

Community Empowerment through Honey Bee Farming Development: Enhancing Rural Livelihoods and Environmental Sustainability in Suka Maju Village, Indonesia

Muhammad Arif Suryo W.¹, Nanang Yuliyapranata^{2*}

Pertamina Hulu Energi Jambi Merang, Musi Banyuasin, South Sumatera, Indonesia

*Corresponding Author

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ABSTRACT

Peatland areas in Tanjung Jabung Timur Regency, Jambi Province, face significant environmental challenges due to land-use change, ecosystem degradation, and recurring forest and land fires (karhutla). These conditions not only threaten environmental sustainability but also reduce local community livelihood opportunities. To address these challenges, Pertamina Hulu Energi Jambi Merang implemented the Honey Bee Cultivation Development Program in Suka Maju Village as a community empowerment initiative that integrates economic development and environmental conservation. This study aims to analyze the implementation and impacts of the program on community capacity building, business development, and environmental sustainability. The program was implemented through advanced product commercialization training, village MSME synergy strengthening, digital marketing training, product innovation development, and value-added product diversification. The results indicate that the program significantly improved the capacity of community groups in business management, product commercialization, and digital marketing. Product quality and competitiveness increased through improved packaging and the introduction of the *Si Kering Manis* (Automatic Honey Drying System), which reduced honey moisture content from 20–22% to 18%, thereby enhancing product quality and consumer confidence. The program also expanded market access through digital platforms, strengthened collaboration among honey bee farmer groups, MSMEs, and educational institutions, and encouraged the development of value-added products such as honey-based snacks and bee-themed batik. Furthermore, the initiative contributed to environmental conservation by promoting sustainable livelihoods that depend on maintaining healthy peatland ecosystems and vegetation. The findings demonstrate that honey bee cultivation can serve as an effective green economy model that simultaneously enhances community welfare, strengthens local economic resilience, and supports environmental conservation. This program offers a replicable approach for sustainable community development in peatland areas vulnerable to forest and land fires.

Keywords: Honey Bee Cultivation, Green Economy, Peatland Conservation, Sustainable Livelihood, Forest And Land Fire Prevention.

INTRODUCTION

Rural development today is not only focused on improving the economic well-being of communities, but also emphasizes the importance of environmental sustainability as the foundation for long-term development (Hariram et al., 2023; Henderson & Loreau, 2023). A development approach that integrates economic, social, and environmental aspects is becoming increasingly important, especially in areas with high ecological vulnerability (Akibu, 2025). One of the areas facing these challenges is Suka Maju Village, Geragai Subdistrict, East Tanjung Jabung Regency, Jambi Province. This village is located in a peatland area that serves important ecological functions as a carbon sink, a water regulator, and a habitat for diverse biodiversity. However, the characteristic of peatland to dry out easily when disturbed makes it highly vulnerable to forest and land fires (karhutla) (Syakirah, 2025).

In recent years, Jambi Province has faced serious problems related to forest and land fires. These recurring fires have not only caused ecological damage but have also resulted in economic losses, public health risks, and disruptions to social activities (Salsabillah, 2024). In 2019, thousands of hectares of land and forest in Jambi Province were affected by fires, with most of the incidents occurring in peatland areas that had been degraded due to land-use changes (Purnomo et al., 2023). This situation indicates that pressure on peatland ecosystems is increasing as various economic activities expand, activities that do not always take environmental sustainability into account.

In East Tanjung Jabung Regency, land-use changes have been quite extensive over the past few decades. Most of the peatland areas have been converted into oil palm plantations or industrial timber plantations (HTI). This landscape transformation has led to a reduction in natural vegetation cover and a decline in the ability of peatlands to store water (Muryati & Kurniawan, 2024). As a result, the land is more prone to drought during the dry season and more susceptible to wildfires. In addition to increasing the risk of forest and land fires, these landscape changes also lead to a decline in environmental quality and a reduction in livelihoods for communities that previously depended on forest products and local natural resources (Fatkhullah et al., 2021).

