Addressing Low Digital Literacy among Rural Farmers through the AGRIKIT

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ABSTRACT

The AGRIKIT initiative addresses the persistent challenge of low digital literacy among rural farmers in Malaysia, focusing on bridging the digital divide to foster economic inclusion and sustainable agricultural practices. Digital transformation in agriculture offers smallholder farmers opportunities to enhance productivity, optimize resource utilization, and access new markets. However, barriers such as poor digital literacy, limited infrastructure, and cultural resistance hinder technology adoption. AGRIKIT, a user-friendly physical training manual tailored for rural communities, provides comprehensive guidance to enable farmers to utilize digital platforms like AgroBazaar Online effectively. By incorporating localized content and visual aids, AGRIKIT specifically targets older farmers and underserved populations, enhancing their digital engagement. This study evaluates the AGRIKIT's design, impact, and potential to transform rural agriculture, emphasizing its role in overcoming traditional barriers and promoting inclusivity. The findings highlight the need for infrastructure improvements, diverse demographic inclusion, and complementary digital tools to maximize the benefits of this innovative solution. AGRIKIT serves as a replicable model to support global efforts toward sustainable development in agriculture.

Keywords: Digital Literacy, AGRIKIT, Rural Development, AgroBazaar Online, Federal Agricultural Marketing Authority (FAMA)

INTRODUCTION

Digital transformation in agriculture has introduced opportunities for farmers to enhance productivity, optimize resource use, access new markets, and ultimately improve their livelihoods (World Bank, 2021). Technologies such as digital marketplaces empower farmers with timely and accurate information that was previously inaccessible. These advancements are particularly significant for smallholder farmers, who account for a majority of agricultural production in developing countries, including Malaysia (Food and Agriculture Organization of the United Nations (FAO), 2021). By leveraging digital platforms, smallholders can overcome traditional barriers, such as middlemen exploitation and limited market access (Hassan et al., 2022).

Despite its potential advantages, the adoption of digital technologies such as the AgroBazaar Online platform developed by the Federal Agricultural Marketing Authority (FAMA) in 2014 to specifically serve smallholder farmers in rural Malaysia remains low. This is attributed to several factors, with digital illiteracy being one of the most significant challenges. Many rural farmers, predominantly senior citizens, lack the basic skills required to navigate digital tools and applications (Ahmad et al., 2023). Furthermore, poor infrastructure, including limited internet connectivity, compounds the issue, alongside socio-cultural resistance to new

technologies (Ramli et al., 2021). These challenges contribute to a "digital divide," leaving rural populations unable to fully benefit from the opportunities presented by digital transformation.

To address this digital divide, the AGRIKIT was developed as a practical, user-friendly solution designed to meet the specific needs of Malaysian rural farmers. The kit provides a comprehensive physical book training manual tailored specifically to the needs of rural farming communities. The manual incorporates clear, user-friendly instructions, visual guides, and infographics to ensure accessibility for individuals with limited technical skills. This initiative particularly targets senior farmers and those in remote areas who encounter significant challenges in utilizing existing agricultural digital platforms (Rahman et al., 2024). By addressing these barriers, the AGRIKIT aims to enhance inclusivity and digital participation among rural farming communities.

This review aims to explore the factors contributing to low digital literacy among smallholder farmers, evaluate the design and effectiveness of the AGRIKIT, and discuss its implications for rural agricultural development. By addressing the challenges faced by rural farmers, this study underscores the potential of innovative digital solutions to foster economic inclusion and sustainable agricultural practices in underserved communities in rural areas.

CHALLENGES OF LOW DIGITAL LITERACY AMONG RURAL FARMERS

Demographics of Rural Farmers

Rural smallholder farmers in Malaysia form a significant portion of the agricultural workforce, contributing to the nation’s food security and agricultural productivity. However, this group is characterized by several demographic challenges that impede their ability to adopt digital agricultural technologies. The majority of smallholder farmers in rural areas are senior citizens, often aged 50 and above, many of whom have spent decades relying on traditional farming methods (Ahmad et al., 2023). For these individuals, limited formal education and a lack of exposure to digital tools such as smartphones and computers create significant barriers to leveraging digital platforms for agricultural purposes (Hassan et al., 2022).

Studies show that the older demographic is less likely to embrace new technology due to cognitive and physical limitations, as well as skepticism about its relevance to their livelihood (Ramli et al., 2021). This lack of familiarity with digital tools means that many farmers struggle with basic functions such as creating user accounts, navigating interfaces, or interpreting digital information, all of which are essential for utilizing digital agricultural solutions effectively (World Bank, 2021).

