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TRANSFORMATION OF ACEH TENGGARA COCOA FARMERS THROUGH GAP AND APPLICATION-BASED PRICE INFORMATION SYSTEM

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Abstract

Cocoa is a strategic commodity in Southeast Aceh Regency, but farmer productivity and income remain low due to limited implementation of Good Agricultural Practices (GAP) and poor access to price information. This community service activity aims to improve farmers' capacity through an integrated approach that combines improving cocoa cultivation knowledge, strengthening the implementation of GAP, and utilizing real-time cocoa price information applications. The activity was carried out in December 2025 through stages of socialization, technical training, field demonstrations, introduction to price applications, as well as mentoring and evaluation. The results of the activity showed an increase in farmers' knowledge levels from low to medium to high, especially in terms of price information. Initial improvements in GAP adoption were reflected in pruning, fertilization, garden sanitation, pest control, and harvesting and post-harvesting practices that were more in line with standards. Access to price information shifted from dependence on middlemen to the use of applications and market comparisons, which increased farmers' independence in determining the time of sale. The price range difference between farmers and market references confirms that limited information weakens farmers' bargaining position. Overall, the integrated approach has proven relevant in improving farming efficiency and strengthening the basis for increasing cocoa farmers' income, although the sustainability of the impact requires continued assistance and strengthening of farmer institutions.
Keywords: *Cocoa; Community Service; Farmer Income; Good Agricultural Practices; Price information.*

Abstrak

Kakao adalah komoditas strategis di Kabupaten Aceh Tenggara, namun produktivitas dan pendapatan petani tetap rendah karena terbatasnya penerapan Cara Bertani yang Baik (GAP) dan akses informasi harga yang buruk. Kegiatan pengabdian masyarakat ini bertujuan untuk meningkatkan kapasitas petani melalui pendekatan terpadu yang menggabungkan peningkatan pengetahuan budidaya kakao, penguatan penerapan GAP, dan pemanfaatan aplikasi informasi harga kakao secara real-time. Kegiatan ini dilaksanakan pada bulan Desember 2025 melalui tahapan sosialisasi, pelatihan teknis, demonstrasi lapangan, pengenalan aplikasi harga, serta pendampingan dan evaluasi. Hasil kegiatan menunjukkan peningkatan tingkat pengetahuan petani dari rendah ke sedang ke tinggi, terutama dalam hal informasi harga. Peningkatan awal dalam penerapan GAP tercermin dalam pemangkasan, pemupukan, sanitasi kebun, pengendalian hama, serta praktik panen dan pasca panen yang lebih sesuai dengan standar.

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Akses terhadap informasi harga bergeser dari ketergantungan pada perantara ke penggunaan aplikasi dan perbandingan pasar, yang meningkatkan kemandirian petani dalam menentukan waktu penjualan. Perbedaan rentang harga antara petani dan referensi pasar mengonfirmasi bahwa informasi yang terbatas melemahkan posisi tawar petani. Secara keseluruhan, pendekatan terpadu telah terbukti relevan dalam meningkatkan efisiensi pertanian dan memperkuat dasar untuk meningkatkan pendapatan petani kakao, meskipun keberlanjutan dampaknya memerlukan bantuan berkelanjutan dan penguatan kelembagaan petani.
Kata Kunci: Kakao; Pengabdian Masyarakat; Pendapatan Petani; Praktik Pertanian yang Baik; Informasi Harga.

1. INTRODUCTION

Cocoa is one of the strategic plantation commodities in Southeast Aceh Regency that contributes significantly to the economy of farming households. This commodity serves as the main or additional source of income for most rural communities (Assauwab et al., 2025; Handayani & Habibie, 2022; Saputro & Sariningsih, 2020). However, this economic contribution has not been optimally reflected in the welfare of farmers (Okpratiwi et al., 2018). The productivity of cocoa plantations and the income generated are still relatively low when compared to the agroecological potential of the region and the available market opportunities (Akbar et al., 2015; Sardani et al., 2025).

Low productivity and income among cocoa farmers cannot be explained solely by natural factors or land conditions. The more dominant problem stems from limited human resource capacity, particularly farmers' knowledge of cocoa plant characteristics and sustainable management (Managanta et al., 2022). Limited understanding of plant growth phases, nutrient requirements, and pest and disease control leads to inefficient cultivation practices and risks reducing the quality and quantity of yields (Suardi et al., 2023; Sugiatno et al., 2024).

Most farmers still rely on cultivation patterns based on generations of experience that are not fully in line with modern agronomy principles. The low implementation of Good Agricultural Practices (GAP) principles is reflected in irregular pruning practices, unbalanced fertilization, suboptimal garden sanitation, and substandard harvesting and post-harvest handling (Alfian et al., 2023; Añazco Chávez et al., 2024; Marasabessy et al., 2023). This condition not only suppresses crop productivity but also impacts the quality of the cocoa beans produced, thereby directly affecting their market value (Harahap et al., 2025; Pidie et al., 2015).

