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Strengthening Transportation Access and Marketing for Empowering Coffee Farmers in Aceh Jaya

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ABSTRACT

The Community Service Program (PKM) in Gampong Sabet, Jaya District, Aceh Jaya Regency, aims to address accessibility issues and enhance the economic capacity of coffee farmers hindered by geographic conditions. The choice of this topic is important due to the transportation difficulties faced by the community, especially during the rainy season, which obstructs the distribution of harvests. The methods applied include socialization, needs identification, management and marketing training, and the construction of a river crossing raft. The results show a significant increase in transportation access and the farmers' managerial capabilities in marketing their products. This program not only empowers the community but also offers practical solutions to local challenges, making it important to continue and develop further in the future.

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INTRODUCTION

Jaya District in Aceh Jaya Regency covers an area of 324 km² with a population of 7,476 people, consisting of 3,835 men and 3,641 women. The Human Development Index (HDI) in this region is 69.84 (Central Bureau of Statistics, Aceh Jaya Regency, 2022). One of the villages in the district is Gampong Sabet, located at an altitude of 709 meters above sea level (Indonesia Village Data Center, 2019). This village has a tropical rainforest climate that supports coffee farming as the main livelihood of the community.

Gampong Sabet has significant potential for coffee plantations, covering an area of 749 hectares (Central Bureau of Statistics, Aceh Jaya Regency, 2022). The geographic condition of the village is affected by a river that separates areas, impeding transportation access for coffee farmers to their plantations. Coffee is the main commodity supporting the local economy. During the rainy season, this challenge becomes more severe, further impeding harvest distribution and endangering farmer's safety. According to the Central Bureau of Statistics (2022), coffee farmers' income levels remain low due to limited accessibility and inadequate business management knowledge.

FIGURE 1. Geographical setting of Gampong Sabet

Socially, the community in Gampong Sabet has strong social cohesion and mutual support, but limited access to information and technology. Economically, coffee is a flagship commodity with high market value but has not been optimally utilized. This service activity aims to optimize this potential through a collaborative approach involving all stakeholders.

The main problems are: (1) access to farmland is often hindered by strong river currents, especially during the rainy season. The absence of safe and reliable river-crossing transportation poses a high risk to farmers' safety and affects agricultural activities; (2) limited market access makes it difficult for farmers to optimally sell their harvests, resulting in low productivity and income. Solutions are therefore needed to improve accessibility and enhance farmers' managerial capabilities.

This program aims to (1) empower the Gampong Sabet community by providing safe river-crossing transportation and (2) improve farmers' capacity in developing market access to enhance the coffee

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farmers' economy. This activity is a downstream application of previous research focusing on local economic empowerment through technology and training. By combining research outcomes and practical experience, it is expected to create a sustainable impact for the Gampong Sabet community.

The development of facilities and infrastructure, particularly transportation infrastructure, is a key factor in improving accessibility and supporting local economic growth (Rani et al., 2021). Infrastructure development plays a vital role in enhancing community welfare. The construction of necessary facilities such as river-crossing raft technology in Gampong Sabet is essential to facilitate economic activities and improve accessibility for rural communities.

Several previous studies have shown that transportation access significantly contributes to agricultural productivity in rural areas, where improved accessibility enables farmers to market their produce more efficiently (Nugroho & Sari, 2021). Wulandari et al. (2020) also emphasized that adequate transportation access can enhance the efficiency of agricultural marketing in remote areas.

Marketing efficiency is one of the key factors determining the success of agricultural enterprises, particularly for robusta coffee, which is a flagship commodity in many regions. According to Simorangkir & Rosiana (2020), analyzing the marketing efficiency of robusta coffee can assist farmers in increasing income and expanding market access. Therefore, marketing management training is essential for improving the business performance of local coffee farmers.

