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Socio-Economic Sustainability Analysis of Alue Simantok Community Forestry, Peudada District, Bireuen Regency

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A B S T R A C T

Community Forestry (HKm) management aims to balance ecological functions with economic welfare; however, it is frequently confronted with commodity price volatility and weak market access. This study analyzes the socio-economic sustainability of the Alue Simantok HKm in Bireuen Regency, focusing on the profitability of superior commodities and social capital. Using a mixed-methods approach with a survey of 61 Forest Farmers Group (KTH) members, this study evaluates the businesses of Jernang (Dragon's Blood), Forest Honey, Stingless Bee Honey (Kelulut), and Rattan.The results indicate that the HKm program successfully increased members' average income from IDR 1,500,000 to IDR 3,000,000 per month. Financial feasibility analysis reveals extreme efficiency disparities; the Jernang commodity recorded the highest R/C Ratio (122.8) due to minimal input costs (natural subsidies), yet it carries the highest price volatility risk. Conversely, rattan processing and honey businesses demonstrate stability through product value addition. Socially, the Kenduri Glee tradition functions as social capital that strengthens group cohesion. The study concludes that HKm sustainability cannot rely on a single extractive commodity; strategies for product diversification (downstreaming) and branding strengthening are required to mitigate market risks

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INTRODUCTION

The paradigm shift in forest management from state-based management to community-based forest management (CBFM) has become a global agenda to alleviate poverty around forest areas while maintaining ecological functions. In Indonesia, the Social Forestry scheme exists as a strategic policy instrument to provide legal access for communities to utilize forest resources sustainably. The goal is not merely to grant access rights, but to create a socio-economic transformation that positions local communities as key actors in sustainable forest management.

One of the main schemes in this policy is Community Forestry (HKm). As regulated in MoEF Regulation No. 9 of 2021, HKm provides legal legitimacy for community groups or cooperatives to manage protection or production forest areas. This regulation is designed to address tenure issues and strengthen community capacity to manage forest resources wisely. Theoretically, HKm is expected to be a middle ground balancing environmental conservation interests with the urgent economic needs of forest-edge communities.

Previous literature, such as studies by Mulyadin et al. (2016) and Lado et al. (2023), consistently shows that HKm programs can create jobs and boost the local economy. Similar success was exemplified in the Wolobobo forest area, NTT, where the community successfully developed coffee and ginger commodities as a livelihood basis. However, these literatures tend to focus on short-term impacts such as income increases, with few highlighting the aspect of business sustainability amidst uncertain market dynamics. Field reality often shows that legal access alone is insufficient; without market access and institutional strengthening, KTHs (Forest Farmers Groups) are vulnerable to economic shocks.

This management paradox is clearly visible in the Alue Simantok HKm in Bireuen Regency, Aceh. With an area of 766 hectares, this area has unique characteristics as it is dominated by high-economic-value Non-Timber Forest Products (NTFPs), specifically Jernang (Daemonorops draco), Forest Honey, and Rattan. Unlike general agroforestry (coffee/cacao), Jernang is a specific commodity with high global market demand, which should be able to significantly guarantee KTH member welfare.

Despite having abundant resource potential (comparative advantage), HKm Alue Simantok faces serious challenges in achieving competitive advantage. Initial observations indicate that forest economic productivity is not yet optimal. The fundamental problem faced is the high price volatility of superior commodities such as Jernang due to reliance on traditional supply chains, lack of product downstreaming (branding), and weak market access. This condition causes farmer income to be fluctuating and threatens the KTH's long-term economic sustainability. Furthermore, the aspect of social sustainability also needs to be tested; do existing economic incentives strengthen social capital and prevent communities from returning to exploitative behavior?.

Therefore, research on socio-economic sustainability in HKm Alue Simantok is urgent. This study differs from previous ones as it does not only measure income magnitude but analyzes the profitability structure (R/C Ratio)

of various commodities and their impact on community social cohesion. The main objective is to analyze the forms of NTFP business utilization managed by the KTH and evaluate the influence of HKm management on the community's socio-economic conditions to formulate more resilient sustainability strategies.

LITERATURE REVIEW

Forests play a fundamental role in biosphere sustainability, not only as providers of environmental services for ecological stability but also as economic resources for human livelihood (Senoaji, 2011). However, challenges of forest degradation and poverty among forest-edge communities demand a shift toward a more inclusive forest management paradigm. Puspitasari et al. (2019) and Wahyuni (2023) emphasize that social forestry exists as a state policy instrument to balance environmental preservation with social justice.

