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Capacity Enhancement and Agribusiness Development: A Case Study of Rubber and Palm Oil Farmers in Kelian Village

Yoga Toyibulah[1], Agung Enggal Nugroho[2], Khoiru Indana[3], Apdila Safitri[4], Dede Aprylasari[5]
[1] Department of Agroecotechnology, Faculty of Agriculture, Mulawarman University, [2] Department of Agribusiness, Faculty of Agriculture, Mulawarman University, [3,4,5] Department of Animal Science, Faculty of Agriculture, Mulawarman University
**Corresponding author*
E-mail: dedeaprylasari@faperta.unmul.ac.id*

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Abstract: *This community service activity was carried out in Kelian Village, an area with significant potential in the agricultural and smallholder plantation sectors but facing various structural challenges such as limited infrastructure, market access, and farmer institutional capacity. This activity aimed to increase community capacity through a participatory approach that included identifying local potential, training in cultivating superior commodities (rubber and smallholder oil palm), strengthening farmer group institutions, and developing community action plans. The methods used included direct observation, focus group discussions, participatory mapping, and technical and institutional training. The activity results showed an increase in community understanding of sustainable cultivation practices, the formation of new farmer groups, and a growing collective awareness to transform towards a more independent and competitive agricultural system. Further mentoring, locally based training, and multi-stakeholder collaboration are recommended to support the sustainability of the initiatives that have been initiated. This experience demonstrates that a participatory approach effectively builds social capital and strengthens the foundations of inclusive and sustainable village development.*

Keywords: *Agriculture, Community Service, Farmer Groups, Participation, Village Empowerment*

Introduction

Kelian Village is a village in Nyuatan District, West Kutai Regency, East Kalimantan, which geographically has quite extensive plantation land. The area of Kelian Village is estimated to be approximately 10,000 hectares, the majority of which has been used by the community for rubber plantations for generations. This rubber plantation has become a primary source of livelihood for most of the community in

Kelian Village. However, rubber plantation management still faces various problems, including tapping techniques that do not comply with agronomic standards, minimal plant care practices, and weak pest and disease control. This has resulted in low rubber tree productivity, low sap quality, and fluctuating farmer incomes (Rosana et al., 2020). In addition to the technical challenges of cultivation, the community faces the problem of an unstable market. Rubber selling prices often fluctuate with global market dynamics, directly impacting farmers' household incomes. Dependence on a single commodity without business diversification makes the community's economy vulnerable, especially amidst unpredictable rubber price fluctuations.

On the other hand, the potential for oil palm cultivation in Kelian Village is very promising. The suitable soil structure, tropical climate, and land availability offer opportunities for the community to develop small-scale oil palm plantations as an alternative business venture. However, oil palm development in Kelian Village remains limited and unmanaged. Some residents have begun planting oil palm independently, but this remains an individual practice and has not been organized into farmer groups or cooperatives. In addition to technical and market factors, the socio-economic conditions of the Kelian Village community are also affected by the presence of mining activities in the surrounding area. Mining areas have a dual impact: on the one hand, they provide job opportunities, but on the other, they also have the potential to reduce the area of productive land for agriculture and plantations. This could impact the community's sustainability of land-based income sources (Kusuma et al., 2022). Therefore, a sustainable land management strategy is needed, combining rubber farming and oil palm development to ensure the community maintains an economic buffer outside the mining sector.

The above issues require intervention through a comprehensive and sustainable empowerment program. Strengthening the capacity of rubber farmers through technical training, improving plantation management skills, and providing guidance on proper tapping techniques are the first steps to increasing productivity (Endriani et al., 2025). Meanwhile, developing palm oil potential focuses on providing technical knowledge of palm oil cultivation, cropping pattern planning, farmer group management, and developing an institutional model that supports the smallholder palm oil business chain.

This community service program is expected to create synergy between the potential of rubber, which has become the community's economic base, and the development of palm oil as an alternative commodity. It is hoped that the approximately 10,000 hectares of land in Kelian Village can be managed productively

and sustainably, providing added economic value, creating job opportunities, and enhancing the community's economic resilience amidst the dynamics of the ever-expanding mining area. Therefore, this community service program focuses on improving farmers' technical skills and encouraging social transformation through institutional strengthening, collaboration between stakeholders, and the development of realistic and sustainable action plans.