Other studies have also highlighted the importance of business and marketing management training, which has been proven to improve the performance of agricultural enterprises (Andriani & Rahman, 2019; Arifin et al., 2020). Previous community service programs have demonstrated the positive impacts of providing training and infrastructure on improving the welfare of communities in remote areas (Husna et al., 2022). Economic empowerment can also be achieved through the utilization of local resources processed into value-added products (Armiati et al., 2024).

The use of technology that is well-suited to local conditions is crucial for increasing productivity and community welfare, particularly in regions with geographical challenges. For instance, Nita et al. (2024) demonstrated that the implementation of conservation agriculture technology on sloped land effectively improved the productivity and welfare of farmers in the area.

METHOD

According to Setiawan & Fauzi (2020), in their study on the use of crossing rafts, such technology provides safer and faster access, particularly for communities living in remote areas with limited transportation infrastructure. One example of simple technological innovation that can be utilized to improve transportation accessibility is the use of affordable and readily available local materials, such as fiber drums and wood, for constructing river-crossing rafts in Gampong Sabet. The use of local materials like plastic drums has been proven effective in enhancing transportation access in remote areas. Plastic drums offer a practical and sustainable solution to meet community transportation needs (Yermi, 2017). Furthermore, the use of recycled materials, as described by Amiruddin et al. (2014), presents an innovative and environmentally friendly approach to raft construction.

The community service activities in Gampong Sabet were carried out using a collaborative and participatory approach, consisting of several key stages:

a. Problem and Needs Identification

   The service team conducted a preliminary survey to identify issues related to transportation accessibility and the training needs in business management and marketing for coffee farmers. Data were collected through interviews with farmers and field observations.

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b. Intervention Design:

Based on the survey results, two main interventions were designed: building the river-crossing raft and providing training in business management and marketing. The raft was built using local materials with community involvement to ensure sustainability.

c. Intervention Implementation

1. The raft, made of fiber and wood, was constructed in collaboration with students and local residents. The construction process adhered to sound civil engineering principles, including safety considerations (Fig. 2).
2. The management and marketing training was delivered by lecturers and students over a two-day period, covering topics such as production planning, financial management, and marketing strategies.

