



Research Article

Impact of Social Media on Agricultural Information Dissemination in District Sanghar, Sindh Province

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Abstract | This study examines the impact of social media on agricultural information dissemination among small-scale farmers in District Sanghar, Pakistan. The study employed a multistage cluster sampling technique with a sample size of 160 respondents from two tehsils of district Sanghar (Shahdadpur and Sanghar) were randomly selected. Data was collected using a structured questionnaire covering demographics, mobile phone usage, social media application use, and farmers' perceptions of agricultural information disseminated through social media. Findings reveal that 62.5% of farmers had access to smartphones (Android/apple). Most of them are used for communication, and entertainment followed by agricultural information. This indicates significant potential for digital agricultural initiatives. Facebook (75% usage) emerged as the most popular platform, followed by WhatsApp (68.75%). The study uncovered a digital divide, with 37.5% of farmers having no access to social media and 12.5% of farmers not having mobile phones. There was low familiarity with specialized agricultural apps. Farmers showed high interest in weather updates and market information (66.25%) disseminated through social media. However, 60.75% of farmers expressed uncertainty about the accuracy of agricultural technology information. The study emphasises the need for targeted efforts to improve farmers' digital literacy, especially with regard to specialised agricultural apps. This study adds to the growing body of literature on digital agriculture in Pakistan by providing stakeholders and policymakers with information on how to use social media to improve agricultural production and farmers' livelihoods.

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Introduction

Development of digital technology and social media applications has profoundly altered

Pakistan's agricultural economy, especially in the Sindh area. This transformation is vital to improve agricultural output, particularly given the problems faced by climate change (Javed *et al.*, 2023). Social

media has fundamentally transformed the way people interacting, communicating, and sharing information in various fields of life including agriculture. The use of social media by farmers has drawn a lot of interest in recent years due to its potential to increase agricultural productivity, knowledge dissemination, and market accessibility (Balkrishna *et al.*, 2017). Pakistan's agricultural sector employs 37.4 percent of the total workforce and makes a 24 percent contribution to the nation's GDP (GoP, 2024). However, small farmers face some difficulties, such as limited access to information, market volatility, and the effects of climate change (Khan *et al.*, 2020). These challenges underscore the necessity for innovative approaches. Innovative approaches are necessary to help farmers increase their resilience and productivity.

Social media such as Facebook, WhatsApp, Twitter, and YouTube have become an integral part of human life. Numerous individuals worldwide use these applications in their daily lives. People use these applications for different activities. Meanwhile, practitioners in both the public and private sectors employ social media platforms to perform their tasks in serving their organizational objectives and goals in various areas, including marketing, management, and communication (Rodriguez-Moran, 2020). These platforms disseminate agricultural knowledge, the sharing of best practices, and the provision of market intelligence (Latif *et al.*, 2020; Salam *et al.*, 2023). Several critical determinants affect farmers' use of social media applications. Demographic variables, including age, educational level, and farm size, significantly influence farmers' propensity to embrace innovative technologies (Khan *et al.*, 2020). The digital culture plays a pivotal role in the adoption process. Using a smartphone and navigating through social media applications are essential for successful adoption (Bin-Khaled and Maredia, 2024). Perceived utility stands as another essential factor; farmers exhibit a higher likelihood of engaging with social media when they anticipate that will enhance their agricultural operations (Yaseen *et al.*, 2016). Moreover, access to a stable mobile network and reliable Internet connectivity is indispensable for sustained engagement with social media platforms (Khan *et al.*, 2020). While much research has been done on the many uses of information and communication technology (ICT) in agriculture, little has been done on how small-scale farmers use social media in Pakistan. This research carefully analyses Sanghar agricultural communities'

social media use and expertise to remedy this essential shortcoming. Understanding farmers' social media usage and knowledge is crucial for numerous compelling reasons. This study is based on Rogers' 2003 theory of innovation diffusion, which provides a comprehensive framework for understanding how new technologies and ideas spread through social structures (Rogers, 2003). This theory says that relative advantage, compatibility with current practices, inherent complexity, trialability, and observability all affect how quickly new ideas are adopted. The theory of innovation diffusion can shed light on farmers' social media adoption patterns and the factors that help or hinder their use for agricultural purposes. By carefully using this theoretical construct, the research seeks to comprehend the complex processes of social media adoption in Pakistan's Sanghar agricultural setting.