Additionally, the digital divide is further widened by linguistic and cultural barriers. Most digital platforms are designed with urban, tech-savvy users in mind and often lack localized content in languages or dialects spoken by rural farmers (Dhaygude & Chakraborty, 2020). This exacerbates the sense of alienation among older farmers, who may perceive digital platforms as complex and irrelevant to their farming practices (Ahmad et al., 2023). Addressing these challenges requires innovative, inclusive approaches that cater specifically to the needs and limitations of this demographic group.

Barriers to Technology Adoption

The low adoption of digital technologies among rural smallholder farmers in Malaysia can be attributed to several key barriers that hinder their ability to effectively use such tools. These barriers are interrelated and exacerbate the challenges posed by low digital literacy.

Limited Infrastructure

One of the primary barriers is the lack of reliable infrastructure in rural areas. Poor internet connectivity remains a significant challenge, with many rural farming communities experiencing limited or no access to broadband or mobile networks (Ramli et al., 2021). This lack of connectivity not only restricts farmers' access

to digital platforms but also discourages their interest in adopting technology altogether, as they perceive it as unreliable or inaccessible (World Bank, 2021). In Malaysia, efforts to expand rural broadband infrastructure have been ongoing, but progress remains uneven, leaving some regions underserved (Ahmad et al., 2023; Naseri et. al. 2024).

Complex User Interfaces

Another barrier is the complexity of existing digital platforms. Many agricultural digital tools are not designed with low-literacy users in mind, featuring interfaces that require a certain level of digital proficiency or familiarity with technical jargon. For smallholder farmers, especially senior citizens, these platforms can appear intimidating and difficult to navigate. Studies have shown that users with limited digital literacy are more likely to abandon technology that is not intuitive or user-friendly (Hassan et al., 2022).

Lack of Training

The absence of localized training programs tailored to the needs of rural farmers further compounds the problem. Effective training is essential to bridge the gap between technology availability and usage (Ahmad et al., 2023). However, most training initiatives are either generic or conducted in urban areas, making them inaccessible to rural farmers. Furthermore, training sessions often fail to account for language barriers, cultural nuances, and the specific challenges faced by smallholders (Ramli et al., 2021).

Cultural Resistance

Cultural resistance to technology adoption is another significant factor. Many rural farmers, especially older ones, are accustomed to traditional farming methods and may view technology as unnecessary or incompatible with their practices (FAO, 2021). This resistance is often rooted in a lack of awareness about the potential benefits of digital tools. Additionally, there is a fear of failure or embarrassment associated with using technology incorrectly, which can discourage farmers from even attempting to engage with digital platforms (Hassan et al., 2022).

Overcoming these barriers requires a multi-faceted approach that combines infrastructure development, user-centric design, localized training, and community engagement. AGRIKIT can help overcome these challenges by delivering training manuals in physical format, specifically tailored to the requirements of rural farming communities.

THE AGRIKIT: AN INNOVATIVE SOLUTION

The AGRIKIT is a comprehensive tool developed to address the unique challenges faced by rural smallholder farmers in Malaysia. Its features are specifically designed to overcome barriers such as low digital literacy, limited connectivity, and cultural resistance, enabling farmers to benefit from digital agricultural solutions.

Training and Support Modules

The AGRIKIT offers comprehensive training modules designed to help farmers use the platform effectively. These modules are essential for building confidence among users with limited digital skills. They include step-by-step guides, which are clear, illustrated manuals tailored specifically for non-technical users (Ali et al., 2023). The physical book training guide includes step-by-step instructions on how to operate the AgroBazaar Online platform, covering all key stages from beginning to end. These include: Registering an Account, Setting Up Profile, Managing Products, Listing Products for Sale, Managing Inventory, Setting Prices and Discounts, Communicating with Customers, Handling Queries and Feedback, Tracking and Managing Sales, Viewing Orders, Managing Payments, Generating Sales Reports, Coordinating Delivery, Tracking Shipments, and Support and Troubleshooting via the Help Center. Figure 1 shows the AGRIKIT cover page, which highlights the vibrant and user-friendly design of the manual. Figure 2 displays the AGRIKIT box, which provides protective and appealing packaging for the physical book, making it easier to distribute and store.