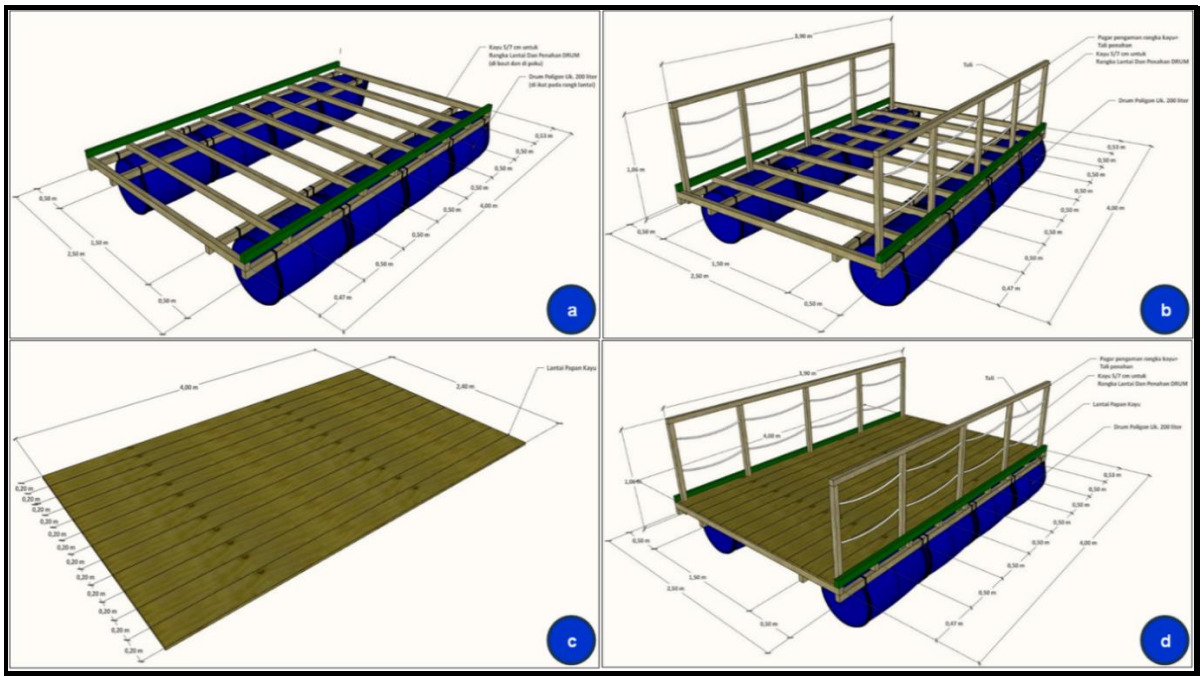

FIGURE 2. Stages of raft construction

To assess the effectiveness of the community service activities, several evaluation tools were employed:

a. Pre- and Post-Activity Questionnaires:

Questionnaires were designed to evaluate changes in farmers' knowledge, attitudes, and skills before and after the training. The questions focused on aspects of business management and marketing comprehension.

b. Performance Indicators:

This included transportation accessibility, the number of trips made using the raft, travel time, and the volume of harvests successfully distributed to the market.

1. Improvement in Managerial Capacity

Measured by the average scores from questionnaires assessing management knowledge before and after the training sessions.

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2. Economic Improvement

   Assessed by comparing coffee sales turnover before and after the training, based on data reported by the farmers.

An effective marketing pattern is essential to the success of agricultural enterprises, particularly in the case of coffee, which remains one of the key commodities in Aceh. Previous studies have shown that the dynamics of coffee marketing patterns greatly influence the welfare of coffee farmers in major production areas (Rosiana, 2020). Therefore, the development of marketing strategies is crucial in improving the economic well-being of the coffee farming communities targeted by this program.

The level of program success was assessed through both quantitative and qualitative analyses:

a. Quantitative Analysis

   Data collected from the questionnaires were analyzed using descriptive statistics to evaluate changes in knowledge and skills. A comparison of sales data before and after the training was conducted to measure the economic impact.

b. Qualitative Analysis

   In-depth interviews were conducted after the activities to understand changes in community attitudes, social interactions, and cultural dynamics. This provided insights into the community's perception of the benefits of the raft and the training.

Through this mixed-method approach, the program is expected to result in significant improvements in transportation accessibility, managerial capacity, and farmers' income. Periodic evaluations will also be conducted to ensure the program's sustainability and to allow for any necessary adjustments.

RESULT AND DISCUSSION

The community service program implemented in Gampong Sabet successfully introduced river-crossing raft technology and provided management and marketing training to coffee farmers. These activities have delivered added value both economically and socially, while also improving transportation accessibility in the area.

The raft, constructed from locally available materials namely fiber and wood has proven effective in enhancing access for coffee farmers to cross the river. Prior to the raft's installation, many farmers experienced significant difficulties transporting their harvests to the market, especially during the rainy season. Following the raft's implementation, crossing time was reduced by up to 50%, and the number of trips to transport harvests doubled from approximately five to ten times per week.

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(a) (b)

FIGURE 3. (a). Preparation of HDPE drums as flotation units. (b). The raft structure is formed by Integrating the drums into a timber frame

The training provided to the farmers covered business management techniques and marketing strategies. Post-training questionnaires indicated a 40% increase in knowledge related to business management. Previously, many farmers relied on traditional marketing methods; now they are able to market their coffee more effectively, leading to a noticeable increase in sales revenue.