In Pakistan, while farmers still rely heavily on traditional sources like fellow farmers, extension staff, radio, and TV, these mediums are often constrained by cost, limited reach, and inefficacy. The emergence of Information Communication Technologies (ICTs), particularly social media platforms like Facebook, WhatsApp, and YouTube, has transformed the information dissemination landscape by enabling real-time, interactive communication among large farming communities. Recent studies highlight that social media not only facilitates frequent information sharing but also empowers farmers to connect, share experiences, and market their products effectively. Recent studies indicate that social media and digital platforms are becoming vital for disseminating agricultural information and enhancing agricultural practices. Farmers are increasingly embracing social media platforms like Facebook and YouTube to gain agricultural information (Salam *et al.*, 2023). Muhammad *et al.* (2019) stated that social media offers an interactive, and real-time platform for disseminating agricultural information by addressing gaps in traditional systems. Similarly, Ramavhale *et al.* (2024) noted that social media enables farmers to interact with colleagues, share experiences, and market their products effectively. Research conducted by Raja *et al.* (2023) revealed that most of the farmers 84.16 percent of farmers utilized mobile phones and social media for agricultural purposes. Platforms were particularly popular for frequent information sharing and networking like WhatsApp and YouTube. This tendency aligns with broader national programs

designed to use digital technologies for agricultural advancement. Nonetheless, the degree to which small farmers in certain regions, such as the Sanghar district, use social media and their expertise remains largely unknown. Understanding demographic features, the use of mobile phones, social media applications, farmers' perception and understanding of these platforms is crucial for formulating targeted interventions and policies. This research intends to bridge this gap by presenting a complete examination of how small farmers in the Sanghar district utilize social media, thus contributing to the expanding body of literature on digital agriculture in Pakistan.

Material and Methods

Study area

This study was conducted in Sanghar district, located in Sindh Province, Pakistan. Sanghar district is bounded by Khairpur and Nawabshah districts in the North and Northwest, Umerkot, Mirpurkhas, and Tando Allahyar districts in the South, Matiari district in the West, Hyderabad district in the Southwest, and India in the East (Figure 1).

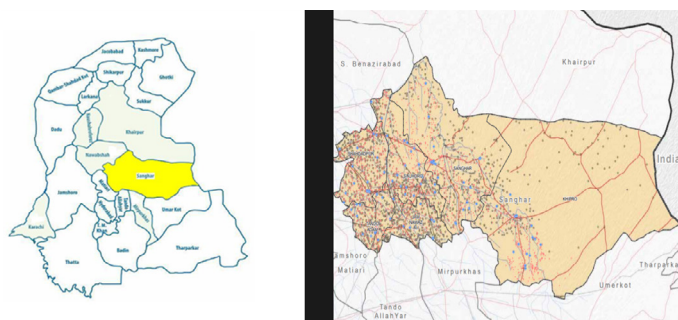


Figure 1: Study map.

Research design and sampling

This research design employed a multistage cluster sampling technique to select study participants. Two tehsils, Shahdadpur and Sanghar, were randomly selected from the six tehsils of the Sanghar district (Sanghar, Shahdadpur, Jam Nawaz Ali, Khipro, Sinjhor, and Tando Adam). This district as a whole consists of 73 union councils distributed across its six tehsils; Shahdadpur has 13 UCs, while Sanghar has 11 UCs, making a combined 24 UCs. From these two tehsils, four UCs were randomly selected. From selected UCs, 16 villages were randomly selected for this study. The sampling process progressed through multiple stages, starting from tehsils to union councils then to villages, and finally to individual respondents. This systematic approach resulted in a total sample

size of 160 respondents (PILDAT, 2024).