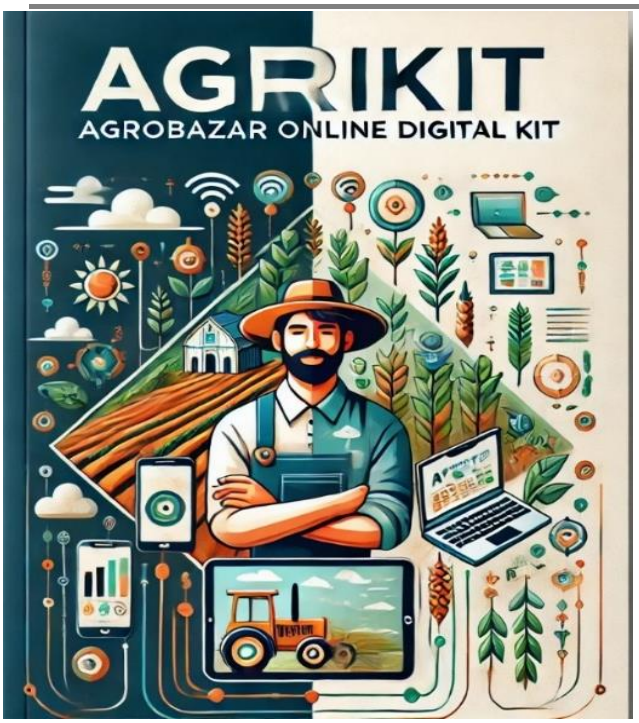

Figure 1. AGRIKIT cover page

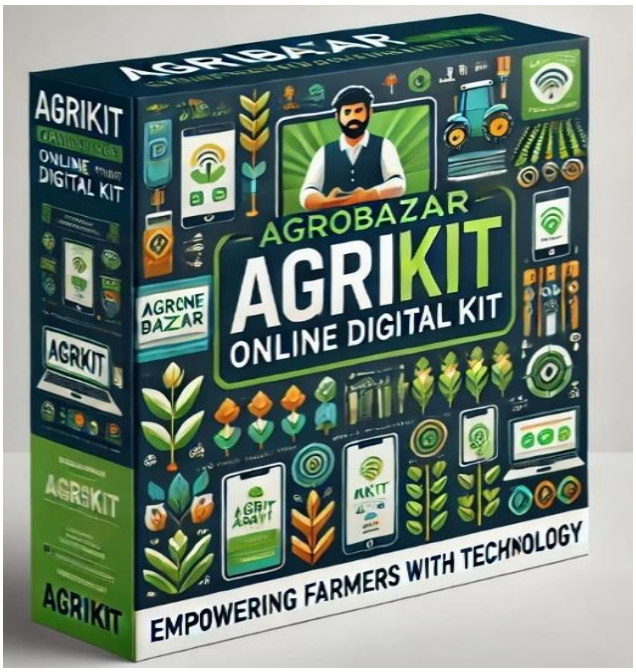

Figure 2. AGRIKIT box

IMPACT AND POTENTIAL OF THE AGRIKIT

The AGRIKIT offers a transformative approach to addressing critical challenges faced by rural smallholder farmers in Malaysia. Its innovative design and localized content enable rural farmers to overcome digital literacy barriers and adopt sustainable agricultural practices. The kit holds significant potential to bridge the digital divide and foster inclusive economic growth.

Bridging the Digital Divide

The AGRIKIT addresses critical barriers to digital literacy, creating opportunities for smallholder farmers to access digital tools and markets. By providing physical book training guide, the kit can significantly improve farmers' ability to participate in the digital economy (Ahmad et al., 2023).

The kit facilitates connections between smallholder farmers and buyers, eliminating the need for intermediaries and providing farmers with fairer prices. Studies indicate that direct market access through digital platforms can increase farmers' incomes by up to 30% (World Bank, 2021). Additionally, real-time market data allows farmers to make informed decisions about the timing and location of their sales, maximizing profitability (Rahman et al., 2023).

The inclusion of real-time updates on crop prices, weather forecasts, and farming best practices empowers farmers to optimize their agricultural activities (Ali et al., 2023). For instance, access to timely weather data helps farmers prepare for adverse conditions, reducing crop loss and improving yields.

The AGRIKIT targets marginalized groups, such as rural women and older farmers, who are often excluded from digital initiatives. Its localized training modules and content designed in local languages make the kit more accessible to underserved populations (Lim et al., 2023). This inclusivity ensures that all farmers, regardless of their education or background, can participate in and benefit from the digital transformation of agriculture through the AGRIKIT.