The threat of forest and land fires not only affects local communities and the surrounding environment, but also has the potential to disrupt strategic assets in the area. One such asset is energy infrastructure, such as corporate pipelines that traverse fire-prone areas. Damage to this infrastructure can pose significant operational risks and threaten public safety (Zuhriyah, 2025). Therefore, mitigation efforts are needed that not only focus on fighting fires when they occur, but also prioritize community-based prevention strategies that can raise awareness about environmental conservation.

One community group that plays a key role in forest and land fire prevention efforts is the Community Fire Watch (MPA). This group has long been at the forefront of patrols, monitoring, and early response to forest and land fires (Dari et al., 2026). However, the effectiveness of MPAs is determined not only by their technical capacity for fire prevention but also by the sustained motivation and economic well-being of their members. Therefore, empowerment programs are needed that can provide economic benefits while strengthening the community's commitment to environmental conservation. One alternative considered promising to address these needs is the development of honeybee beekeeping. Honeybee beekeeping is a productive economic activity that is relatively environmentally friendly because it does not require land-use changes, does not produce hazardous waste, and relies heavily on natural vegetation as a source of bee forage (Mashur, 2026). The success of honeybee farming depends heavily on the quality of the surrounding environment, which indirectly encourages communities to preserve vegetation cover, maintain biodiversity, and avoid land-clearing practices that involve burning (Buni et al., 2025).

From an ecological perspective, bees play a vital role as pollinators of various types of forest and cultivated plants. Their pollination activities contribute to increased plant productivity, ensure the sustainability of vegetation regeneration, and support ecosystem balance. Additionally, bees are often used as bioindicators of environmental health because their presence is heavily influenced by habitat quality and the availability of adequate food sources. Thus, the development of honeybee beekeeping not only provides economic benefits but also contributes to environmental conservation efforts (Sumandya et al., 2024).

From an economic perspective, the honeybee farming business offers quite promising prospects. Market demand for natural honey products continues to rise as public awareness of healthy lifestyles grows. Honey products not only have a relatively high market value but can also be developed into various byproducts such as propolis, bee pollen, beeswax, and royal jelly, which offer additional economic value. The development of this industry has the potential to serve as an alternative income source for rural communities, particularly for groups that have historically faced limited access to productive economic activities (Hasanah & Hidayat, 2025).

Seeing this potential, the Corporate Social Responsibility (CSR) Program of Pertamina Hulu Energi Jambi Merang initiated the development of honey bee farming in Suka Maju Village as part of a strategy for community empowerment and environmental preservation. This program not only aims to increase community income thru honey business development but also to build collective awareness about the importance of

preserving peatland ecosystems and preventing forest and land fires. With the direct link between the success of bee farming and environmental conditions, the community is encouraged to actively participate in maintaining the sustainability of natural resources that support their livelihoods.

Furthermore, the development of honey bee farming also has positive social impacts, such as the creation of new jobs, strengthening community group institutions, enhancing human resource capacity, and opening up business opportunities based on the green economy. This program can serve as a model for community empowerment that integrates economic, social, and environmental aspects sustainably. The success of such a program is expected to serve as a model of good practice in peatland management that is not only oriented toward the exploitation of natural resources but also toward environmental preservation and the improvement of community welfare.

Based on the aforementioned description, research on the development of honey bee farming as a strategy for economic empowerment and environmental preservation in Suka Maju Village becomes important to conduct. This research is expected to provide an overview of the process of developing honey bee farming, its contribution to the improvement of the community's economy, and its role in supporting environmental conservation efforts and preventing forest and land fires in the peatland area of Tanjung Jabung Timur Regency. The results of this research are also expected to serve as a reference for the government, companies, and community organizations in designing sustainable environment-based empowerment programs.

METHODS

This study employed a mixed-methods approach with a quasi-experimental evaluation design to assess the effectiveness of the Honey Bee Cultivation Development Program in improving community economic capacity and supporting environmental conservation in Suka Maju Village, Geragai District, East Tanjung Jabung Regency, Jambi Province. The evaluation combined quantitative measurements of economic and environmental outcomes with qualitative assessments of community experiences, program implementation processes, and behavioral changes among beneficiaries.