The success of this community service initiative was measured using key progress indicators: accessibility (for example, the frequency of raft uses and reduced travel time), capacity building (improvement in management knowledge scores pre- and post-training), and economic improvement (increase in coffee sales after program implementation). This initiative offered several advantages. First, the introduction of the river crossing raft provided a technological solution that directly addressed local needs and geographical constraints. Second, the practical training sessions immediately enhanced the farmers' business and marketing skills. However, the program also faced certain limitations. The primary issue observed was resource constraints some farmers had difficulty accessing modern marketing technologies due to limited devices and internet connectivity. Furthermore, the raft's long-term sustainability could be affected by extreme weather conditions, so a maintenance plan is required to ensure its safe operation under harsh weather. Finally, the initiative's reliance on external funding raises concerns about continuity; without sustained financial support or community-based funding, maintaining the raft and follow-up training activities will be challenging in the long term.

The implementation process faced challenges, particularly unpredictable weather conditions. However, strong collaboration among students, lecturers, and the local community ensured the smooth execution of the program. The potential for further development is highly promising. Diversifying coffee products such as producing ground coffee or packaged products can add value and expand market reach. Moreover, continued assistance in raft operation and business management training will help improve the program's long-term sustainability.

Visual documentation of the program illustrates the raft construction process, training activities, and community use of the raft. These images provide evidence of the program's direct impact and highlight community involvement at every stage of the activity. Notably, although the farmer group in Gampong Sabet consisted predominantly of men, women in the community were also actively involved in the program particularly during the socialization phase and in supporting post-harvest activities such as coffee bean drying. This inclusive participation ensured that both male and female community members benefited from and contributed to the agricultural empowerment efforts.

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FIGURE 4. Marketing management training session

The table below illustrates changes in coffee sales turnover before and after the training.

TABLE 1. Sales turnover

Month	Turnover Before (Rp)	Turnover After (Rp)	Percentage Increase (%)
June	2.500.000	4.500.000	44
July	2.500.000	5.000.000	50
August	2.500.000	6.000.000	58

Furthermore, the improved transportation access and training provided by this program have started to positively impact the welfare of farming households. Farmers have reported that higher coffee sales and easier market access have increased their incomes, enabling them to better support their families and invest in their farms. This suggests that the program's economic benefits extend to improving overall household living standards in the community.

This community service program has not only delivered short-term benefits but also opened opportunities for long-term sustainable development for the residents of Gampong Sabet. The program aligns with the findings of Hidayat & Permana (2018), who demonstrated that the implementation of simple technologies can enhance the local economy, especially in areas with limited accessibility.

Additionally, the improvement of coffee farmers' capacity through training in innovative coffee processing technologies as conducted by Kusuma & Yulianto (2021) has had a positive impact on product

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quality and market access. Jaya et al. (2018) also emphasized the importance of community empowerment in enhancing market access and promotional strategies, particularly for specialty coffee. Pratiwi et al. (2019) highlighted that marketing higher-value coffee derivative products, such as robusta coffee, can contribute significantly to farmers' welfare in agricultural regions. Efforts to diversify coffee-based products are consistent with the marketing strategies applied by Fadhiela & Roslita (2023) in the Gayo coffee business in Aceh, where product diversification successfully opened wider market opportunities.

Thus, the application of appropriate technology and improved management practices is an effective strategy to enhance community productivity. Advancements in production technology and management have proven to increase efficiency, improve product quality, and expand access to broader markets (Nurrahmawati et al., 2024).

CONCLUSION

Based on the outcomes of the community service program implemented in Gampong Sabet, the following conclusions can be drawn:

1. The implementation of the river-crossing raft successfully improved accessibility for coffee farmers by reducing the time and difficulty associated with distributing their harvests.
2. The raft, constructed using fiber materials, demonstrated both relevance and sustainability by addressing the region's geographical challenges.
3. Business management and marketing training enhanced farmers' knowledge and skills, which was reflected in increased sales and their improved ability to access broader markets.
4. Limited access to marketing technology remains a challenge in raft operations and product marketing.
5. Diversification of coffee-based products and continued mentoring in marketing could serve as effective strategies for increasing added value and ensuring the economic sustainability of coffee farmers in Gampong Sabet.
6. Further collaboration with government bodies and business partners is necessary to support the sustainability of the program and to improve infrastructure that can facilitate the local community's economic activities.

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