Through this scheme, the government grants legal access to local communities whether individuals, farmer groups (KTH), or cooperatives to manage forests legally and sustainably (Permen LHK No. 9 of 2021). The urgency of social forestry lies in its ability to reduce tenure conflicts and provide management rights certainty. This certainty becomes an incentive for communities to invest in land conservation while utilizing it for economic fulfillment (Puspitasari et al., 2020; Wahyuni, 2023).

One of the main schemes in social forestry is Community Forestry (HKm). Aksa (2015) and Fauzi & Nahlunnisa (2021) define HKm as state forest whose management is mandated to the community with the primary goal of economic empowerment without neglecting ecological functions. Unlike property rights, the HKm scheme provides usage or management rights, aiming to prevent land conversion often triggered by demographic and economic pressures (Rosalia & Ratnasari, 2016).

HKm implementation is designed to be a comprehensive solution to two crucial problems: environmental degradation and rural poverty. According to the Aceh Environment and Forestry Service (DLHK) (2023), successful HKm implementation must be based on principles of transparency, participation, legal certainty, and not altering the main function of the forest area, while encouraging commodity diversification for community welfare. To ensure effective operationalization at the site level, the existence of the Forest Management Unit (KPH) is crucial.

Successful forest management cannot be separated from the socio-economic conditions of its community. Wahyuni (2023) highlights that a deep understanding of human forest interactions including cultural aspects, participation patterns, and economic structures is vital in formulating targeted policies. In the context of forest farmer household economics, income analysis becomes the main indicator of welfare. Dodirman (2018) explains that net income reflects the household's ability to meet its living needs.

METHODOLOGY

Location and Time

The research was conducted at the Alue Simantok Community Forestry, Hagu Village, Peudada District, Bireuen Regency, Aceh Province. The study lasted for ± 3 months, from October to December 2024.Research DesignThis study uses a descriptive approach with mixed methods, combining quantitative and qualitative analysis. The quantitative approach analyzes financial feasibility (income and efficiency), while the qualitative approach describes the social conditions and institutional aspects of the Alue Simantok KTH members.

Data Collection

1. ***Primary Data***: Obtained directly via field surveys and interviews using questionnaires. Data includes respondent identity, social characteristics, cost structures, production volumes, and selling prices.
2. ***Secondary Data***: Literature studies, journals, and official documents from the KTH Secretariat and Hagu Village Office.

Sampling Method

The population is all members of KTH Alue Simantok. The sampling technique used was a census (total sampling) method, setting the sample size at 61 respondents.

Data Analysis

Data was analyzed descriptively and quantitatively to calculate income and business feasibility.

1) Total Revenue (TR): TR = Q x P; Where: Q = Quantity; P = Price.
2) Net Income (Pd): Pd = TR – TC; Where TC = Total Cost.
3) Profitability: (Pd/TC) x 100%
4) Efficiency (R/C Ratio): Revenue Cost Ratio. If R/C > 1, the business is profitable/feasible.

RESULTS

General Overview of the Research Area

The Alue Simantok Community Forestry (HKm) is administratively located in Hagu Village, Peudada District, Bireuen Regency, Aceh Province. The legality of this area was confirmed through the Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number S.4241/MENLHK-PSKL/PKPS/PSL.0/7/2020 issued in July 2020. This designation is a strategic government instrument to realize the Social Forestry program, mandated to empower communities and improve welfare through sustainable forest management (Saragih & Navalino, 2019).

Ecologically, this 766 hectare HKm is an integral part of the production forest area in Bireuen Regency. Geographically, the area is located at coordinates 05°03’20”– 05°05’20” N and 96°32’00”– 96°34’40” E. The topography varies from 250 to 600 meters above sea level (masl), with a landscape dominated by highland forests, forest cover, shrubs, and agricultural land. This topographical variation directly influences the local microclimate, drainage, and vegetation characteristics.

Resource Potential and Management Challenges

The Alue Simantok HKm area possesses high biodiversity, both in terms of environmental services (nature tourism) and Non-Timber Forest Products (NTFPs). Superior commodities intensively utilized by the Forest Farmers Group (KTH) include Jernang (Daemonorops draco), Forest Honey (Apis dorsata), Kelulut/Linot Honey (Trigona sp.), and Rattan (Calamus sp.). Additionally, there is potential for ecotourism at Putroe Dusun Waterfall and the Educational Forest (Arboretum), offering added conservation value.