The quasi-experimental design was implemented through a pre-intervention and post-intervention comparison to identify changes associated with the program. Baseline data were collected before the implementation of the intervention, while follow-up data were collected after the completion of the program activities. The comparison focused on several measurable indicators, including changes in household income derived from honey-related activities, honey production capacity, product diversification, marketing performance, community participation, environmental awareness, biodiversity conservation practices, and community involvement in preventing forest and land fires in the peat ecosystem.

The Honey Bee Cultivation Development Program was designed to strengthen honey cultivation as a sustainable alternative livelihood source while simultaneously promoting environmental preservation. The specific objectives of this program were:

1. To develop honey bee cultivation as a sustainable alternative livelihood source for the community through improved production capacity and business management practices.
2. To enhance the capacity of community groups in product processing, packaging, commercialization, digital marketing, and the development of honey-based derivative products.
3. To support peat ecosystem conservation and reduce the risk of forest and land fires by strengthening the role of honey bee cultivation as an environmentally sustainable livelihood activity.
4. To encourage collaboration among honey bee cultivation groups, village-based SMEs, educational institutions, and the wider community in developing an independent and sustainable local economy.

The quantitative evaluation involved collecting data from beneficiary groups regarding economic and production indicators before and after program implementation. The indicators included: (1) changes in

household income from honey-based businesses, (2) changes in honey production yield, (3) increase in the number and variety of processed honey products, (4) improvement in product marketing reach through digital platforms, and (5) participation rates in conservation-related activities. Environmental indicators included community-based peatland protection practices, biodiversity conservation efforts around cultivation areas, and community participation in preventing forest and land fires.

Qualitative data were collected through interviews, observations, and focus group discussions with program beneficiaries, including honey cultivation groups, MSME actors, students, and village stakeholders. The qualitative component aimed to explore changes in knowledge, skills, entrepreneurial capacity, environmental awareness, and perceptions regarding the sustainability of honey cultivation as an economic and ecological strategy.

The target beneficiaries of the Honey Bee Cultivation Development Program were the residents of Suka Maju Village who were directly involved in honey cultivation, processing, and business development activities. The main beneficiaries consisted of the Sabak Honey Bee Cultivation Group and Sedayu Sejahtera MSME Group, which received support in strengthening business capacity, product commercialization, digital marketing, product innovation, and development of value-added honey products. The program also involved students from State Senior High School 10 Tanjung Jabung Timur (SMAN 10 Tanjung Jabung Timur) as part of environmental education and conservation awareness activities.

The implementation stages and evaluation activities are presented in Table 1, while the distribution of beneficiary groups and participants involved in each activity is presented in Table 2.

Table 1. Implementation Time and Evaluation Activities

No.	Activity Name	Planning vs Implementation	Month
1	Advanced Product Commercialization Training	Planning and Implementation	Month 5
2	Village MSME Synergy Training (Supply Chain and Collaboration)	Planning and Implementation	Month 5
3	Digital Marketing Training for MSME Products through Digital Platforms	Planning and Implementation	Month 6
4	Product Innovation Development	Planning and Implementation	Month 8
5	Development of Value-Added Products	Planning and Implementation	Month 6–12

Table 2. Beneficiary Groups and Number of Beneficiaries

No.	Activity	Beneficiary Group	Number of Beneficiaries (Persons)
1	Advanced Product Commercialization Training	Sedayu Sejahtera MSME Group	10
2	Village MSME Synergy Training (Supply Chain and Collaboration)	Sabak Honey Bee Cultivation Group and Sedayu Sejahtera MSME Group	25
3	Digital Marketing Training for MSME Products through Digital Platforms	Sabak Honey Bee Cultivation Group and Sedayu Sejahtera MSME Group	25
4	Product Innovation Development	Sabak Honey Bee Cultivation Group	15
5	Development of Value-Added Products	Sedayu Sejahtera MSME Group and State Senior High School 10 Tanjung Jabung Timur	30

The integration of quantitative and qualitative approaches enabled a more comprehensive assessment of the program's economic and environmental impacts. The baseline and follow-up comparison provided evidence regarding the contribution of the intervention to improving community livelihoods, strengthening local entrepreneurship, and supporting peatland ecosystem conservation.

RESULT AND DISCUSSION

Program Implementation

The implementation of the Honey Bee Cultivation Development Program in Suka Maju Village has brought changes to the capacity of business groups, strengthened collaboration among village business actors, and developed innovations and diversification of honey-based products. The changes in conditions before and after the program implementation are presented in Table 3.

