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The Role of Social Media in Disseminating Agronomic Information and Empowering Farmers

Maria Goretti Meity Polii[1], Romi Mesra[2]
[1]Program Studi Agronomi, Universitas Sam Ratulangi.
[2]program Studi Pendidikan Sosiologi, Universitas Negeri Manado
Email: [1]meitypolii24@gmail.com, [2]romimesra@unima.ac.id

Abstract
This study aims to explore the role of social media in agronomic information dissemination and farmer empowerment. Using a systematic literature review method, this study analyzes current research on the use of social media in the agricultural context. The results show that social media has significantly improved farmers' access to agronomic information, accelerated the adoption of agricultural innovations, and facilitated the formation of virtual farmer communities. Platforms such as Facebook, WhatsApp, and YouTube have become the main channels for sharing agricultural knowledge and accessing markets. However, challenges such as the digital divide and information reliability still need to be addressed. The study concludes that social media has great potential for transforming the agricultural sector, but requires an integrated approach involving improving digital infrastructure, developing farmers' digital literacy, and multi-stakeholder collaboration to optimize its benefits.

Keywords: Role, Social Media, Agronomic Information, Empowering Farmers

A. Introduction

The development of information and communication technology has brought significant changes in various aspects of human life, including the agricultural sector. Social media, as one of the products of technological innovation, has become a platform that is not only used for social interaction, but also as a means of effective and efficient information dissemination. In the context of agriculture, social media has great potential to bridge the information gap between researchers, extension workers, and farmers, as well as accelerate the adoption of modern agricultural technologies and practices (Aker, 2011).

The agricultural sector, as one of the pillars of the economy in many developing countries, continues to face challenges in terms of productivity, sustainability, and adaptation to climate change. To overcome these challenges, access to accurate and timely agronomic information is crucial for farmers. Social media, with its wide reach and ability to disseminate information in real-time, offers a promising solution to improve the dissemination of agricultural knowledge and empower farmer communities (Saravanan et al., 2015).

The use of social media in the agricultural sector has shown significant potential in improving the efficiency of the agricultural supply chain, facilitating the exchange of knowledge between farmers, and promoting sustainable agricultural practices. Platforms such as Facebook, Twitter, and YouTube have been used to share information

on cultivation techniques, pest control, and agricultural product marketing strategies. This allows farmers to access information relevant to their needs without geographical and temporal constraints (Joshi et al., 2019).

In addition, social media also plays an important role in forming virtual communities of farmers, where they can exchange experiences, discuss problems faced, and find solutions together. Such interactions not only increase the knowledge of individual farmers but also strengthen social capital within the farming community. This in turn can encourage innovation and adoption of new technologies in agricultural practices (Thakur & Chander, 2018).

The role of social media in empowering farmers is also reflected in its ability to strengthen farmers' voices in agricultural policy making. Through social media, farmers can easily organize themselves, voice their concerns, and participate in dialogue with policy makers. This opens up opportunities for the creation of agricultural policies that are more responsive to the needs of farmers in the field (Mwangi & Kariuki, 2015).

In the context of disseminating agronomic information, social media offers advantages in terms of speed and reach. Up-to-date information on weather forecasts, market prices, or crop disease outbreaks can be disseminated quickly, enabling farmers to make timely decisions in managing their land. This is especially important given the highly dependent nature of agriculture on dynamic environmental conditions (Khatri-Chhetri et al., 2017).

However, the use of social media in the agricultural sector also faces several challenges. The digital divide between urban and rural areas, as well as between younger and older generations of farmers, remains a significant barrier to widespread adoption of this technology. In addition, the reliability and accuracy of information disseminated through social media is also a concern, given the potential for the spread of false or misleading information (Lwoga, 2010).

To optimize the role of social media in disseminating agronomic information and empowering farmers, a holistic approach is needed. This involves improving information technology infrastructure in rural areas, digital literacy training for farmers, and developing relevant and easy-to-understand content. Collaboration between agricultural research institutions, extension workers, and farmer communities is also important to ensure that information disseminated through social media truly meets the needs of farmers in the field (Mwangi & Kariuki, 2015).

Furthermore, the integration of social media with conventional agricultural extension systems can create a strong synergy in the dissemination of agronomic information. Social media can serve as a platform to expand the reach of extension programs, facilitate two-way interactions between extension workers and farmers, and provide a space for continuous feedback and evaluation. This approach has the potential to increase the effectiveness and efficiency of the agricultural extension system as a whole (Saravanan et al., 2015).

