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Developing An Innovative Web based Agricultural Management System for Sukamaju village

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Abstract

Agriculture is a vital component of the economy and livelihoods in Indonesia, particularly in Sukamaju village, West Java, Indonesia. Many local farmers rely on traditional farming management methods, which hinder efficiency and productivity due to challenges such as manual data entry, inadequate tracking of crop yields, and limited avenues for product promotion. To address these issues, an Agricultural Management Web Application was developed to streamline the management of agricultural activities within the community. This user-friendly platform allows farmers to input and monitor essential data about their crops, thereby enhancing informed decision-making. Additionally, the application features a blog system for promoting agricultural products, helping farmers reach a wider audience and improve their sales prospects. Key objectives of the application include improving documentation and monitoring of agricultural processes, fostering community engagement through knowledge sharing, and providing promotional tools for farmers. By leveraging technology, this initiative aspires to establish a sustainable agricultural environment that supports the growth of the farming community in Sukamaju village. In the future, this application can be expanded to create a more comprehensive supply chain management system for farmers in a broader area. The feature also can be expanded so that the farmers can connect to the other players whether in the upstream and the downstream.

Keywords: Agriculture, Web, Knowledge Sharing

INTRODUCTION

Agriculture is a main sector in Indonesia, especially in the rural area. It becomes the fundamental sectors in sustainable development (Moeis et al., 2020). Unfortunately, there are a lot of problems regarding this sector that can harm its sustainability.

The first problem is the aging of the farmers where they grow older while replacement by the youth is not appropriate. In August 2020, the proportion of older workers whose age is above 60 years old is about 21.2 percent compared to 12.6 percent in 2025 (Ngadi et al., 2023). Moreover, the number of agricultural workers tends to decrease where there were 41.3 million workers in 2005 to 38.22 million workers in 2022 (Ngadi et al., 2023). The main factor that triggers this circumstance is the less attractiveness of the agricultural sector compared to other sectors for young people. It makes agriculture become the last option for the youth. Even the parents whose job is farmer will encourage their children to take other options rather than continuing to become farmer. Jobs in agriculture is identical with low job, high risk, and uncertainty (Ngadi et al., 2023).

The second problem is urbanization where people in the rural area migrate to the urban area especially for the young people. This second problem has a correlation with the first problem. The income of the farmers in Indonesia remains low so that it is difficult for them to cover their basic needs (Anandita & Patria, 2017).

The third problem in agriculture in Indonesia is related to the decline of the farmland. This circumstance makes the number of farmers also decreases as time goes (Anandita & Patria, 2017). The farmland loss occurred due to several factors. The first factor is industrialization. Industrialization changes the function of the land from agriculture to industry. It also transforms the jobs of certain people in this area from farmers to industrial workers. (Moeis et al., 2020). The second factor is the transformation of the farmland to the residential area. As the population grows, the need for housing also increases and for farmers, selling their land is more promising rather than keeping their land for agriculture (Anandita & Patria, 2017). The massive growth of

tourism put pressure for traditional farming as the farmland changes to tourism objects (Ghadami et al., 2022).

The utilization of technology plays an important role in resolving this problem. This technology includes digitalization. Overall, the objectives are increasing productivity, minimizing uncertainty, and reducing risk. There are a lot of studies in the implementation of information technology in the agricultural sector. Digitalization also plays an important role in creating sustainable farming (Giagnocavo et al., 2025). The stakeholders, especially farmers, can take benefits, such as knowledge exchange, information sharing, and so on. The rise of internet of things and deep learning may enhance the efficiency (Liang et al., 2025).

This circumstance also occurs in Sukamaju village, West Java, Indonesia. According to recent agricultural production statistics, the overall output for the sub-sectors of food crops, horticulture, and plantations in Bandung Regency reached 1.3 tons annually (Dinas Pertanian (DISTAN) Kabupaten Bandung, 2024). This data emphasizes the significance of agriculture in the local economy and underscores the potential for growth and innovation in farming practices.