Despite abundant resource potential, the management of Alue Simantok HKm still faces structural challenges, particularly regarding economic sustainability. A crucial identified issue is the volatility of productivity and commodity prices, specifically Jernang. Field observations indicate that the selling price of Jernang is highly fluctuating and often does not reflect the real value of the commodity. This condition is exacerbated by the absence of a strong brand identity and limited market access. This phenomenon confirms Wahyuni's (2023) thesis, which states that the main obstacles to NTFP development often lie in weak marketing aspects and value creation.

HKm Business Utilization

NTFP Utilization ProfileThe Alue Simantok Forest Farmers Group (KTH) focuses its business activities on utilizing NTFPs as a livelihood strategy. Product diversification includes Jernang, Forest Honey, Kelulut Honey, and Rattan, which are used as food sources, raw materials for handicrafts, and trade commodities.

1) Dynamics of Jernang (Daemonorops draco) Farming

Jernang is the prime mover commodity of the economy in Alue Simantok HKm due to its high market value. Utilization patterns are carried out through two approaches: extraction from natural populations and harvesting from cultivated plants. The production process involves exploring forests with steep topography, demanding physical fitness. Harvesting is done manually using poles, with a harvest frequency of twice a year (October–December) and an average productivity of 3–4 kg per bunch. Post-harvest processing uses a wet extraction method. Jernang fruit is pounded using traditional tools (Jingki) to separate the resin from the fruit skin, then extracted with water, settled, and dried. Although the technology used is still simple, the final product is dry resin ready for sale.

Table 1. Volume and Production Value of Jernang (2022–2024)

Year	Production Volume (Kg)	Selling Price (IDR/Kg)
2022	5,567	280,000
2023	6,700	250,000
2024	7,560	160,000

Primary Data (Processed), 2024.

Based on Table 1, there is a consistent trend of increasing production from 2022 to 2024. However, this phenomenon is accompanied by a sharp (inverse)

price decline. In 2022, the price reached IDR 280,000/kg, but corrected sharply to IDR 160,000/kg in 2024. This price decline is influenced by market mechanisms (supply and demand) and the farmers' lack of control over the trading chain.

2) Utilization of Forest Honey (Apis dorsata)

Forest honey harvesting is a secondary economic activity that is seasonal (June and November). The harvesting process is carried out with sustainable principles using smoking techniques and cutting only part of the comb to maintain colony sustainability.

Table 2. Volume and Production Value of Forest Honey (2022–2024)

Year	Production Volume (Kg)	Selling Price (IDR/Kg)
2022	5,567	280,000
2023	6,700	250,000
2024	7,560	160,000

Primary Data (Processed), 2024.

Data in Table 2 shows a significant downward trend in production volume from 700 liters (2022) to 300 liters (2024). This decline is likely caused by climate factors and the availability of natural forage. Nevertheless, the selling price has increased and stabilized at IDR 250,000/liter, indicating high market demand for pure honey products.

3) Cultivation of Kelulut Honey (Trigona sp.)

Through the Bungong Jaroe Social Forestry Business Group (KUPS), KTH members develop stingless bee cultivation. Cultivation techniques involve placing stup (bee boxes) in shaded areas that still receive sunlight and are protected from pests. Harvesting is done using a suction machine (battery-operated) once every 3 months during the dry season. Kelulut honey productivity is highly influenced by internal factors (colony number, queen health) and external factors (nectar availability, climate). This aligns with Lamusa (2010), who states that micro-environmental changes such as rainfall and forage vegetation determine production success.

4) Rattan Product Downstreaming

In addition to raw commodities, HKm Alue Simantok has carried out rattan product downstreaming through KUPS Bungong Jaroe. Rattan is processed into value-added handicrafts such as food covers, fruit baskets, and laundry baskets. Product price ranges vary between IDR 15,000 to IDR 300,000 depending on design complexity. These products have been marketed at the district level and various local exhibitions.

Impact and Institutional Analysis

Structural Marketing Constraints, the marketing system for NTFP products in Alue Simantok still faces classic obstacles. Based on field analysis, there are three main barriers:

1) Absence of Product Identity (Branding): Products do not yet have a strong trademark, so they are only sold as bulk commodities (raw material) without value differentiation.