In the context of previous research, a study conducted by Aker (2011) in West Africa showed that the use of mobile technology and social media can improve farmers' access to market information and modern agricultural practices. This study revealed that farmers who have access to information through digital platforms tend to adopt more efficient farming techniques and

generate higher incomes compared to those without such access.

Another study conducted by Joshi et al. (2019) in India examined the role of social media in empowering smallholder farmers. They found that social media platforms such as WhatsApp and Facebook have become important channels for farmers to share knowledge, discuss farming issues, and even organize collective action to address common challenges. This study highlights the potential of social media in strengthening social capital in farming communities and increasing farmers' resilience to economic and environmental shocks.

Meanwhile, Thakur and Chander (2018) conducted a study on the effectiveness of social media in disseminating agronomic information among young farmers in South Asia. They found that the use of social media platforms significantly increased the adoption of precision farming technologies and sustainable farming practices among the younger generation of farmers. The study also underscored the importance of adapting content and communication strategies to meet the specific preferences and needs of different demographic groups of farmers.

While these studies have provided valuable insights into the potential of social media in the agriculture sector, there are still several research gaps that need to be addressed. One major gap is the lack of in-depth understanding of how social and cultural dynamics influence the adoption and use of social media among farmers, especially in developing countries with high socio-cultural diversity. Further research is needed to explore how societal norms, social hierarchies, and local cultural practices interact with social media use in the agricultural context.

Furthermore, there is a gap in understanding the long-term effectiveness of social media as a tool for farmer empowerment and agricultural productivity improvement. Most existing studies focus on short- and medium-term impacts, while comprehensive longitudinal analyses are limited. Further research is needed to evaluate how social media use in the agricultural sector evolves over time, and how this impacts the overall socio-economic structure of farming communities.

Given the existing research gaps and the importance of this topic in the context of sustainable agricultural development, further research on the role of social media in agronomic information dissemination and farmer empowerment is urgently needed. Comprehensive and contextual studies can provide valuable insights for the development of effective policies and strategies to optimize the use of social media in supporting agricultural sector transformation. This in turn can contribute to improved food security, rural poverty alleviation, and sustainable rural development.

B. Method

This study adopted a qualitative approach with a literature review method to explore the role of social media in agronomic information dissemination and farmer empowerment. A qualitative approach was chosen because of its ability to provide an in-depth and holistic understanding of complex social phenomena (Creswell & Poth, 2018). In the context of this study, a qualitative approach allows researchers to explore the nuances and complexities of the interactions between social media technology, agricultural practices, and social dynamics among farmer communities.

A systematic literature review method

was used to collect, evaluate, and synthesize existing research on this topic. According to Snyder (2019), a systematic literature review is a very effective method for integrating and analyzing large amounts of information from various sources, allowing researchers to identify trends, gaps, and future research directions. In this study, the literature review will include peer-reviewed journal articles, research reports, academic textbooks, and other relevant sources published in the last ten years.

The literature search and selection process will follow a strict protocol to ensure comprehensiveness and reduce bias. The main electronic databases that will be used include Web of Science, Scopus, and Google Scholar. Search terms will include, but are not limited to, "social media," "agriculture," "information dissemination," "farmer empowerment," and "agricultural communication technology." Inclusion and exclusion criteria will be predetermined to ensure the relevance and quality of the selected literature (Moher et al., 2015).

Data analysis will be conducted using a thematic analysis approach, which allows researchers to identify, analyze, and report patterns or themes in the data (Braun & Clarke, 2006). This process will involve several stages: familiarization with the data, initial coding, searching for themes, reviewing themes, defining and naming themes, and finally, producing a report. The use of qualitative data analysis software such as NVivo will be considered to assist in the coding and analysis process.

To ensure the reliability and validity of the study, several strategies will be implemented. First, triangulation of data sources will be conducted by comparing findings from different types of literature and different disciplines. Second, peer debriefing will be conducted where the researcher will discuss findings and interpretations with academic colleagues to gain alternative perspectives and test assumptions (Lincoln & Guba, 1985). Third, a detailed audit trail will be kept to document research decisions and processes, increasing transparency and allowing for future replication of studies. Although the literature review method has the power to synthesize existing knowledge, it is important to acknowledge its limitations. One major limitation is the potential for publication bias, where studies with positive or significant results are more likely to be published (Rothstein et al., 2005). To address this, efforts will be made to seek out and include grey literature and unpublished sources. In addition, the researcher will be critical of the quality and relevance of each source included in the review, using appropriate quality assessment tools to evaluate the methodological rigor and significance of the findings of included studies.