Method

This community service activity uses a participatory and collaborative approach, positioning the community as active participants in every process stage. This approach was chosen to ensure that the activities truly address the real needs of the Kelian Village community and encourage the sustainability of the results. The community service activities are implemented through the following phases:

A. Identification of Village Problems and Potential

The initial stage was conducted through field observations, informal interviews, and participatory mapping with community leaders, rubber farmers, village officials, and village youth. The goal of this stage was to:

1. Identify key issues in rubber farming, such as tapping techniques, plant care, selling prices, and the product distribution chain.
2. Map underutilized land that has the potential to be developed for smallholder oil palm cultivation.
3. Explore local knowledge and community experiences in addressing economic, social, and environmental challenges around mining areas. The data collected at this stage will serve as the basis for designing training materials and intervention strategies tailored to local needs.

B. Community Outreach and Dialogue

After identifying the problems, an open outreach program was conducted with the community as a forum to convey initial findings and open up dialogue. This activity involved farmer groups, traditional leaders, village officials, and the general public. The objectives of the outreach and dialogue were:

1. Convey the importance of joint efforts to improve the quality and sustainability of community rubber businesses.
2. Promote a shared understanding of the importance of business diversification through gradual and organized palm oil development.

3. Encourage the community to participate actively in the planning and implement capacity building and mentoring activities.

Socialization is carried out in an informal but structured manner, emphasizing openness of aspirations and collective commitment as the foundation of joint activities (Kusumo & Ma'ruf, 2025).

C. Focus Group Discussion (FGD)

Focus group discussions were held to more deeply and systematically address community aspirations. FGD participants were divided into groups based on proximity to their gardens or affiliation with existing farmer groups. Some of the points discussed in the FGDs included:

1. Identification of opportunities and challenges in developing rubber and palm oil businesses.
2. Initial formulation of an integrated land management action plan.
3. Ideas for establishing farmer institutions or village cooperatives that can support the business chain and market access.
4. There is a need for further support, such as capital, business development, and partnerships.

This FGD is a forum for building collective agreements and compiling community action plan documents as a reference for implementing and evaluating activities (Sumarto, 2025).

D. Field Assistance and Monitoring

The final stage of the community service activity is direct field assistance, which is carried out periodically and flexibly according to the community's agricultural activity cycle. This assistance is provided in the form of:

1. Direct visits to farmers' gardens to support more effective rubber and oil palm plantation management practices.
2. One-on-one or small-group dialogues to support the implementation of collaboratively developed work plans.
3. Observation of practice changes, community responses, and obstacles encountered during implementation.
4. Providing feedback and motivation to encourage communities to continue their initiatives independently.

Monitoring is carried out by recording activity progress and community input

as material for evaluation and planning for the next strengthening phase (Ismiratri et al., 2023).

The following is documentation of this community service activity.

Figure 1. Field activities

Result

The initial phase of community service implementation emphasized the importance of gathering information based on a participatory approach to understand the Kelian Village community's socio-economic realities comprehensively. Covering an area of approximately 10,000 hectares, this village has significant agricultural potential, particularly in the rubber plantation sector. However, due to traditional cultivation practices, rubber land productivity tends to be low. Irregular tapping techniques cause tree damage, reduce latex production, and shorten the productive period of the plants (Sudibjo, 1999). Furthermore, rubber marketing highly depends on intermediaries, creating unstable selling prices and harming farmers. These findings align with a 2022 report by the Central Statistics Agency (BPS), which indicates that smallholder rubber farmers in East Kalimantan tend to experience economic uncertainty due to price volatility and low product added value.

On the other hand, the mapping results indicate the existence of extensive unused land that has not been optimally utilized. This opens up opportunities for economic diversification, such as developing agroecologically based smallholder oil palm plantations. This potential is considered strategic for strengthening local economic resilience, in line with Pusvisasari et al. (2025), who stated that rural economic transformation must be based on utilizing local potential that is adaptive to market and environmental changes.

Discussion

A. Strengthening Farmer Institutions and Multi-Stakeholder Collaboration

One of the main challenges farmers face in Kelian Village is the weak institutional structure that can support and advocate for their collective interests. Most farmers still operate their farms individually and have not yet joined formal groups or cooperatives. This lack of institutionalization has resulted in various systemic impacts, including difficulty accessing government programs such as seed and fertilizer subsidies, limited access to agricultural credit, and limited bargaining power in commodity markets. The community service team then took the initiative to facilitate discussions with each community group. Each hamlet was identified as having different potential and social characteristics, so forming farmer groups was conducted contextually and based on community deliberations. These farmer groups not only function as a communication platform for farmers but also as institutions capable of planning agricultural businesses, compiling production needs, and managing training and advocacy agendas with relevant agencies (Mulyadi et al., 2024).