Table 3. Comparison of Conditions Before and After the Implementation of the Honey Beekeeping Development Program in Suka Maju Village.

No	Activity	Condition Before	Condition After
1	Community and Business Group Capacity	The group's capacity in product commercialization, business management, and marketing was still limited, resulting in suboptimal honey business development.	The group's capacity improved through commercialization training, digital marketing, and strengthened collaboration, enabling the business group to develop its enterprise more independently.
2	Product Quality and Value Added	Honey products and their derivatives were packaged in a simple manner, with quality standards that had not yet sufficiently supported increased market competitiveness.	Product quality improved through better packaging and processing innovations, increasing product value and making it more competitive in the market.
3	Marketing and Market Reach	Product marketing was still dominated by conventional methods with limited market reach.	Product marketing began utilizing social media and digital platforms, significantly expanding market reach.
4	Product Innovation	Honey-based product innovation was still limited, including in honey quality control, resulting in suboptimal consumer trust, especially for shipments outside the region.	The Si Kering Manis (Automatic Honey Drying System) innovation reduced honey moisture content from 20–22% to 18%, improving product quality and strengthening consumer confidence.
5	Product Diversification and Waste Utilization	Honey derivative products and the utilization of residual bee hive materials had not yet been optimally developed.	Derivative products began to diversify, including honey chips, candied honey, dodol, and bee-themed batik products. Beeswax from unused hive residues was also utilized more effectively.
6	Collaboration and Youth Engagement	Honey business development was limited to the main group and had not involved many external partners.	Collaboration among the Sabak Honey Beekeeping Group, Sedayu Sejahtera MSME, and Senior High School 10 Tanjung Jabung Timur expanded, supporting product development and environmental conservation campaigns.

The implementation of the Honey Bee Cultivation Development Program in Suka Maju Village shows that the community empowerment approach based on the green economy can bring about changes that are not only economic but also social and environmental. The program implemented thru capacity building for groups, technological innovation development, marketing strengthening, product diversification, and multi-stakeholder collaboration has created significant transformations in the sustainability of honey bee farming businesses. Analysis of the conditions before and after the program shows that the interventions carried out successfully addressed various major issues previously faced by the honey bee farming groups and village SMEs. Before the program was implemented, the capacity of the honey bee farming groups and SMEs was still relatively limited, especially in the aspects of product commercialization, business management, and marketing. This condition caused the honey farming business to be solely production-oriented without adequate capabilities in market development and increasing the economic value of the products. These limitations are a common issue

often faced by rural business groups, namely the low capacity of human resources in managing businesses professionally.

After the program was implemented, there was a significant increase in capacity through various training and mentoring activities. Training in product commercialization, digital marketing, and strengthening collaboration among village entrepreneurs has provided group members with new knowledge and skills. This capacity building has not only improved technical production capabilities but also enhanced the group's ability to develop business strategies, understand market needs, and build business networks. Consequently, the business groups have become more self-reliant and are better prepared to develop their businesses sustainably. From a community empowerment perspective, this capacity building represents a form of human capital strengthening, which serves as a crucial foundation for local economic development. The higher the group's capacity, the greater their ability to generate innovation and adapt to market changes (Chen et al., 2025; OWEDE, 2025).

One of the tangible impacts of the program is evident in the improved quality of honey and honey-based products. Before the program began, honey products were packaged simply and did not meet quality standards that could effectively compete in broader markets. These limitations resulted in low product value and restricted market access. Through mentoring and training programs, the business groups gained an understanding of the importance of product quality, packaging design, production standards, and processing innovations. Improvements in these areas resulted in higher-quality products that better align with consumer needs. Products that were previously valued solely as primary commodities began to evolve into products with a stronger identity and greater competitiveness.

Improved product quality directly contributes to higher selling prices. In the context of the local economy, this is crucial because it provides opportunities for increased income for group members without the need to significantly increase production volume. In other words, added value is achieved through improved quality and product differentiation.