Sampling structure

District Sanghar (160)

- Sanghar Tehsil (80) → UC Mian (40) → 4 Villages (10 each)
- UC Khadwari (40) → 4 Villages (10 each)
- Shahdadpur Tehsil (80) UC Shahdadpur-1 (40) → 4 Villages (10 each)
- UC Jatia (40) → 4 Villages (10 each)

Data collection and analysis

Data was collected using a structured questionnaire that met research objectives. The questionnaire covered demographics, mobile phone usage, social media application use, social media expertise, and farmers' perceptions of agricultural information disseminated through social media. Data was collected through field interviews with farmers and by using a structured questionnaire.

Results and Discussion

Demographic characteristics

Demographic characteristics play a significant role in farmers' adoption and use of social media for agricultural purposes. Several key demographic factors influence how farmers engage with social media platforms. Age and education are the most important demographic factors affecting the use of social media among farmers:

Age of the respondents

Age of the farmer plays a vital role, as does designing positive attitudes towards the adoption behavior that helps in the decision-making process. In the study area, growers were divided into various age groups, such as those 15 to 30 years, 31 to 40 years, 41 to 60 years, 61 and above.

Table 1: Age categories of the respondents.

Age category	Frequency	Percentage
15 to 30 years	70	43.75
31 to 40 years	60	37.5
41 to 60 years	20	12.5
61 and above years	10	6.25
Total	160	100.00

Table 1 highlights the age distribution of small-scale farmers in the Sanghar district. The data reveals that

the majority of younger farmers (43.75%) are between 15 and 30 years old. This group falls under the category of early adopters. These farmers are a potential receptive audience for social media applications in agriculture. This aligns with the findings from Thailand, where young farmers performed better than older ones in adopting social media for agriculture (Kanjina and Development, 2021). The second largest group is middle-aged (37.5%) are between 31 to 40 years old. This group is not as quick to adopt the younger farmer. These farmers often use social media for practical purposes such as market and peer networking. This group benefits from their experience in farming combined with moderate exposure to digital tools. The small proportion of older farmers, 41 and above, required more support in adopting these technologies. Age is a descriptive variable; its influence on the adoption of social media is indeterminate and depends on many factors (Liu *et al.*, 2018). The younger farmers are more innovative and risk-takers, whereas older farmers are laggards. Therefore, it unfavorably impacts the use of social media applications (Zhang *et al.*, 2012).

Educational level

Education is another key factor that affects farmers' attitudes and behavior regarding knowledge gain, technology utilization, and related aspects of agricultural development.

Table 2: Education level of the respondent.

Educational level	Frequency	Percentage
Illiterate	30	18.75
Primary	80	50.00
Enter	20	12.5
Graduate	20	12.5
Postgraduate	10	6.25
Total	160	100.00

Table 2 shows the educational distribution of small-scale farmers. Most farmers (50%) have primary education, which is the basic level of education. Farmers with primary education can still engage with simple social media platforms like WhatsApp or Facebook for basic agricultural information and communication. This is supported by findings from Ethiopia, where basic education improved access to agricultural technologies (Zegeye *et al.*, 2022). This can facilitate using mobile phones and simple social media applications. However, the significant illiteracy

rate (18.75%) indicates obstacles in technology adoption for farming communities. The farmers with higher education levels (12.5% graduates, 12.5% intermediate, and 6.25% postgraduates) have a higher rate of utilizing agricultural information from media platforms. These groups are more likely to adopt social media due to their advanced literacy skills and ability to navigate complex platforms. Educational status significantly influences a farmer's ability to use mobile phones effectively.

Age and education play an effective role in how farmers engage with these platforms. The farmers with higher education are more tilted toward the use of social media to access agricultural information and resources (Thakur *et al.*, 2017). Conversely, the illiteracy rate among farmers presents challenges in technology adoption. This indicates that educational status is a critical factor that affects the use of mobile phones and social media applications among farming communities (Zolkepli and Kamarulzaman, 2015).

