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# Improving the Capacity of Rice Farmers Through Micro-Business Management and Information Technology Training in Pematang Johar Village

**Elisabeth Nainggolan[1], Joni[2], Widalicin Januarty[3], Najla[4], Loo Teck Khun[5], Phan Bao Giang[6], Annisa I. Hafifa Siregar[7]**
[1,3,7] Sekolah Tinggi Ilmu Ekonomi Eka Prasetya, [2] STMIK TIME, [4] Universitas Syiah Kuala, [5] UOW Malaysia KDU UC Penang, [6] Universiy of Economics and Finance, Ho Chi Minh (UEF) Vietnam
**Corresponding author*
E-mail: elisabeth.golan@gmail.com (Elisabeth Nainggolan)*

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***Abstract:*** *This community service activity aims to improve the capacity of rice farmers in Pematang Johar Village through micro-business management training and the use of information technology in agricultural activities. Farmers' low business management skills and limited access to agricultural information are major obstacles to increasing productivity and income. The activity was implemented through socialization, training, mentoring, and evaluation. The results showed an increase in farmers' understanding of farm management, simple financial record keeping, and the ability to use Android-based agricultural applications. This activity encourages farmers to manage their farms more efficiently, transparently, and sustainably.*

**Keywords:** *Community Empowerment; Information Technology; Micro-Business Management; Rice Farmers*

## Introduction

Agriculture is a megasector that plays a vital role in the Indonesian economy due to its strategic contribution to food security and the national economy (Hasibuan et al., 2022). Food security is a condition where food is available to meet everyone's needs, both in terms of quality and quantity, at all times, for survival and productivity (Salasa, 2021). Food security itself is part of national stability; therefore, a strong agricultural sector protects the community from disruptions to food supplies, rising food prices, or food imports. In addition to its role in food production, agriculture is crucial for the national economy, particularly in terms of employment. The gaming sector is a key strategy for creating jobs, but agriculture's contribution to Gross Domestic Product is relatively low (Lasaksi, 2023). In the first quarter of 2025, agriculture contributed 10.52% to national GDP (Kusuma, 2024).

Indonesia's agricultural sector contributes relatively little to GDP due to its low productivity, primarily due to the dominance of smallholder farmers with limited land and limited use of modern technology, mechanization, and supporting infrastructure. At the same time, Indonesia's economic structure is shifting toward manufacturing and services, which have significantly higher added value, leaving agriculture lagging behind in economic growth. The added value generated from agriculture also tends to be small because most products are sold in their raw form at fluctuating and often low commodity prices. Furthermore, land fragmentation, land conversion, low private investment, and high dependence on natural factors hinder consistent productivity increases. This combination of factors means that agriculture plays a significant role in absorbing labor, but its contribution to GDP remains limited.

Indonesia's most needed agricultural commodity is rice, which is processed into rice as it is a staple food for the nation. This demand is increasing due to population growth (Hidayat, 2021). However, the quality and quantity of rice farming production are currently quite low, forcing the government to import rice from abroad to meet national food needs (Sulastri et al., 2022).

The lives of rice farmers in Indonesia still face various challenges that contribute to their relatively low welfare. The majority of farmers are smallholders with limited land holdings, often less than one hectare, so the income generated is not commensurate with the amount of labor and time devoted. Agricultural productivity is also limited because the use of modern technology, mechanization, and efficient production facilities is not evenly distributed, while the costs of fertilizer, seeds, and pesticides continue to rise. This condition is also being experienced by farmers in Pematang Johar Village. Pematang Johar Village, Labuhan Deli District, Deli Serdang Regency, is known as one of the rice production centers in North Sumatra. The majority of the village community works as rice farmers using traditional farming systems. Farmers in Pematang Johar Village have a relatively low level of business management literacy and minimal use of digital technology, resulting in suboptimal productivity and added value of their harvests.

The low utilization of digital technology is characterized by the generally inadequate level of technology adoption by Indonesian farmers (Alta, 2023). According to data from the Central Statistics Agency (BPS), only around 13% of farmers use the internet for agricultural activities. This indicates that digital literacy among farmers remains low, particularly among older farmers with low levels of formal education. In facing the digital era, farmers are expected to be proficient not only in cultivation techniques but also in managerial and information technology skills. Good micro-business management can help farmers manage finances, calculate

production costs, and determine marketing strategies. Meanwhile, information technology can be used to access information on market prices, weather, fertilizers, and the latest agricultural innovations.

Poor business management and suboptimal utilization of digital technology will be inhibiting factors in the agricultural sector, impacting productivity and cost efficiency, which are still suboptimal due to the inability to analyze the business. Furthermore, it will impact competitiveness and added value. Farmers who do not utilize digital technology will struggle to compete in the current agribusiness era, which increasingly follows a more open market pattern and will struggle to obtain added value or open digital market access. In the digital era, a number of public facilities are required to provide convenience for the public (Januarty et al., 2023) . Trade openness for Indonesian agriculture has encouraged increased agricultural exports, but competition with imported products has reduced the prices and competitiveness of local agricultural products (Febrina et al., 2024)

Therefore, this community service activity focuses on improving the capacity of rice farmers through micro-business management and information technology training. This activity is expected to help farmers manage their farms professionally, adapt to technological developments, and increase family incomes.

## Methods

This community service activity was conducted in Pematang Johar Village, an international community service program. The program collaborated with lecturers from Syiah Kuala University, UOW Malaysia, KDU UC Penang, and the University of Economics and Finance, Ho Chi Minh City (UEF), Vietnam. Thirty farmers from local farmer groups participated in the activity. The implementation method involved the following stages:

1. **Activity Socialization**

   The implementation team coordinated with village officials and farmer groups to explain the activity's objectives and identify training needs.