2) Market Information Asymmetry: Farmers have limited access to current price information and demand trends, making their bargaining position weak against collectors (middlemen).
3) Limited Networks: Marketing still relies on local supply chains and has not penetrated industrial or export markets.These problems align with the analysis of Dodirman (2018) and Mulyadin et al. (2016), who concluded that market inefficiency and lack of information are fundamental obstacles in the social forestry economy.

Economic Impact: Income Increase

The implementation of the HKm program provides a tangible quantitative economic impact. There has been an increase in KTH members' household income from an average of IDR 1,500,000/month (before the program) to IDR 3,000,000/month (after the program). This increase stems from product diversification and labor absorption in forest management activities. Additionally, the formation of a saving culture among members is an indicator of improved family financial literacy.

Social Capital and Behavioral Change, Social and institutional aspects show significant strengthening. The Kenduri Glee (Forest Feast) tradition, carried out routinely every year, functions as social capital that strengthens cohesion among members and revitalizes local wisdom. Furthermore, a behavioral transformation has occurred from exploitative patterns to conservative ones. A total of 122 respondents stated an increase in awareness of environmental preservation. This success indicator is visible in the decline of forest encroachment and illegal logging activities.

This capacity building is supported by intensive training interventions from various stakeholders, such as DLHK Aceh, BPDAS, BPSKL, and WRI, covering technical cultivation materials to institutional management (Aksa, 2015; Martapani et al., 2021). Active member participation in deliberations, forest patrols, and mutual cooperation activities confirms a high sense of belonging to the forest area. As emphasized by Rosalia & Ratnasari (2016), active community participation is an absolute prerequisite for the sustainability of community-based forest management.

DISCUSSION

NTFP Cost Analysis

By nature, cost components are distinguished into two: fixed costs and variable costs.Fixed Costs: Costs involving equipment depreciation.Variable Costs: Costs incurred in one production process, which are fixed in amount and do not change, covering raw materials, labor costs, and supporting material costs.

Jernang Plants

Fixed costs in KTH Alue Simantok are costs that are not exhausted in one production run and are not influenced by the amount of production generated. One component of fixed costs is the depreciation cost of goods used as tools in the Jernang production process.

Table 3. Equipment Depreciation Costs for Jernang

No	Description	Vol	Unit	Unit Price (IDR)	Eco. Life (Years)	Total Price (IDR)	Salvage Value (IDR)
1	Work Hut	1	Unit	3,000,000	4	3,000,000	750
2	Machete	61	Unit	120	1	7,320,000	-
3	Mower	3	Unit	1,500,000	2	4,500,000	2,250,000
4	Chisel	6	Unit	150	3	900	300
5	Basket	6	Unit	150	2	900	450
6	Boot	61	Unit	120	1	7,320,000	-
7	Glove	122	Unit	10	1	1,220,000	-
Total						25,160,000	3,750,000

Source: Primary Data (Processed), 2025

The fixed cost structure of the Jernang farming business in Alue Simantok HKm reflects the characteristics of an extractive business starting to adopt simple technology. Based on Table 3, the total initial investment for equipment reaches IDR 25,160,000. However, in the annual financial feasibility analysis, the value calculated is the depreciation cost of IDR 3,750,000 per year. The largest investment allocation is for the procurement of Brush Cutters (IDR 4,500,000), indicating an effort for labor efficiency in weed clearing around plant clumps, a step forward compared to traditional manual methods.

Variable costs are costs whose magnitude greatly affects the amount of production. Variable costs for Jernang include raw material costs, labor costs, and others.

Table 4. Variable Costs for Jernang

No	Description	Quantity	Wage (IDR)	Total Wage (IDR)
1	Maintenance	30 People	100	3,000,000
2	Harvesting	31 People	100	3,100,000
Total			200	6,100,000

Source: Primary Data (Processed), 2025

Analysis of the variable cost structure in Table 4 confirms that Jernang farming is labor-intensive, where 100% of the variable cost components are absorbed for maintenance and harvesting labor wages amounting to IDR 6,100,000 per year. The absence of chemical input costs (fertilizers/pesticides) confirms that the cultivation pattern applied is organic forest-farming, relying on the natural carrying capacity of the forest. In aggregate, the total annual production cost is recorded at IDR 9,850,000. This low cost structure provides a comparative advantage for farmers, considering the production inputs required are relatively minimal compared to monoculture plantation commodities.

Revenue is the calculated value of all sold production. In other words, business revenue is the product of production quantity and the prevailing price.