Utilization of mobile phone

Mobile phones connect the farmers, and they can easily communicate among themselves. These gadgets make it easy for farmers to share information that greatly increases their income and output. Farmers use their cell phones to get important information like market prices, weather reports, and ways to get rid of pests. This helps them make better choices and handle risks better (Nikola *et al.*, 2019). Access to extension services, expert advice, and financial activities is also made easy by the technology, which helps agricultural growth even more. Even though there are problems like low awareness and poor network service in some rural places, cell phones have become an important way for farmers to connect and make their lives better (Panda *et al.*, 2023).

Table 3: Farmer response regarding the use of mobile phones.

Perception	Frequency	Percentage
Keypad mobile	40	25
Smartphone(android/apple)	100	62.5
Have not mobile	20	12.5
Total	160	100.00

Table 3 highlights the response of farmers regarding the utilization of mobile phones. The data reveals that 62.5% of farmers use smartphones (Android/

Apple), for various purposes like communication, entertainment, and getting agricultural information through different sources. This shows considerable potential for innovative agricultural apps and social media. This high smartphone usage rate in a rural zone indicates considerable prospects for digital agricultural projects (Quandt *et al.*, 2020). Understanding and addressing the reason for non-adoption among the farming communities that could lead to effective and inclusive digital agriculture initiatives in the region is crucial. However, 25% of farmers still use keypad phones, which may limit their access to advanced digital services. There is still a persisting digital gap, as seen by the 12.5% of farmers who do not own cell phones. The adoption rate increases the opportunities for digital agriculture. There is a need to bridge effectively mobile technology and farming practices.

Farmer's engagement with social media applications
Farmers' involvement in social media applications means that they use different online platforms and tools to connect with each other, share information, and get resources that are connected to their farming activities.

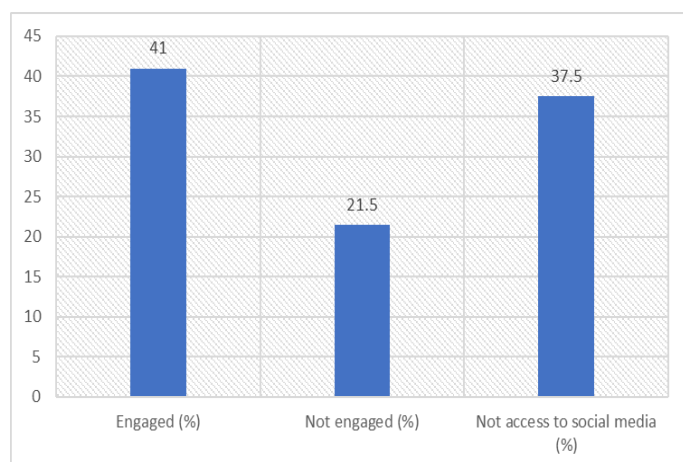


Figure 2: Farmer's engagement with social media applications.

Figure 2 displays the level of engagement in social media applications. 41% of the population actively engages in social media applications. This indicates a strong engagement in entertainment, communication, and agricultural information. Due to either lack of

access to modern technology or personal preference, the smallest segment, 21.5% were not engaged due to lack of knowledge or lack of interest, while 37.5% of farmers had no access to social media. Some farmers had no mobile phones and others had keypad mobile phones. The significant proportion of engaged farmers provides an opportunity for developers, educators, and policymakers to engage them in digital agricultural programs. Social media is the most efficient tool for the transformation of agricultural communication. In a previous study Salisu *et al.*, (2024) stated that mobile phone is ranked top in the dissemination of agricultural information than the traditional mass media like television, radio, newspapers, and magazines. Traditional mediums were effective in the dissemination of information to the rural population. However, it is limited due to one-way communication and lack of interconnection. Despite challenges in ICT adoption, social media has the potential to bridge gaps in traditional systems by providing timely and tailored information. It enhances agricultural productivity and improves the socioeconomic condition of rural people. Social media like Facebook and WhatsApp offer real-time updates, user-generated content, and interactive forums that enable farmers to directly engage with experts and peers to tailor solutions (Raza, 2019; Yadav *et al.*, 2023). To maximize the potential of social media in agriculture, stakeholders should focus on developing user-friendly agricultural apps tailored to local needs, providing training to enhance farmers' digital literacy, addressing infrastructure challenges in rural areas, and creating content that combines entertainment with valuable agricultural information. This can be achieved by leveraging the high engagement rate and addressing non-users' needs. Social media can become a powerful tool for improving agricultural productivity and farmers' livelihoods (Cinelli *et al.*, 2021; Thakur *et al.*, 2017). Additionally, social media's widespread adoption among younger have digitally literate farmers. It makes a more adaptable and future-oriented medium for modern agricultural needs.