2. **Micro Business Management Training**

   The material presented includes basic concepts of farm management, simple financial record-keeping, cost and revenue analysis, and harvest marketing strategies. The course is delivered through interactive lectures, group discussions, and farm case simulations.

3. **Information Technology Training**

   Participants were trained to use smartphones to access agricultural

information through digital applications such as PetaniGo, SiGap Pangan, and TaniHub. They were also taught how to create email accounts and use Google Sheets to record production results.

4. **Field Assistance**

   Lectures and students conduct regular field visits to help farmers apply training results in their daily business activities.

5. **Activity Evaluation**

   Evaluation was conducted through pre-tests and post-tests to measure increases in knowledge, as well as in-depth interviews to assess changes in behavior and application of the material in the field.

## Results

This community service program significantly impacted the capacity of rice farmers in Pematang Johar Village. After the training, farmers demonstrated improved managerial skills, including simple bookkeeping, production cost identification, and capital planning. Eighty percent of participants were able to independently record their finances, while 70% were able to develop seasonal business plans. Farmers' digital literacy also improved, as evidenced by their use of financial recording applications, online access to price information, and the use of WhatsApp Business for marketing. Sixty-five percent of participants began using digital applications and 40% utilized social media for product promotion.

Furthermore, this activity successfully increased production cost efficiency by 5–10% through structured recording and digital comparison of fertilizer prices. The establishment of the Pematang Johar Farmers WhatsApp group also strengthened communication and collaboration networks in sharing market information and coordinating collective purchasing. The increased farmer confidence was also evident in their ability to make data-driven decisions, manage their businesses more professionally, and utilize technology to support their farming efforts. Overall, this community service has made a significant contribution to modernizing and strengthening farmers' capacity in managing rice farming.


Figure 1. Photo of the PKM lecturer and student team

## Discussion

### Improving Knowledge of Micro-Business Management

The training provided demonstrated an increase in rice farmers' knowledge of the basics of micro-business management. Successful business management requires sound business management techniques (Setyowati et al., 2024). Prior to the training, the majority of participants had not implemented systematic financial record keeping, lacked a business plan, and had not conducted a structured cost-benefit analysis. Financial reports were designed simply to meet the needs of MSMEs without compromising official regulations and standards (Santoso & Widowati, 2021). After the training, farmers were able to prepare simple financial records. This increased capacity was evident in the evaluation results, which showed that 80% of participants were able to independently prepare simple bookkeeping.

### Information Technology Skills Improvement

Information technology training has had a significant impact on farmers' digital capabilities. Before the training, most farmers only used mobile phones for basic communication. After the service, farmers are able to use simple digital financial

recording applications such as BukuWarung. BukuWarung is a business financial recording application that offers various attractive features, such as transaction recording, accounts receivable and payable, business reports, sending invoices via WhatsApp, and digital payment features. BukuWarung is suitable for start-up MSMEs and can be used offline (Dealls, 2025). In addition, farmers can access information on grain and fertilizer prices through online platforms and farming groups and have begun utilizing social media and WhatsApp Business to sell grain and rice directly to consumers or agents, thereby reducing reliance on middlemen. The mentoring program showed that 65% of participants have begun using digital applications for record-keeping, and 40% have uploaded or promoted their products through social media.

**Increased Efficiency and Productivity**

Through an understanding of business management and information technology, farmers demonstrate efficiency in fertilizer and pesticide use due to better control of cost records and the ability to compare agricultural input prices across multiple retailers through digital platforms. Furthermore, farmers are able to better plan crops based on the previous season's financial data. Initial impacts seen within a single cropping cycle indicate a 5–10% reduction in production costs, particularly in fertilizer purchases and transportation.

**Establishing a Digital-Based Farmer Network**

This community service activity also led to the formation of the Pematang Johar Farmers WhatsApp Group, which is used to share information on market prices, fertilizer availability, and weather, coordinate collective agricultural input purchases to obtain lower prices, and communicate with agricultural extension workers and training resource persons. This network accelerates the flow of information and strengthens farmers' bargaining power in negotiations with distributors or middlemen.

**Increasing Farmers' Confidence and Independence**

Through training and direct mentoring, farmers feel more confident in managing their businesses professionally, making data-driven decisions, and adopting technology to support their farming efforts. Final interviews showed that 85% of farmers felt better prepared to deal with changing market prices and more independent in managing their businesses.

**Social and Economic Impact on Villages**

Community service activities provide extensive benefits to the Pematang Johar Village community, including increased business and digital literacy. They also offer the potential to strengthen the local economy through increased production efficiency

and foster entrepreneurial spirit, particularly among farming families involved in digital marketing. This training is expected to lay the foundation for digital agribusiness development in the village and encourage farmers to integrate into modern supply chains. In the long term, this service is also expected to have an impact in supporting the Pematang Johar Village government program, especially in providing excellent service to every business actor in Pematang Johar Village (Manik, D. E. M., Gultom, P., & Nainggolan, 2022)

## Conclusion

A community service activity themed "Improving the Capacity of Rice Farmers through Micro-Business Management and Information Technology Training" successfully improved the skills of farmers in Pematang Johar Village. Farmers were able to manage their farms more systematically and utilize digital technology in agricultural activities. To maintain the sustainability of the activity's results, it is recommended that further mentoring and the establishment of a digital farming business unit under the coordination of farmer groups and the village government be carried out. The synergy between universities and the community is expected to continue to strengthen the rural economy based on modern agriculture.

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