Table 5. Cost and Income Analysis for Jernang

No	Cost Component	Value (IDR/Year)
1	Fixed Cost (Depreciation)	3,750,000
2	Variable Cost	6,100,000
3	Total Production Cost	9,850,000
4	Revenue	1,209,600,000
5	Profit	1,199,750,000

Source: Primary Data (Processed), 2025

The revenue performance of the Jernang business shows a very significant figure of IDR 1,209,600,000 per year, obtained from a production volume of 7,560 kg with a selling price of IDR 160,000/kg. However, there are crucial findings regarding market volatility. Data shows that although production increased from 5,567 kg (2022) to 7,560 kg (2024), there was a sharp price correction from IDR 280,000/kg to IDR 160,000/kg. This phenomenon indicates farmers' vulnerability to global price shocks. Although the current profit margin is very large (IDR 1,199,750,000), dependence on a single commodity has long-term risks that need to be mitigated.

Forest Honey Business (Apis dorsata)

Unlike Jernang, the Forest Honey business has a low barrier to entry in terms of capital. Data in Table 6 shows that equipment depreciation costs are only IDR 875,000 per year.

Table 6. Equipment Depreciation Costs for Forest Honey

No	Description	Vol	Unit	Unit Price (IDR)	Eco. Life (Years)	Total Price (IDR)	Salvage Value (IDR)
1	PPE Suit	10	Unit	350	4	3,500,000	875
2	Rope	5	Unit	30	1	150	0
3	Bucket	5	Unit	30	1	150	0
4	Machete	10	Unit	120	1	1,200,000	0
5	Lighter	20	Unit	5	1	100	0
6	Boot	10	Unit	120	1	1,200,000	0
7	Basin	10	Unit	20	1	200	0
8	Strainer	10	Unit	20	1	200	0
9	Knife	10	Unit	45	1	450	-
Total						7,100,000	875

Source: Primary Data (Processed), 2025

Interestingly, the largest investment component is allocated for Personal Protective Equipment (PPE) suits worth IDR 3,500,000. This signals a behavioral change among farmers toward better Occupational Health and Safety (K3) standards, leaving behind traditional harvesting methods that pose high risks to

life safety. Variable costs are costs whose magnitude greatly influences the amount of honey obtained.

Table 7. Variable Costs for Forest Honey

No	Description	Quantity	Price (IDR)	Total Price (IDR)
1	Bottle 125 Ml	1,200 Pcs	5	6,000,000
2	Label	1,200 Pcs	4	4,800,000
3	Harvesting	20 People	100	2,000,000
Total				12,800,000

Source: Primary Data (Processed), 2025

The variable cost structure of the Forest Honey business presents empirical evidence regarding simple downstreaming efforts. Packaging costs (bottles and labels) are recorded at IDR 10,800,000; this figure far exceeds harvesting labor costs of only IDR 2,000,000. Forest honey harvesting is done traditionally with sustainable principles. The main challenge is natural production fluctuation. The dominance of packaging costs in the total variable cost structure shows that KTH Alue Simantok has shifted its paradigm from raw material providers to end-product sellers with a market identity, a strategic step to increase product bargaining value.

Revenue is the rupiah value received by honey hunters from honey sales multiplied by the prevailing price of IDR 150,000 per bottle (125 ml). With a total revenue of IDR 180,000,000 per year from the production of 1,200 bottles, this business proves to be very efficient. Although highly dependent on the flowering season (seasonal dependency), the high profit ratio makes forest honey a strategic source of cash income to support farmers' household economic liquidity.

Kelulut HoneyIn

KTH Alue Simantok, fixed costs are equipment depreciation costs.

Table 8. Equipment Depreciation Costs for Kelulut Honey Cultivation

No	Description	Vol	Unit	Unit Price (IDR)	Eco. Life (Years)	Total Price (IDR)	Salvage Value (IDR)
1	Plank	70	Pcs	35	3	2,450,000	816
2	Wooden Frame	30	Pcs	50	3	1,500,000	500
3	Suction Machine	7	Unit	400	3	2,800,000	933
4	PPE Suit	7	Unit	350	4	2,450,000	612
5	Glove	7	Unit	10	1	700	0
6	Hammer	6	Unit	60	2	360	180
7	Saw	6	Unit	100	1	600	0
8	Nail (2 inch)	13	Kg	35	1	455	0