The existence of farmer groups is a crucial starting point in strengthening local governance in the agricultural sector. In the long term, these institutions serve as a gateway to forging cross-sectoral collaborations, including with government agencies (such as the Department of Agriculture, the Department of Food Security, and the Department of Plantations), NGOs, universities, and private partners such as production input providers and microfinance institutions. This institutional strengthening is inseparable from the importance of a sustainable mentoring approach. The community service team conducted institutional workshops, basic group management training, and reflective discussions to strengthen internal governance. This process was also accompanied by developing the farmer group's organizational structure, from the chairperson, secretary, and treasurer to those responsible for technical areas such as planting, fertilization, and marketing. According to Elizabeth (2007), strong farmer institutions are crucial to rural economic development. These institutions increase production efficiency and strengthen farmers' bargaining power in the supply and distribution chain. This is in line with Azizah et al. (2025), who stated that multi-stakeholder partnerships are an effective strategy for encouraging agricultural innovation, expanding market access, and promoting the sustainability of smallholder farming businesses.

B. Potential for Agroforestry-Based Smallholder Oil Palm Development

The development of smallholder oil palm plantations in Kelian Village is guided by an agroforestry approach, an integrated land use system that combines crops with woody trees within a single plot. This model was chosen because it offers a balanced solution between improving the community's economy and preserving the environment, two issues highly relevant in the socio-ecological context of Kelian Village. Unlike large-scale oil palm monocultures, which often lead to environmental degradation, the agroforestry system encourages polyculture by integrating oil palms with local species such as durian, rambutan, langsat, petai, and hardwood trees like meranti, ironwood, and sungkai. In addition to contributing to biodiversity and a more stable ecosystem structure, this model also creates broader income opportunities through crop diversification. In the long term, woody and fruit trees also serve as a long-term asset for farmers.

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Figure 2. Oil Palm Seedlings

The community service team has facilitated initial workshops and small demonstration plots to introduce the agroforestry model in several areas of idle land owned by farmers. Farmers are encouraged to understand the basic principles of agroforestry, efficient planting layouts, and multi-commodity maintenance techniques through these activities. The response has been enthusiastic, especially from young farmer groups beginning to see agroforestry as a form of contemporary farming innovation grounded in local values. More than just a technical approach, agroforestry-based smallholder oil palm development also represents an inclusive socio-cultural approach. This model positions the community as the primary actor and environmental preserver. The involvement of traditional leaders in the land-use planning process and women in the management of non-timber forest products (NTFPs) strengthens the social legitimacy of this system and increases the likelihood of the program's long-term sustainability.

C. Farmers' Income Diversification Strategy

Facing climate uncertainty, fluctuating commodity prices, and limited market access, income diversification is a crucial strategy for farmers in Kelian Village. Reliance on a single primary commodity like rubber has proven its weaknesses, particularly when market prices plummet or crop failures occur due to drought. Therefore, a more adaptive approach oriented toward household economic sustainability is needed. Initial assessment results indicate that the community is interested in developing alternative businesses such as household-scale cattle farming, freshwater fish farming using tarpaulin ponds, seasonal horticultural cultivation (chili, tomato, mustard greens), and processing agricultural products into value-added products such as banana chips, pure coconut oil, or liquid organic fertilizer from agricultural and livestock waste.

The community service team promotes implementing an integrated farming system as a basic development framework. This model combines the food crops, horticulture, livestock, and fisheries sectors into a mutually supportive production system. For example, livestock waste can be used as organic fertilizer for plants, while crop waste can be used as animal feed or fish farming media. This aligns with Siregar's (2023) perspective, which emphasizes that an integrated farming system efficiently utilizes local resources and creates greater economic resilience against external risks. Furthermore, this diversification strategy is supported by a participatory approach. Farmers are actively involved in planning and determining the types of businesses to be developed based on local agroecological conditions, resource availability, and the interests and capacities of each family. This intervention is integral to technical

training, entrepreneurial mentoring, and strengthening marketing networks.

Diversification also opens up opportunities for the involvement of other family members, particularly women and village youth, in productive economic activities. This strengthens the overall economic role of the household and creates space for cross-generational participation in sustainable agricultural development in Kelian Village. With this strategy, it is hoped that farmers will not only survive economic and environmental pressures but also grow into innovative and resilient entrepreneurs, capable of building village economic independence based on local potential.

D. Market Access and Supporting Infrastructure Challenges

The geographical isolation of Kelian Village poses a serious challenge to the development of smallholder agriculture. Severely damaged main roads during the rainy season, a lack of vehicles for transporting agricultural produce, inadequate storage facilities, and post-harvest technology contribute to high logistics costs and reduce farmers' competitiveness. Furthermore, the lack of agricultural processing facilities forces farmers to sell only raw produce at low sales value, resulting in small profit margins that are disproportionate to the high production and transportation costs. Dependence on local intermediaries is also a pressing structural issue. Farmers have little choice but to sell their produce to intermediaries at prices far below market prices. This situation hinders the creation of a fair and transparent trading ecosystem for farmers. Ignorance of market prices, weak bargaining power, and limited access to communication facilities and distribution networks exacerbate this inequality. To address this, the community service team recommends the formation of farmer cooperatives or joint venture groups that serve not only as a means of product consolidation but also as entities managing logistics, storage, and marketing. This cooperative is expected to bridge the gap between farmers and the market, while facilitating access to capital, business training, and strengthening managerial capacity.