Table 4: Farmers' perception regarding the use of Mobile Phones for various purposes.

Purpose	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly asgree (%)
Entertainment	5	10	25	35	25
Agricultural information	10	15	30	30	15
Communication	3	7	20	40	30

Table 4 presents the farmers' perceptions regarding the use of mobile phones for various purposes, including entertainment, agricultural information, and communication. The analysis depicts that primarily mobile phones are used for formal or informal communication, with the highest percentage of agreeing or strongly agreeing at 70 percent. It maintains the connectivity between farming and non-farming communities. This aligns with previous studies, such as Raza *et al.* (2019), which emphasize that mobile phones are primarily used for communication. It enables farmers to interact with extension workers, brokers, and peers effectively. Communication through mobile phones bridges the information gap and enhances access to timely updates for quick decision-making in agriculture. Secondly, 60 percent of farmers agree and strongly agree with entertainment. They use mobile phones for recreational purposes like playing games, watching videos, or social media engagement like Facebook, WhatsApp, etc. However, the use of mobile phones for agricultural information is relatively lower at 45 percent indicating underutilization in this domain despite its potential to revolutionize farming practices. Raza *et al.* (2019) noted that while mobile phones have emerged as effective tools for disseminating agricultural information, their adoption for this purpose remains limited due to factors such as digital literacy gaps and lack of tailored content.

Proficiency level in social media applications

Growers were asked about their proficiency level regarding social media applications through a five-point Likert scale. (1= Not at all, 2= To some level, 3= Moderate level, 4= High level, 5= Extremely high level).

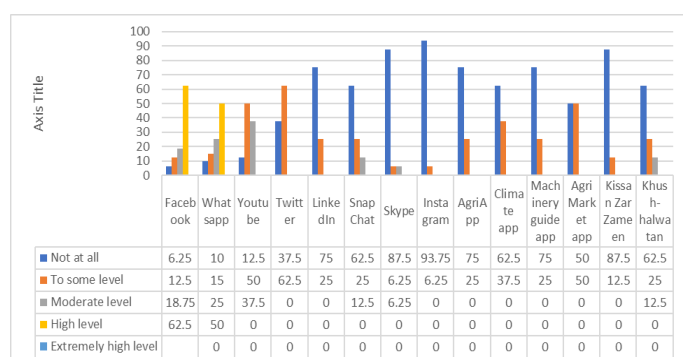


Figure 3: Proficiency level of social media applications.

Figure 3 highlights the proficiency level of farmers in various applications. The respondents reported Facebook as a “high level” of familiarity at 62.5%,

followed by WshatsApp (50% at a “high level”). YouTube displayed a unique pattern, with the majority (50%) reporting knowledge “to some level” and 37.5% indicating a “moderate level.” However, on professional platforms such as LinkedIn, 75% of respondents reported not knowing at all. Other apps, such as AgriApp, Machinery Guide App, and Climate App, showed alarmingly low familiarity levels, predominantly categorized as “Not at all.” Most of the respondents were familiar with Twitter, Instagram, Skype, and Snapchat. The Kissan Zar Zameen and Khushhal-watan face significant gaps in awareness, highlighting a critical opportunity for targeted training and outreach. These results highlight the necessity of specialized interventions to improve farmers' digital literacy, with an emphasis on applications that directly improve resource management and agriculture. Gaining more experience with social media platforms might transform information exchange, market access, and communication, eventually boosting the Sanghar District agricultural community.