9	Basin	10	Unit	30	1	300	0
10	Bucket	10	Unit	20	1	200	0
11	Strainer	10	Unit	20	1	200	0
Total						12,015,000	3,041,000

Source: Primary Data (Processed), 2025

The Kelulut Honey business represents a transition from an extractive pattern (hunting) to domestication (farming). Consequently, as shown in Table 15, higher technology investment is required, including honey suction machines (IDR 2,800,000) and vegetation/cages. The total depreciation value is recorded at IDR 3,041,000 per year. Although the fixed cost burden is higher than wild forest honey, this cultivation system offers more measurable production stability guarantees.Variable costs are costs whose magnitude greatly affects the amount of honey produced. Variable costs in Kelulut honey cultivation are packaging bottles and labels.

Table 9. Variable Costs for Kelulut Honey

No	Description	Quantity	Price (IDR)	Total Price (IDR)
1	Bottle 125 Ml	900 Pcs	5	4,500,000
2	Label	900 Pcs	4	3,600,000
3	Harvesting	20 People	100	4,600,000
Total				12,800,000

Source: Primary Data (Processed), 2025

Analysis of Table 16 shows a variable cost pattern consistent with forest honey, where packaging costs (bottles and labels) dominate at IDR 8,100,000. Labor is an absolute factor required by every business. Labor in Kelulut honey is non-permanent labor where workers only receive wages based on the number of working days. Wages for 30 workers amount to IDR 2,100,000/Year, and wages for 25 workers amount to IDR 2,500,000. Thus, the total wages incurred in cultivating Kelulut honey is IDR 4,600,000/Year. With total operational costs of IDR 24,715,000 and revenue of IDR 108,000,000, this business generates a net profit of IDR 92,259,000 per year. Theoretically, this business functions as risk diversification: although its revenue is lower than Jernang, its production fluctuations are not as extreme as commodities fully dependent on nature.

Rattan Processing Business

The business unit under study produces various types of rattan handicrafts. The products produced are finished goods oriented towards the household supplies market. Identification of product types includes ten main variants: Fruit Baskets, Food Covers (small and large), Laundry Baskets, Umbrella Stands, Onion Baskets, Money Baskets, Water Jug Holders, Flower Vases, and Lamp Frames.

Table 10. Equipment Depreciation Costs for Rattan

No	Description	Vol	Unit	Unit Price (IDR)	Eco. Life (Years)	Total Price (IDR)	Salvage Value (IDR)
1	Pitrit Machine	1	Unit	45,000,000	10	45,000,000	4,500,000
2	Machete	10	Unit	120	1	1,200,000	0
3	Rattan Knife	6	Unit	110	1	660	0
4	Small Saw	10	Unit	80	1	800	0
5	Brush	10	Unit	10	1	100	0
6	Scissors	30	Unit	100	2	3,000,000	1,500,000
7	Bucket	2	Unit	30	1	60	0
Total						50,820,000	6,000,000

Source: Primary Data (Processed), 2025

The rattan business unit shows the most advanced level of downstreaming. Table 10 confirms this with significant capital investment in a Pitrit Machine worth IDR 45,000,000. The existence of this machine is vital for increasing planing efficiency and quality standardization so that the products produced can penetrate wider markets. The annual depreciation expense for this unit is IDR 6,000,000.

Table 11. Rattan Labor Costs

No	Description	Quantity	Wage (IDR)	Total Wage (IDR)
1	Harvesting	10 People	120	1,200,000
2	Processing	30 People	80	2,400,000
Total			200	3,600,000

Source: Primary Data (Processed), 2025

Based on the table above, it can be seen that the wages of 30 processing workers amount to IDR 2,400,000/Year, and wages for 10 harvesting workers amount to IDR 1,200,000/Year. Thus, the total labor wages for 40 people amount to IDR 3,600,000/Year. The fixed costs incurred are IDR 54,420,000/Year (investment), while the Total Variable Cost is IDR 3,600,000/Year. Thus, the total cost incurred in rattan management (depreciation + variable) is IDR 9,600,000/Year.

Revenue is the calculated value of all sold production. Rattan harvest in a year reaches 120 Kg, with a selling price of IDR 250,000/Kg (for raw/semi-processed). Then, total Rattan revenue is IDR 30,000,000/Year. Besides being sold directly, rattan is also processed by KUPS Bungong Jaroe in KTH Alue Simantok.