On the other hand, marketing aspects are equally serious issues. High cocoa price fluctuations are not balanced by the availability of a transparent and easily accessible price information system for farmers (Puspitafuri & Kasmawati, 2025). Dependence on price information from middlemen or local buyers puts farmers in a weak bargaining position in the marketing chain (Gayi & Tsowou, 2017). As a result, increased production achieved through hard work at the farm level does not always correlate with an increase in farmers' income (Assauwab et al., 2025).

Based on these conditions, this community service activity was designed with an integrative approach that includes increasing general knowledge about cocoa, strengthening the implementation of GAP, and utilizing real-time cocoa price information applications. The

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integration of technical aspects of cultivation and access to market information is aimed at improving production efficiency, strengthening the position of farmers in making agricultural business decisions, and ultimately promoting sustainable income growth for cocoa farmers.

2. METHOD OF IMPLEMENTATION

The implementation of community service activities in Southeast Aceh Regency during the period of December 1-30, 2025, was carried out through a gradual and continuous approach as illustrated in the activity cycle flowchart in Figure 1. The activity began with an initial socialization stage, which served as an entry point to map the farmers' initial level of knowledge regarding cocoa cultivation, understanding of GAP, and the mechanism for determining cocoa prices. This stage formed the basis for adjusting the material and methods of subsequent interventions.

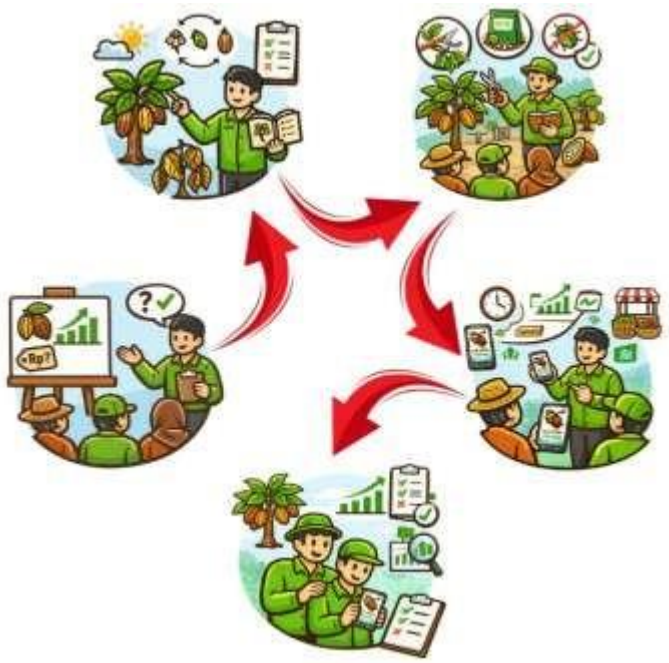

Figure 1. Scheme for the Implementation of Cocoa Farmer Outreach Activities

The activities continued with training on general cocoa knowledge and demonstrations of Good Agricultural Practices (GAP), as illustrated through educational illustrations of planting, pruning, fertilizing, pest control, and harvesting. At this stage, farmers were provided with an understanding of the characteristics of cocoa plants, growing conditions, production cycles, and yield limiting factors, which were then translated into practical application through GAP practices in the farmers' gardens. Furthermore, farmers were introduced to a cocoa price information application that provides real-time price data, an understanding of price trends, and strategies for determining the timing and channels of sale, in order to strengthen market literacy and reduce dependence on intermediaries. The entire series of activities concludes with mentoring and evaluation to ensure the independent implementation of GAP and the use of the

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price application, while monitoring changes in farmers' knowledge and behavior as an integrated capacity-building cycle between technical cultivation aspects and market access.

3. RESULTS AND DISCUSSION

a. Farmers' Knowledge Level Before and After the Activity

The results in Table 1 show an increase in the level of knowledge of cocoa farmers after the implementation of community service activities. Before the activities, farmers' knowledge related to cocoa cultivation, the application of Good Agricultural Practices (GAP), and price information was still in the low category. After the activity, general knowledge of cocoa increased to a moderate level, while understanding of GAP increased to a moderate-high level. This change indicates that the training and mentoring materials provided were able to improve farmers' understanding of the technical aspects of cultivation in a more structured manner.

