gadgets	126	70.00	VI
7.	Creating awareness about the benefits in usage of digital communication and services in agriculture	122	67.78	VII
8.	The low size data per day at cheaper rates will be helpful for the farming community	110	61.11	VIII

The findings from Table 2 sheds light on the critical suggestions provided by input dealers to address the constraints within the digital agricultural communication and services ecosystem. It is evident that the overwhelming majority of input dealers, comprising 80.00%, underscored the crucial need for the Department of Agriculture and State Agricultural Universities (SAUs) to deliver timely information material regarding new farm practices to the farming community through digital channels. Moreover, a significant proportion of respondents, at 73.33 percent, advocated for the establishment of digital gadget sales and repair shops in rural areas, highlighting the necessity of infrastructure development to support digital adoption among farmers. Additionally, around two-thirds of input dealers, at 66.67%, emphasized the importance of promoting agricultural products via digital platforms in local languages, pointing towards the potential of digital marketing and language accessibility to effectively reach farmers. Furthermore, suggestions for bureaucratic streamlining, such as reducing the approval duration for licenses to less than 10 days, and the development of comprehensive disease diagnostic apps/portals were also voiced by nearly two-thirds of respondents, indicating a need for smoother operational processes and enhanced disease management capabilities facilitated by technology. Finally, the importance of providing training on digital

gadget usage, as suggested by 60.00 percent of input dealers, underscores the necessity of capacity building

among stakeholders to fully harness the benefits of digital tools in agriculture.

Table 2: Suggestions given by input dealers to overcome constraints in digital agricultural communication and services ecosystem (n=30)

Sl. No	Suggestions	f	%	Rank
1.	Department of agriculture and SAU's should provide adequate timely information material about new farm practices for disseminating to farmers community digitally	24	80.00	I
2.	Establishment of digital gadgets sales and repair shops at rural areas	22	73.33	II
3.	Government and manufacturing companies should take measures for promotion of the agriculture products through digital platforms in local language	20	66.67	III
4.	The duration of approval of licenses issues should be reduced to less than 10 days	19	63.33	IV
5.	Comprehensive disease diagnostic should digital app / portal need to be developed	19	63.33	IV
6.	Training should be provided on better digital gadget usage for dissemination of information	18	60.00	VI

Table 3 provides valuable insights into the suggestions put forward by extension agents to address the challenges within the digital agricultural communication and services ecosystem. The data reveals that a significant majority of extension agents, comprising 76.67 percent, emphasized the importance of maintaining servers responsible for uploading farmers' data, particularly during peak periods of data entry. This underscores the critical need for robust infrastructure to ensure the seamless functioning of digital platforms, crucial for effective communication and service delivery in agriculture. Furthermore, approximately 60.00 percent of respondents highlighted the necessity of capacity building initiatives aimed at enhancing extension personnel's proficiency in handling digital tools and managing digital information, indicating a demand for skill development programs tailored to the evolving technological landscape. Moreover, an equal percentage of extension agents advocated for the provision of internet infrastructure in Rythu Vedika and Mandal offices, recognizing the pivotal role of connectivity in facilitating access to digital resources and services at the grassroots level. Additionally, concerns regarding the management of noise in media/content used for information dissemination were raised by 56.67 percent of respondents, underscoring the importance of quality control measures to ensure the reliability and relevance of digital agricultural information. Furthermore, suggestions for the integration of various digital applications related to agriculture and the provision of orientation sessions for extension personnel before the introduction of new portals and applications were also highlighted by approximately 53.33 percent of extension agents each, emphasizing the need for cohesive digital ecosystems and adequate training mechanisms to maximize the benefits of digital technologies in agricultural extension services.

Table 3: Suggestions given by extension agents to overcome constraints in digital agricultural communication and services ecosystem (n=30)

Sl. No	Suggestions	f	%	Rank
1.	Servers uploading farmers data should be maintained properly especially during peak periods of data entry	23	76.67	I
2.	Capacity building of extension personnel in handling of digital tools and handling digital information	18	60.00	II
3.	Provision of Internet infrastructure in the Rythu Vedika and Mandal office	18	60.00	II
4.	Noise in the media/ content through which information is disseminated, should be carefully handle	17	56.67	IV
5.	Integration of all digital apps related to agriculture	16	53.33	V
6.	Orientation should be given extension personal before introduction of new portals and applications	16	53.33	V

Table 4 provides significant insights into the suggestions offered by scientists to overcome the constraints within the digital agricultural communication and services ecosystem. The data illustrates that a substantial majority of scientists, constituting 80.00 percent, emphasized the importance of enhancing the relevance of regularly updated information to specific field conditions through advanced technology and proper infrastructural facilities. This underscores the critical role of tailored information delivery in leveraging digital platforms to expand agricultural services effectively. Additionally, approximately 73.33% of respondents advocated for synchronizing all services within digital communication platforms to address location-specific needs, emphasizing the need for cohesive and integrated digital solutions in agriculture. Moreover, suggestions to incorporate the basics of mobile application and digital portal development in post-graduation levels were put forward by an equal percentage of scientists, indicating a demand for skill enhancement initiatives to harness digital technologies more efficiently. Furthermore, the importance of encouraging the participation of all stakeholders, particularly farmers, in the development of digital agricultural communication and services ecosystem was highlighted by 66.67 percent of respondents, underscoring the significance of inclusive approaches in technology adoption. Other suggestions, such as budget provisions for the purchase and upgrade of digital gadgets, development of image and video-based content in digital communication, and the shift towards video conference mode for general review meetings to reduce costs, were also recommended by approximately 63.33% of scientists each, demonstrating a comprehensive understanding of the diverse strategies required to optimize digital agricultural communication and services. Moreover, proposals to establish state-level digital communication and service integrated monitor cells for creating, monitoring, and evaluating digital communication and services were voiced by 50.00% of respondents, highlighting the need for institutional mechanisms to facilitate effective governance and oversight in digital agriculture initiatives.

Table 4: Suggestions given by scientists to overcome constraints in digital agricultural communication and services ecosystem (n=30)

Sl. No	Suggestions	f	%	Rank
1.	Enhancing regular updated information relevance to location specific field conditions through proper infrastructural facilities through advanced technology can help in expansion of the services	24	80.00	I
2.	By Synchronizing all the services in digital communication and services which can address location specific needs	22	73.33	II
3.	Incorporation basics of mobile application and digital portal development in post-graduation levels will help better use of digital technologies	22	73.33	II
4.	Encouraging participation of all stakeholders and more precisely farmers will develop better digital agriculture communication and services ecosystem	20	66.67	IV
5.	Budget provision for purchase and upgrade digital gadgets	19	63.33	V
6.	The content developed in digital communication should be more image and video based	19	63.33	V
7.	The general review meeting can be shifted video conference mode to reduce travel and other recurring costs	17	56.67	VII
8.	State levels digital communication and service integrated monitor cell need to establish for creating, monitoring and evaluating the digital communication and services	15	50.00	VIII

Conclusion

The research findings underscore the pressing need for comprehensive enhancements in the digital agricultural communication and services ecosystem. Farmers, input dealers, extension agents, and scientists have collectively highlighted crucial areas for improvement, including infrastructure development, linguistic inclusivity, capacity building, and stakeholder participation. The recommendations emphasize the importance of accessibility, affordability, and tailored information delivery to meet the evolving needs of agricultural stakeholders. Addressing these challenges through collaborative efforts and strategic interventions is essential to harnessing the full potential of digital technologies in agriculture, ultimately enhancing productivity, sustainability, and resilience in the agricultural sector.

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