Another significant change is the shift in marketing strategy from conventional methods to digital marketing. Before the program was implemented, honey marketing still relied on local networks and direct sales to consumers in the surrounding villages. As a result, market reach was very limited and business growth was slow. The digital marketing training provided to the business groups opened up new access to various modern marketing platforms, such as social media and online marketplaces. The use of digital technology has enabled honey products from Suka Maju Village to be known by a wider consumer base, even beyond the Tanjung Jabung Timur Regency. This change demonstrates that digitalization plays a strategic role in the development of rural SMEs. Digital technology serves not only as a promotional medium but also as a tool for building a brand, expanding the customer base, and improving marketing efficiency. With a broader market reach, the opportunities for increased sales and business sustainability grow significantly. (Chen et al., 2025).

The success of the program is also reflected in the birth of the Si Kering Manis innovation (Automatic Honey Drying System). Before this innovation was implemented, the quality of honey still faced challenges due to high moisture content ranging from 20–22 percent. This condition had the potential to lower product quality and reduce consumer trust, especially for marketing outside the region which requires higher quality standards. The implementation of Si Kering Manis successfully reduced the honey's moisture content to 18 percent. This reduction in moisture content has significant implications for honey quality as it can enhance shelf life, maintain product stability, and meet better quality standards. In addition, this innovation increases consumer confidence in the honey products produced by the group. The existence of this appropriate technology innovation shows that the development of community enterprises does not only rely on the improvement of human skills but also requires technological support that meets local needs. The Si Kering Manis innovation serves as an example of how simple technology can create significant added value for businesses based on local resources.

Before the program began, the utilization of honey derivative products and bee hive waste was still very limited. In fact, honey bee farming has economic potential not only from honey but also from various high-value by-products. Thru the derivative product development program, the community has started to produce various innovative products such as masinis chips, grubi, and bee motif batik. Additionally, beeswax or candle

wax from leftover bee nests is also beginning to be utilized as raw material for creative products. This condition indicates a shift in the community's mindset from merely selling primary products to developing various value-added products. Product diversification provides significant economic benefits because it creates new sources of income for business groups. On the other hand, the utilization of bee nest waste reflects the application of circular economy principles, which maximize resource use so that waste can be reduced and economic value can be increased (Velenturf & Purnell, 2021).

Another important aspect of the program's success is the development of collaboration among various stakeholders. Before the program, honey business development was still carried out in a limited manner by cultivation groups without extensive involvement from other parties. After the program was implemented, the cooperation between the Sabak Honey Bee Cultivation Group, Sedayu Sejahtera SMEs, and SMAN 10 Tanjung Jabung Timur was strengthened. This collaboration provides extensive benefits as it enables knowledge exchange, joint product development, and the expansion of environmental conservation campaigns. The involvement of students also serves as a strategic step in instilling environmental awareness in the younger generation while ensuring the sustainability of the program in the future. In the perspective of sustainable development, multi-stakeholder collaboration is an important factor that determines the success of community empowerment programs. The synergy between community groups, business actors, educational institutions, and companies creates an ecosystem that supports innovation, learning, and business sustainability.

Although this program focuses on the economic development of the community, its impact on environmental preservation is also very significant. Beekeeping has a close relationship with environmental quality because bees need healthy vegetation as a food source. Thus, the success of honey farming directly depends on the preservation of the peat ecosystem and the presence of vegetation cover. This condition creates economic incentives for the community to maintain the environment and avoid land clearing practices thru burning. The better the environmental conditions, the higher the bee productivity and the greater the economic benefits obtained by the community. Therefore, the honey bee farming program in Suka Maju Village can be viewed as a model of green economy-based development that integrates the goal of improving community welfare with efforts to conserve the environment and prevent forest and land fires in peatland areas.

Program Impact

The Honey Bee Cultivation Development Program in Suka Maju Village shows that the interventions carried out not only result in increased capacity for individuals and business groups but also have a broader impact on strengthening the local economy, technological innovation, business network development, and environmental preservation. Analysis of the achievements of each activity shows a mutually supportive relationship between the improvement of community skills, product development, and institutional strengthening in creating more sustainable businesses (table 4).