According to Mulyanah & Fitriyani (2024), farmer cooperatives can serve as a collective tool to strengthen bargaining power, reduce distribution costs, and expand market networks. Furthermore, integrating cooperatives with digital technologies such as e-marketplaces has begun to be introduced as a medium-term strategy to connect farmers with direct buyers, such as city traders, processing industries, and end consumers. This initiative is supported by digital literacy training and technical assistance so that farmers can utilize digital platforms, although internet connectivity remains a challenge in the region. Furthermore, to improve logistical efficiency and strengthen agricultural infrastructure, the community service team encourages

collaboration with local governments by proposing farm road construction programs, providing joint production houses, and procuring group-based collective transportation facilities. These interventions are crucial for creating an agricultural system that is productive and competitive in the long term.

E. Evaluation of Participation and Impact of Activities

Community participation in every stage of the activity demonstrated positive and progressive dynamics. The participatory approach encouraged physical community involvement and successfully built a sense of ownership of the process and results of the activity. Active involvement was evident in the enthusiasm of young farmers in developing planting plans, women's initiatives in developing agricultural processing businesses, and the commitment of traditional leaders to uphold local values integrated into the decision-making process. Various participatory methods, such as focus group discussions, social and resource mapping, and weekly reflection and evaluation sessions, provided a space for the community to voice aspirations, critiques, and provide solutions. This process created an atmosphere of co-learning that strengthened the community's social capital and fostered trust across groups. Furthermore, this approach reinforced the principle of bottom-up development, which positions the community as the primary agent of change.

The short-term impacts of this activity include increased technical capacity in the community in rubber and oil palm cultivation, the formation of two new independently facilitated farmer groups, and the development of a jointly designed and sustainability-oriented community action plan. Some community members have also begun utilizing their home gardens for small-scale horticultural farming as a local adaptation to income diversification. In the medium term, this activity can strengthen the community's socio-economic resilience through increased productivity, intergroup collaboration, and reduced dependence on external parties. This aligns with Maani's (2011) empowerment theory, which states that meaningful participation is only achieved when the community controls the planning, implementation, and evaluation processes. Similarly, according to Fauzi et al. (2025), true empowerment creates project outcomes and transforms social structures toward a more just and inclusive one.

Going forward, a sustainable mentoring strategy is needed to strengthen the capacity of community organizations, improve digital literacy, and connect local groups with market networks and supporting institutions. Thus, this community service activity will serve as a short-term intervention and become a catalyst for long-

term change in Kelian Village, moving towards regional independence and resilience.

Conclusion

The community service activities in Kelian Village reflect the importance of participatory and collaborative approaches in building an economy based on local potential. Theoretically, this intervention reinforces the notion that community empowerment must go beyond improving technical skills to include social and institutional transformation. This aligns with Maani's (2011) empowerment theory, which emphasizes that meaningful empowerment occurs when the community controls the planning, implementation, and evaluation processes. By involving the community at every stage, this program not only produced technical improvements in rubber farming and the development of agroforestry-based smallholder oil palm plantations but also fostered new social structures by forming more cohesive and responsive farmer groups. Another theoretical reflection shows that farm business diversification, integrated farming systems, and farmer institutional strengthening are adaptive strategies in facing commodity market dynamics, environmental degradation, and dependency on extractive sectors such as mining. The introduced agroforestry model offers not only an economic solution but also an ecological one, combining land productivity with biodiversity preservation. However, infrastructure and market access challenges indicate that empowerment must not only occur at the micro-level (farmers) but also require systemic support from governments and the private sector through multi-stakeholder collaboration.

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The community service activities in Kelian Village successfully achieved their primary objectives: building awareness, increasing capacity, and strengthening collaboration among residents in managing local potential based on agriculture and smallholder plantations. The participatory approach effectively encouraged the active involvement of various community elements, from young farmers and women to traditional leaders and village officials.

Tangible results of these activities include increased knowledge about rubber and oil palm cultivation, forming new farmer groups, and developing Community Action Plans. These activities also fostered collective awareness and strengthened social capital, a crucial foundation for sustainable village development. These community service initiatives have opened up opportunities for transformation

toward a self-sufficient, competitive, and inclusive agricultural system.

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