Table 1. Development of Cocoa Farmers' Knowledge Levels Related to Cultivation, GAP, and Price Information

Aspects of Knowledge	Pre-Activity	After Activities
General knowledge about cocoa	Low	Currently
Understanding GAP	Low	Currently – Height
Cocoa price information	Low	Height

The most notable improvement occurred in the aspect of cocoa price information, which increased from low to high. This shows that the use of real-time price information applications has a direct impact on farmers' market literacy (Puspitafuri & Kasmawati, 2025). Better access to information has the potential to reduce farmers' dependence on a single source of information and strengthen decision-making in determining the timing and channels of sales (Mwakifwamba et al., 2024). Overall, this increase in knowledge is an important prerequisite for changing cultivation practices and more rational marketing strategies to support increased income for cocoa farmers (Lee et al., 2021).

b. Level of Adoption of Good Agricultural Practices

The results in Table 2 show changes in cocoa cultivation practices after the implementation of community service activities. Prior to the activities, most components of Good Agricultural Practices were not consistently applied, as evidenced by infrequent pruning, irregular fertilization, poor garden sanitation, and reactive pest control. These conditions reflect the low adoption of GAP at the farmer level, which has an impact on production efficiency and crop quality.

Table 2. Changes in Cocoa Cultivation Practices Based on GAP Components

GAP Components	Before Activity	After Activity
Pruning	Rarely implemented	Started to be implemented
Balanced fertilization	Irregular	More organized
Garden sanitation	Infrequent	Quite routine
Pest control	Reactive	More preventive
Harvesting and post-harvesting	Inconsistent	More in line with standards

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After the activity, initial improvements were observed in all GAP components, as evidenced by the implementation of pruning, more regular fertilization, more routine garden sanitation, and a shift in the approach to pest control towards a more preventive approach (Binalopa et al., 2024; Marasabessy et al., 2023). Harvesting and post-harvest practices also showed a tendency to be more in line with standards (Suparno et al., 2023). These changes indicate that farmers' increased understanding of GAP is beginning to be translated into field practices, albeit at an early stage (Putra et al., 2023). With continued assistance, these improvements in practices have the potential to increase cocoa productivity and quality in a sustainable manner.

c. Access and Utilization of Cocoa Price Information

The results in Table 3 show changes in the pattern of access to and use of cocoa price information after the implementation of community service activities. Before the activities, farmers tended to rely on price information from middlemen, with irregular access and decisions on when to sell determined by buyers. This condition reflects the low market literacy of farmers and their weak bargaining position in the cocoa marketing chain.

Table 3. Comparison of Access to Price Information and Sales Decision-Making Patterns Before and After Activities

Indicators	Before Activity	After Activities
Price information sources	Middleman	Applications & market comparisons
Price access frequency	Irregular	Routine
Selling decision time	Determined by buyer	Farmers decide

After the activity, there was a shift in the source of price information from middlemen to the use of applications and market comparison tools, accompanied by an increase in the frequency of regular price access. This change had an impact on increasing farmers' independence in determining the time of sale (Mwakifwamba et al., 2024; Shimamoto et al., 2013). These results indicate that access to real-time price information plays an important role in strengthening farmers' economic decision-making (Akshaya, 2025). Although the changes that have occurred are still in their early stages, improving access to information is a strategic prerequisite for efforts to increase the marketing efficiency and income of cocoa farmers (Puspitafuri & Kasmawati, 2025).

d. Comparison of Cocoa Prices

The results in Table 4 show differences in cocoa prices based on the sources of information accessed by farmers. Before using the app, farmers received prices ranging from IDR 40,000 to IDR 50,000 per kilogram, which was relatively lower than the market price at the district level and the reference price provided by the app. This difference indicates an information gap between farmers and the wider market, which has the potential to disadvantage farmers in the process of selling their harvest.

Table 4. Reference Range of Cocoa Prices from Various Sources of Information

Price Source	Price Range (Rp/kg)	Description
Farmer price	40.000–50.000	Before accessing the application
District market price	60.000–65.000	Secondary data
Application reference price	63.000–70.000	Real-time information

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County market prices and application reference prices show a higher range, namely Rp60,000–65,000/kg and Rp63,000–70,000/kg, sourced from secondary data and real-time information. These findings emphasize the importance of access to accurate and up-to-date price information as a basis for farmers' economic decision-making (Herman, 2018). Although this data is comparative and not the result of a primary price survey, the difference in price ranges illustrates that improving market literacy through access to price information has the potential to strengthen farmers' bargaining position and support efforts to increase cocoa income (Puspitafuri & Kasmawati, 2025; Rosyidah et al., 2024).

4. CONCLUSION

The results of the activities confirm that increased farmer knowledge correlates directly with initial improvements in GAP implementation and strengthened access to cocoa price information, which simultaneously improves cultivation practices and strengthens farmers' marketing decisions. The price gap between the farmer level and market reference indicates that limited information weakens bargaining power, making an integrated approach between technical aspects and market access relevant to improving farming efficiency and income. However, without continuous assistance, strengthening of farmer institutions, and integration of price applications into a broader marketing system, the impact of increased income is likely to be temporary.

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