Table 4. Impact Program

No	Activities	Main Finding	Impact
1	Advanced Product Commercialization Training	As many as 10 members of the MSME Sedayu Sejahtera participated in 1 training session and were able to produce and package honey/processed products more professionally.	The selling price of the product increased by about 20–30 percent.
2	Village MSME Synergy Training (Supply Chain & Collaboration)	As many as 25 participants from the Sabak Honey Bee Cultivation Group and Sedayu Sejahtera SMEs attended one training session and supply chain collaboration strengthening.	Collaboration with village SMEs for the development of honey-based derivative products has begun to take shape.
3	Training on Marketing MSME Products thru Digital Platforms (Suka Maju Village)	As many as 25 participants understand digital marketing thru social media and e-commerce.	The market reach of the product has become broader.

4	Product development innovation	The emergence of the Si Kering Manis innovation (Automatic Honey Drying System) that can reduce the water content of honey from 20–22 percent to 18 percent.	Honey quality has improved, product value has increased, and consumer confidence has grown stronger, particularly regarding marketing and shipping to other regions
5	Development of derivative products	The development of derivative products was carried out through a collaboration between the Sedayu Sejahtera SME and State Senior High School 10 in Tanjung Jabung Timur, resulting in masinis chips, grubi, and batik with a bee motive	Product diversification is on the rise, beehive waste is being put to better use, and environmental conservation campaigns

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First, the impact of advanced product commercialization training on economic value improvement. The advanced product commercialization training attended by 10 members of MSME Sedayu Sejahtera resulted in enhanced abilities to produce and package honey and its processed products more professionally. This change shows that the training not only improved technical skills but also enhanced participants' understanding of product quality standards and consumer preferences.

The most noticeable impact of this activity is the increase in product value by about 20–30 percent. This improvement indicates that enhancing packaging quality and commercialization strategies can create added value without significantly increasing production volume. In the perspective of economic empowerment, this condition shows that the enhancement of human resource capacity can be a key factor in increasing community income. In other words, the training has successfully transformed honey products from mere primary commodities into products with higher competitiveness in the market.

Second, the impact of village MSME synergy training on strengthening the local economic network. The village MSME synergy training, which involved 25 participants from the Sabak Honey Bee Cultivation Group and Sedayu Sejahtera MSME, contributed to the formation of closer cooperation in the supply chain and business development. Before this activity was carried out, each group tended to work separately, so the opportunity to create added value thru collaboration had not been optimally utilized. The training results show the beginning of cooperation between honey bee farming groups and village SMEs in the development of honey-based derivative products. This impact is significant because it indicates the formation of a stronger local economic network. The collaboration enables the exchange of resources, skills, and market access, allowing each group to support one another in developing their businesses. From the perspective of local economic development, the synergy among business actors is an important social capital to enhance the economic resilience of rural communities.

Third, the impact of digital marketing training on market access expansion. The digital marketing training attended by 25 participants successfully enhanced the community's understanding of utilizing social media and e-commerce platforms as means of promoting and selling products. Before the program took place, marketing was still dominated by conventional methods that only reached consumers in the surrounding village area. The increase in capacity in digital marketing has resulted in a wider market reach for honey products and their derivatives. This change is very strategic because it allows local products to enter larger markets without being limited by geographical factors. In addition, the use of digital platforms also increases the opportunities for business groups to build product brands, acquire new customers, and increase sales volume. In the context of

rural economic transformation, digital marketing is an important step to reduce the market access gap between rural entrepreneurs and urban entrepreneurs. Therefore, the impact of this activity is not only short-term in the form of increased promotion but also has the potential to strengthen business sustainability in the long term.

Fourth, the impact of the “Si Kering Manis” innovation on quality and consumer trust. The creation of the “Si Kering Manis” innovation (Automatic Honey Drying System) is one of the most strategic achievements in this program. The innovation successfully reduced the water content of honey from 20–22 percent to 18 percent, significantly improving the product's quality. The reduction in water content has very important implications for honey quality because it can enhance the product's shelf life, reduce the risk of fermentation, and meet better quality standards. The impact produced is not only an increase in product quality but also an increase in market value and consumer trust. This is especially important for marketing and shipping products to areas that require higher quality assurance. From a business development perspective, this innovation demonstrates that the application of appropriate technology can be a leverage factor in enhancing the competitiveness of local products. Technology not only helps improve production efficiency but also creates product differentiation that becomes a competitive advantage in the market.