Table 1. Production of agricultural sub-sector commodities (food crops, horticulture, plantations) (tons) Bandung Regency

Agriculture Sub-sector	Annually Production (Ton)		
	2021	2022	2023
Food Crops	883.513,81	921.978,74	773.520,10
Horticulture	479.867,41	495.219,66	525.018,36
Plantations	12.412,15	13.150,56	13.690,54

However, many farmers in this region still rely on traditional methods for managing their agricultural activities. The absence of a centralized platform for sharing agricultural knowledge and experiences restricts community engagement and collaboration among farmers. Digitalization has emerged as a vital tool for modernizing management practices across various sectors, including agriculture (Kovalev & Kostomakhin, 2023).

To address these challenges, the development of a dedicated web application for agricultural management is proposed. This application aims to centralize the management of various agricultural processes, providing farmers with a user-friendly interface to input and monitor essential data related to their crops. Additionally, the application features a blog system designed to facilitate the promotion and marketing of agricultural products, allowing farmers to reach a broader audience and improve their sales outcomes (Halvorsen, 2019).

In this context, the primary objectives of the agricultural management web application include improving the documentation and monitoring of agricultural activities, enhancing community engagement through shared knowledge, and equipping farmers with promotional tools. By leveraging technology, this initiative aspires to foster a more sustainable and prosperous agricultural environment in Sukamaju village, ultimately supporting the growth of its farming community.

METHOD

This work is a part of the community service project that is handled by Telkom University, Indonesia. This work is granted under “Desa Binaan” scheme, and this project runs in 2025 period. It is conducted in three phases: initial survey, web development, and socialization.

The first phase is conducted to gather initial information about Sukamaju village, including the geographical and demographic aspects. This survey also investigates the business process of farming in Sukamaju village. Moreover, the survey is important to collect the needs and the unresolved problems that are faced by the farmers.

The second phase is web development. The features of this application are built based on the needs that have been collected in the first phase. This application was developed by the computer engineering students at Telkom University. The web-based application was chosen due to its flexibility and easiness to operate using smartphone.

The third phase is the implementation and socialization of the application. This phase plays a critical role in ensuring the success of the implementation and collecting feedback from the users. The development and implementation of the agricultural management web application were guided by a systematic approach aimed at ensuring effective usage and maximum community impact in Sukamaju village.

Regular socialization sessions were conducted for farmers and local officials to familiarize them with the features of the agricultural management web application. These sessions aimed to enhance their understanding of the application, ensuring that users can make the most of its functionalities. By

addressing potential barriers to technological adaptation, these trainings fostered a more versatile and confident user base in the community.



Figure 1. Socialization of the web-based application

To empower farmers, there was a strong emphasis on encouraging active participation from farmer groups in managing their agricultural data within the application. By allowing farmers to input and monitor information about their crops, land, and harvests, the application promoted a sense of ownership. This involvement not only increases the accuracy of the data collected but also helps to create a more engaged community.

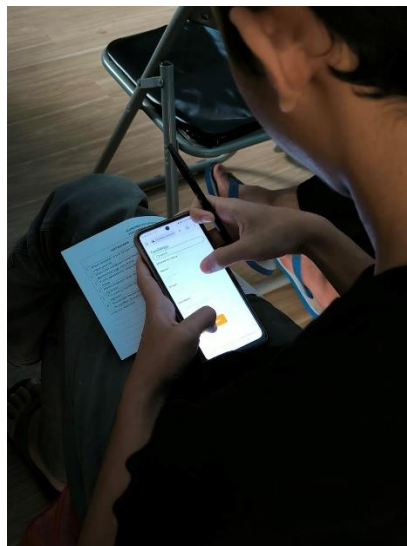


Figure 2. Hands-On Experience by Farmers

A structured system for routine monitoring and evaluation was established to assess the effectiveness of the application. This evaluation process involved local officials, farmer groups, and other relevant stakeholders to ensure that the application met the needs of the community and produced positive results. Regular feedback was essential in making necessary adjustments and improvements to the application.