Promoting Sustainable Agriculture

The AGRIKIT plays a crucial role in promoting sustainable agricultural practices by providing farmers with the knowledge and tools needed to effectively operate the AgroBazaar Online Platform. This initiative supports global sustainability goals, such as those outlined by the Food and Agriculture Organization (FAO, 2023), by encouraging resource-efficient farming, reducing food waste, and enhancing market accessibility. By equipping rural farmers with essential digital skills and comprehensive guidance, the AGRIKIT contributes to the long-term resilience and sustainability of agriculture.

More than just a physical book, the AGRIKIT serves as a comprehensive guide tailored to the unique needs of rural farming communities. It empowers farmers to overcome barriers such as limited digital literacy and connectivity, enabling them to adopt sustainable practices and achieve economic growth. According to Ahmad et al. (2023), bridging the digital divide is critical for fostering inclusion and enabling smallholder farmers to compete in a rapidly digitizing agricultural economy.

By integrating simplified digital training modules with offline functionality, the AGRIKIT addresses the challenges faced by farmers in remote areas with limited access to resources. This innovative approach has the potential to transform the agricultural sector in Malaysia, making it more sustainable, inclusive, and economically viable. Furthermore, the AGRIKIT can serve as a replicable model for other regions facing similar challenges, providing a pathway for global agricultural advancement and alignment with the United Nations' Sustainable Development Goals (UN SDGs) (UN, 2022).

LIMITATION AND RECOMMENDATION

The study primarily focuses on older rural farmers, a significant segment of the farming community, but this emphasis does not capture the full diversity of farmers, particularly younger individuals or those with varied educational backgrounds. As a result, the findings have limited generalizability across the broader farming population (Ahmad et al., 2023; Hassan et al., 2022). Additionally, limited internet access and uneven broadband distribution in rural areas present substantial barriers to the effective adoption of AGRIKIT. This infrastructural gap restricts the scalability of digital initiatives and their potential impact on rural communities (Ramli et al., 2021). Moreover, while AGRIKIT’s reliance on physical book manuals is innovative and caters to less digitally literate users, it does not fully address the needs of farmers with higher digital readiness or those residing in better-connected areas. This approach highlights a gap in addressing varying levels of digital literacy among the target population (Ali et al., 2023).

To address these limitations, several recommendations are proposed for future research and development. Firstly, future studies should include a more diverse demographic, particularly younger farmers, to evaluate the scalability of AGRIKIT across different age groups and educational levels. Including a broader spectrum of participants would enhance the generalizability of the findings and ensure that the tool meets the needs of all farmers, not just older ones (Ahmad et al., 2023).

Secondly, improving infrastructure in rural areas should be prioritized through collaboration with governmental and private sectors. Enhancing internet connectivity would significantly reduce barriers to the effective adoption of AGRIKIT. Additionally, incorporating offline-compatible digital tools could provide a transitional approach for farmers in areas where connectivity remains a challenge, thereby expanding the tool's accessibility and usability (Ramli et al., 2021; Lim et al., 2023).

Thirdly, the development of complementary e-learning modules or mobile applications in local languages could greatly enhance AGRIKIT's reach. Interactive digital tools would cater to farmers with varying levels of digital literacy, providing personalized and engaging learning experiences. This approach would address the needs of farmers who are more digitally ready and reside in better-connected areas, ensuring that AGRIKIT effectively serves a wider audience (Rahman et al., 2023).

Lastly, conducting longitudinal studies to measure the sustained impact of AGRIKIT on farmers' productivity and market participation is recommended. Such studies would provide deeper insights into the tool's effectiveness over time, highlighting long-term benefits and areas for improvement. Understanding the lasting effects of AGRIKIT would help in refining the tool to better serve the farming community and contribute to sustainable agricultural development (Tripathi et al., 2024).

CONCLUSION

This study highlights the critical role of digital literacy in empowering rural smallholder farmers and bridging the digital divide in Malaysia. By addressing barriers such as poor infrastructure, cultural resistance, and low literacy levels, the AGRIKIT demonstrates potential as an inclusive tool for enhancing digital adoption in underserved communities.

The AGRIKIT’s user-friendly design and localized content offer practical solutions for overcoming traditional barriers to technology adoption. However, its impact is constrained by infrastructural challenges and the lack of complementary digital modules. Future initiatives must focus on fostering infrastructure improvements, broader demographic inclusion, and adaptive training models to maximize the benefits of digital transformation in agriculture.

In conclusion, AGRIKIT serves as a replicable model for other regions facing similar challenges, supporting global efforts to promote sustainable and inclusive agricultural practices in alignment with the United Nations’ Sustainable Development Goals (UN, 2022; FAO, 2021).

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