C. Result and Discussion

1. Result

The literature review revealed several key findings related to the role of social media in disseminating agronomic information and empowering farmers. First, there has been a significant increase in the adoption of social media among farmers, especially in developing countries. Platforms such as Facebook, WhatsApp, and YouTube have become the primary channels for sharing agricultural information.

Second, social media has proven effective in accelerating the dissemination of agronomic information, including the latest cultivation techniques, integrated pest management, and climate change adaptation strategies. Farmers who actively use social

media tend to adopt agricultural innovations more quickly than those who do not.

Third, the formation of virtual farmer communities through social media has increased farmers' social capital and collective capacity. Online discussion groups facilitate the exchange of knowledge and experiences among farmers, even across geographies.

Fourth, social media plays a significant role in empowering farmers by providing direct access to market information. This enables farmers to make better decisions regarding harvest times and marketing strategies for their products.

Fifth, the use of social media by agricultural extension institutions has increased the effectiveness and reach of extension services. Extension workers can reach more farmers and provide more timely advice through digital platforms.

Sixth, social media has facilitated collaboration between farmers, researchers, and policy makers. Online forums have become a discussion space to identify agricultural problems and develop joint solutions.

Seventh, it was found that visual content such as video tutorials and infographics on social media are very effective in conveying complex agronomic information to farmers with various levels of education.

Eighth, social media plays a role in promoting sustainable and environmentally friendly agricultural practices. Environmental campaigns and movements on social media have raised farmers' awareness of the importance of natural resource conservation.

Ninth, the use of social media has helped reduce the gender gap in access to agricultural information. Female farmers who previously faced barriers in accessing conventional extension services can now obtain information through digital platforms.

Tenth, despite the many benefits, the study also revealed challenges in using social media for disseminating agronomic information, including issues of information reliability, the digital divide in rural areas, and the need for digital literacy among older farmers.

2. Discussion

These findings suggest that social media has significantly changed the landscape of agricultural communication. Within the framework of Rogers' (2003) diffusion of innovation theory, social media can be seen as a communication channel that accelerates the spread of agricultural innovations. These digital platforms facilitate the stages in the innovation adoption process, from introduction to confirmation, by providing quick access to information and allowing farmers to virtually observe the experiences of their peers.

The role of social media in farmer empowerment can be analyzed using the concept of social capital proposed by Putnam (2000). Virtual communities formed through social media strengthen bonds between farmers (bonding social capital) and also build bridges between farmers and other actors in the agricultural value chain (bridging social capital). This is in line with Van Dijk's (2012) findings on how digital social networks can strengthen social cohesion and facilitate collective action.

The effectiveness of social media in the dissemination of agronomic information can be explained through the media richness theory developed by Daft and Lengel (1986). The ability of social media to combine text, images, audio, and video allows the delivery of complex information in a way that is easier to understand for farmers with various educational backgrounds. This is in line with

the principles of effective communication in the context of agricultural extension emphasized by Leeuwis (2004).

However, the challenges faced in using social media for disseminating agronomic information reflect the concept of the digital divide discussed by Van Dijk (2020). Gaps in access, skills, and use of digital technologies remain significant barriers, especially in rural areas and among older farmers. This suggests the need for a more inclusive approach and targeted capacity building strategies to ensure that the benefits of social media are equally accessible to all farmer groups.

Finally, the role of social media in promoting sustainable agricultural practices is in line with the concept of environmental communication put forward by Cox (2013). Social media provides a platform for raising ecological awareness and mobilizing collective action for environmental conservation in the agricultural sector. However, as Fuchs (2021) reminds us, it is important to remain critical of the potential for bias and manipulation of information on social media, and to ensure that these platforms are used ethically and responsibly in the context of sustainable agricultural development.

D. Conclusion

Social media has proven to be an effective tool in disseminating agronomic information and empowering farmers. These digital platforms have transformed the agricultural communication landscape by accelerating the spread of innovations, increasing access to market information, and facilitating the formation of virtual farmer communities.

However, challenges such as the digital divide and information reliability still need to be addressed to optimize the potential of social media in the agricultural sector. To maximize the benefits of social media in the agricultural context, an integrated approach is needed that involves improving digital infrastructure in rural areas, developing farmers' digital literacy, and collaboration between various stakeholders. With the right strategy, social media can be an important catalyst in transforming the agricultural sector towards a more efficient, inclusive, and sustainable system.

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