Fifth, the impact of derivative product development on economic diversification and environmental preservation. The derivative product development activities carried out thru collaboration between SMEs (UMKM) Sedayu Sejahtera and State Senior High School 10 Tanjung Jabung Timur have produced various innovative products such as masinis chips, grubi, and bee motif batik. In addition to producing new products, this activity also encourages the utilization of bee nest waste, which had not been optimally utilized before. The main impact of this activity is the development of honey-based product diversification, which provides a new source of income for the community. That diversification is important because it can reduce the business group's dependence on a single main product, namely honey. The more diverse the products produced, the greater the group's opportunity to reach different market segments.

In addition to the economic aspect, this activity also has a significant environmental impact. The utilization of bee nest waste demonstrates the application of circular economy principles that aim to maximize resource use and minimize waste. On the other hand, the involvement of State Senior High School 10 Tanjung Jabung Timur strengthens the environmental preservation campaign among the younger generation. Thus, this activity not only generates economic benefits but also raises public awareness about the importance of maintaining ecosystems that support the sustainability of honey bee cultivation.

Overall, the program's impact can be categorized into three main dimensions. First, the economic dimension, characterized by increased product value, business diversification, market expansion, and enhanced competitiveness of honey products. Second, the social dimension, evident in the increased capacity of the community, the formation of collaborations among business groups, and the involvement of the younger generation in product development and environmental campaigns. Third, the environmental dimension, reflected thru the utilization of bee hive waste, strengthened conservation awareness, and the development of businesses that depend on the preservation of environmental quality and peatland ecosystems.

These findings indicate that the Honey Bee Farming Development Program not only serves as a community income enhancement initiative but also as a model for green economy-based empowerment that integrates economic, social, and environmental goals sustainably. This program proves that environmental conservation and the improvement of community welfare are not two conflicting goals, but can instead proceed simultaneously thru the development of environmentally friendly businesses based on local potential.

CONCLUSION

The Honey Bee Farming Development Program in Suka Maju Village, Tanjung Jabung Timur Regency, shows that honey bee farming can be a community empowerment strategy that integrates the goal of improving economic welfare with environmental preservation. Thru a series of activities including product commercialization training, strengthening MSME synergy, digital marketing, technological innovation, and the development of derivative products, the program successfully enhanced the capacity of business groups, strengthened local economic institutions, and encouraged the creation of added value for honey-based products.

The program results show an improvement in product quality and business competitiveness, marked by the increased capability of the group in business management, marketing, and product packaging. The product commercialization training successfully increased the selling value of honey and its processed products by 20–30 percent, while the use of digital marketing was able to expand market reach beyond the village area. In addition, the Si Kering Manis innovation (Automatic Honey Drying System) successfully improved the quality of honey by reducing the moisture content from 20–22 percent to 18 percent, thereby increasing consumer trust and strengthening marketing opportunities to a wider area.

This program has also successfully encouraged business diversification thru the development of various honey-based derivative products and the utilization of bee hive waste into economically valuable products. The collaboration between the Sabak Honey Bee Cultivation Group, Sedayu Sejahtera SMEs, and SMAN 10 Tanjung Jabung Timur strengthens local business networks while also increasing youth involvement in product innovation and environmental conservation campaigns. These conditions indicate that the success of the program is not only determined by the enhancement of individual capacity but also by the strengthening of social capital and multi-party collaboration that supports business sustainability.

From an environmental perspective, the development of honey bee farming provides economic incentives for communities to maintain the quality of peatland ecosystems and preserve vegetation as a source of bee feed. Thus, this program contributes to efforts to prevent forest and land fires thru an environmentally friendly economic approach. These findings affirm that honey bee farming is a green economic model capable of creating mutually beneficial relationships between environmental conservation and the improvement of community welfare.

Overall, the Honey Bee Farming Development Program in Suka Maju Village has successfully become a model of community empowerment based on local potential, generating simultaneous economic, social, and environmental impacts. This program can be replicated in other peatland areas as a sustainable development strategy that not only strengthens the economy of rural communities but also supports environmental conservation and regional resilience against the threat of forest and land fires.

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