The observed patterns align with recent research on social media adoption in agriculture. For instance, Thakur *et al.* (2017) found that Facebook and WhatsApp were among the most popular platforms for agricultural information dissemination. Similarly, Garcia *et al.* (2019) highlighted the potential of social media in fostering community engagement and knowledge sharing among farmers. Cinelli *et al.* (2021) found that purpose-built agricultural apps often have trouble getting users, while general social media platforms see a lot of use. Specifically, they discovered that farmers rarely use specialized agricultural apps. This suggests a need for more focused efforts to promote and educate farmers about these specialized tools. To address these gaps, agricultural extension services and policymakers should consider developing targeted training programs that not only introduce farmers to these specialized applications but also demonstrate their practical benefits in improving agricultural productivity and market access.

Social media application in disseminating agricultural information

Social media platforms have emerged as powerful tools for disseminating agricultural information, offering significant benefits to farmers and the agricultural sector as a whole. These platforms enable the rapid spread of relevant, timely, and reliable information across large geographical areas, effectively reducing

farmers' social isolation and enhancing networking opportunities (Ramavhale *et al.*, 2024). The ability to cover vast geographical boundaries in a short time allows for efficient information sharing. It also facilitates the connections between farmers, experts, and other stakeholders in the agricultural community.

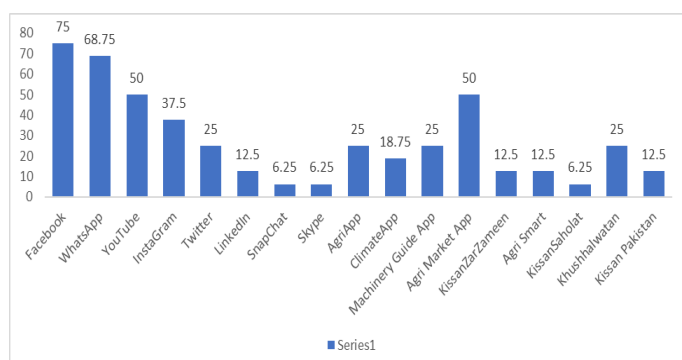


Figure 4: Social media applications used for getting agricultural information.

Figure 4 illustrates the diverse usage of social media platforms and applications for accessing agricultural information this analysis was done on the basis of those farmers who have smartphones. It sheds light on how technology influences farming communities. Facebook is the most dominant platform, with 75% of users followed by WhatsApp (68.75%). Easy access and interactive features help farming communities interact with each other. For video-based learning, 50% of respondents followed YouTube, which provides practical demonstrations and tutorials. Machinery Guide App and AgriApp both have 50% and 25% interest. These applications may provide equipment and agronomic advice for farmers. Twitter and Kissan Pakistan have a 25% usage rate, which could be attributed to their significance in providing timely updates and localized agricultural recommendations. Interestingly, Kissan Saholat and Snapchat have low adoption (6.25% each). This may imply that some platforms are less knowledgeable and relevant for agricultural material than others. The research indicates a lower utilization of agriculture-focused

apps compared to general social media platforms. This trend suggests that major platforms should include farming-specific features and promote specialist agriculture applications to boost their popularity.

These findings align with recent studies showing the growing importance of social media in agriculture. For instance, Thakur *et al.* (2017) found that farmers increasingly use social media platforms to access agricultural information and connect with peers (Thakur *et al.*, 2017). Additionally, Gandasari *et al.* (2024) highlighted the potential of social media in disseminating agricultural knowledge and fostering community engagement among farmers (Gandasari *et al.*, 2024).

Farmers perceptions of agricultural information disseminated through social media platforms

Social media disseminates a variety of agricultural information about farming, market conditions, and technology. This includes updates on market prices, weather conditions, and rates for agricultural products; information about seeds, fertilizers, and pesticides; as well as details on agricultural technologies and innovations.

Table 5 presents farmers' perceptions of various types of agricultural information disseminated through social media platforms. A total of 66.25% of farmers found weather updates useful, followed by 60.65% who agreed or strongly agreed that they were most interested in receiving market updates. 58.75% of farmers express their response to pesticide advice. On the other hand, people encounter more uncertainty when it comes to agricultural technology, seeds, and fertilizers. 60.75% of people disagree with agricultural technology information. These results are in line with a study that shows farmers like getting quick, useful information on social media (Ramavhale *et al.*, 2024). Research indicates that farmers utilize social media sites like Twitter for

Table 5: Types of agricultural information being disseminated through social media.