RESULTS AND DISCUSSION

Farmer Aspirations for Broader Implementation

One of the main results from the feedback sessions was the farmers' expressed desire for the application to be adapted for use in other villages. This expansion would promote a wider reach for the application. It also enables a collective effort to improve agricultural practices across multiple communities. Farmers indicated that having access to agricultural data from peers in different areas would foster healthy competition. They believe that being able to compare harvest data could stimulate better performance, innovation, and productivity among farmers, ultimately elevating the overall standard of agriculture in the region.

Knowledge and information sharing is important especially for the current market price and supply. As is known in common, the market price is constructed by the supply-demand balance. It means that knowing the harvesting dynamics in other regions is critical so that the farmers can decide the

destination of their own harvesting product. Moreover, they can take critical measures, especially when facing very low market price that can destroy their farming effort.

Importance of Ongoing Evaluation and Adaptation

Farmers emphasized the necessity of regular evaluation of their progress and evolving needs. Continuous monitoring of the application's functionalities and the farmers' engagement is crucial for adapting the application to better serve its users. This feedback loop will ensure that the application remains relevant and effective in addressing the actual challenges faced by the farming community in Sukamaju village. Stakeholders must prioritize routine assessments and make iterative improvements based on the changing dynamics of agriculture and farmer requirements.

Continuing monitoring and assistance are important to keep the farmers using this application. As is known in common, many community service projects failed due to the lack of continuous adoption by the users. It is not because the innovation is bad, but because the users stop using the innovation.

Future Directions

In the future, the implementation of information technology, or in other word digitalization in Sukamaju Village, can be conducted on several tracks. The first track is expanding the features to become a fully integrated and comprehensive supply chain for farming.

In the downstream path, developing a marketplace for farming will be a potential work. The adoption of marketplace or e-commerce for agriculture product has been done in several regions, such as in Wuchang city, China (He et al., 2024) and in sub-Saharan countries (Morepje et al., 2024). The question is that whether a new marketplace should be built or the education for farmers to enter the existing marketplaces that is also enhanced with the promotion through social media as also have been conducted by small farmers in Jordan valley area (Al-Shaikh et al., 2023).

In the upstream, the channeling with suppliers is also important. This supply can be seed, fertilizer, and others. The collective purchasing is necessary so that the quantity can be big enough to request lower prices. A more discounted price for supplies is important for farmers, especially the small farmers so that their profit is still appropriate.

Looking ahead, a strategic approach is required to address the needs expressed by the farmers. This includes planning for the gradual rollout of the application in other villages and incorporating the requested features, such as price prediction tools. Engaging with agricultural economists and data analysts will be essential to develop these functionalities effectively (Harshith et al., 2023).

Furthermore, establishing partnerships with local agricultural organizations could facilitate the expansion of the application's reach while contributing to community sustainability. Continuous feedback and collaborative efforts among farmers, local officials, and developers are paramount for maximizing its potential and achieving long-term advancements in agricultural management.

CONCLUSION

The implementation of the agricultural management web application marks a significant step toward enhancing agricultural practices in Sukamaju village. The primary aim of the application—to facilitate efficient management of agricultural data—has been successfully met, benefiting both farmers and local agricultural administration. Feedback from the farmers has underscored the application's potential beyond its initial scope. There is a palpable interest in expanding the platform to include other villages, which would enhance competition and foster knowledge sharing among a broader farming community. This desire highlights the role of the application as a catalyst for regional agricultural innovation and collaboration. The agricultural management web application has the potential to transform agricultural practices in Sukamaju village and beyond. Moving forward, it is crucial to leverage the insights gained from the initial implementation to refine the application's features and expand its reach. By fostering a culture of collaboration and innovation, the application can play a pivotal role in enhancing the livelihood of farmers and strengthening the agricultural framework in the region.

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