Type of agricultural information	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
Agricultural technology	32	28.75	20.6	11.25	7.4
Seeds	29.4	31.25	22.5	10.6	6.25
Fertilizers	30.6	33.75	19.4	9.35	6.9
Pesticides	8.75	11.9	20.6	31.25	27.5
Weather updates	5.6	9.4	18.75	33.75	32.5
Market updates	7.5	10.6	21.25	30.9	29.75

networking and soil-plant information, which aligns with their desire for weather updates (Ramavhale *et al.*, 2024). There may be less trust in technical knowledge about seeds and fertilizers because these are challenging issues that farmers would rather learn about in a more traditional, face-to-face way (GP *et al.*, 2022).

Conclusions and Recommendations

Conclusion

This study provides valuable insights into the adoption and usage of social media platforms by small-scale farmers in Pakistan's Sanghar District. As a result of the high percentage of farmers that use smartphones (62.5 percent). Mobile phones used for agricultural purposes are relatively lower than communication and entertainment but still a good proportion is connected through this media with experts, and peers for getting the agricultural information. There is a significant opportunity to implement digital agriculture initiatives. The survey also shows that there is still a persistent digital gap. Some farmers are either using traditional media, outdated phones, or without access to mobile technology altogether. The increasing use of social media platforms like Facebook and WhatsApp to transmit agricultural information proves their effectiveness in reaching and training farmers. However, low adoption rates of specialized agriculture applications indicate the need for targeted marketing activities to promote their value. Farmers were suspicious of technical agricultural information on social media but interested in weather and market updates. This reality highlights the significance of adapting resources to farmers' preferences and requirements. Overall, this study demonstrates the growing importance of social media in agriculture while also revealing areas for improvement in digital literacy and the adoption of specialized agricultural technologies.

Recommendation

A focused approach is recommended to enhance the adoption and effective utilization of social media applications among small-scale farmers in the Sanghar District. Initially, targeted training initiatives should be established to enhance farmers' digital skills, particularly concerning specific agricultural applications. Subsequently, user-friendly agricultural applications should be developed that address the local community's specific needs and farming practices. Finally, collaborations with widely used social media

platforms, such as Facebook and YouTube should be pursued to integrate agriculture-focused features and content, taking advantage of their widespread use among farmers. These strategies can significantly improve agricultural productivity and information dissemination in the area.

Future research direction

Future research should focus on longitudinal studies that track changes in social media adoption among small-scale farmers in the Sanghar District over time. Additionally, an in-depth qualitative study is required to identify the challenges to the adoption of specialized agricultural apps that are unfamiliar to farmers. Comparative analyses of how farmers in different regions of Pakistan use social media could help in identifying ways to make solutions more efficient and effective. Furthermore, research should explore the role of traditional government media, such as radio and television, in agricultural information dissemination to complement social media platforms. This would ensure participation for farmers with limited access to digital tools or low digital literacy, creating a more integrated and accessible communication strategy.

Novelty Statement

This study contributes novel insights into the adoption and usage patterns of social media applications among small-scale farmers in Sanghar District, Pakistan. The study offers a distinctive integration of demographic analysis, mobile phone utilization, and farmers' views on different social media channels for sharing agricultural information. The results also show that there is a big gap in digital access and a lack of use of specialized agricultural apps. This highlights important areas where the region's agricultural sector needs to put more effort.

Author's Contribution

Nabeel Ahmed Jat: Led the conceptualization, data collection, and drafted the original manuscript.

Aijaz Ali Khooharo: Provided supervision, critical review, and guidance on the research direction.

Basit Ali Talpur: Performed data analysis and organized the manuscript structure.

Azeem Shahzad: Contributed to reviewing and editing the manuscript.

Waqas Raza: Was responsible for reviewing and

submitting the manuscript.

All authors discussed the results and approved the final version.

Conflict of interest

The authors have declared no conflict of interest.

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