Table 12. Products Produced from Rattan Handicrafts

No	Description	Vol	Unit	Unit Price (IDR)	Total Price (IDR)
1	Fruit Basket	300	Unit	25	7,500,000
2	Food Cover (S)	100	Unit	150	15,000,000
3	Food Cover (L)	150	Unit	250	37,500,000
4	Laundry Basket	55	Unit	75	4,125,000
5	Umbrella Stand	20	Unit	85	1,700,000
6	Onion Basket	50	Unit	50	2,500,000
7	Money Basket	60	Unit	70	4,200,000
8	Water Jug Holder	70	Unit	60	4,200,000
9	Flower Vase	50	Unit	70	3,500,000
10	Lamp Frame	40	Unit	85	3,400,000
Total					83,625,000

Source: Primary Data (Processed), 2025

Based on the table above, it is seen that the largest revenue is from large food covers with IDR 37,500,000/Year and the smallest is from Umbrella Stands at IDR 1,700,000/Year. The total revenue generated in rattan processing is IDR 83,625,000/Year.The urgency of downstreaming is clearly visible from the revenue comparison. Selling rattan in the form of raw material (Manau Rattan) only contributes IDR 30,000,000. Conversely, rattan products processed into handicrafts generate much larger value added, namely IDR 83,625,000. This data validates the hypothesis of Hayami et al. (1987) that the transformation from primary commodity sales to processed products is key to increasing rural community income. Superior products like Large Food Covers contribute the highest (IDR 37,500,000), confirming market preference for functional products with aesthetic value.

Business Feasibility Analysis (Profitability / R/C Ratio)

To measure business efficiency, Revenue Cost Ratio (R/C Ratio) analysis is used. An R/C value > 1 indicates the business is profitable and feasible to run.

Table 13. Recapitulation of R/C Ratio for NTFP Businesses

Commodity	Total Revenue (IDR)	Total Cost (IDR)	Profit (IDR)	R/C Ratio	Interpretation
Jernang	1,209,600,000	9,850,000	1,199,750,000	122.8	Very Feasible
Forest Honey	180,000,000	13,675,000	166,325,000	13.1	Feasible
Kelulut Honey	108,000,000	15,741,000	92,259,000	6.8	Feasible
Rattan	113,625,000	9,600,000	104,025,000	11.8	Feasible

Source: Primary Data (Processed), 2025

The synthesis of financial feasibility of the four commodities shown in the Recapitulation Table reveals interesting efficiency disparities. The Jernang commodity recorded the highest R/C Ratio reaching 122.8. In the perspective of natural resource economics, this extreme figure is a positive anomaly reflecting resource rent, where high revenue is caused more by scarcity and global market value (premium price), as well as minimal input costs facilitated by nature (nature-based inputs), not merely managerial efficiency.

On the other hand, Kelulut Honey recorded the lowest ratio of 6.8. This is economically rational considering this cultivation business demands a more intensive investment and variable cost structure compared to pure forest extraction. Nevertheless, a value of 6.8 still indicates that this business is highly feasible, where every IDR 1.00 of cost incurred is able to generate revenue of IDR 6.80.Strategically, the combination of high-value commodities (Jernang) with stable-income commodities (Cultivated Honey & Handicrafts) successfully creates a resilient economic portfolio for the livelihood sustainability of KTH Alue Simantok community.

However, the high R/C Ratio of Jernang (122.8) must be interpreted critically. This figure does not solely reflect managerial efficiency but the existence of large resource rent where nature provides main inputs for free. However, time series data (2022-2024) shows a negative correlation between production volume increase and selling price. This indicates that dependence on a single extractive commodity is very vulnerable to price shocks. Therefore, Jernang's high profitability should be considered as 'initial capital' for investment into more stable sectors such as downstreaming, not as a guarantee of long-term income.

This study finds strong empirical evidence regarding the importance of downstreaming. Rattan revenue comparison shows that raw material sales only contribute IDR 30,000,000, while processed handicraft products are able to generate IDR 83,625,000. This confirms that value added through simple technology (such as the pitrit machine) is able to triple income. The honey business model, which has started using bottle packaging and labels, also shows a paradigm shift among farmers from merely 'forest product collectors' to 'social forestry entrepreneurs'.

CONCLUSIONS AND RECOMMENDATIONS

Conclusion

1) Significant Economic Impact: The HKm program effectively alleviates poverty, increasing member income by 100% (from IDR 1.5 million to IDR 3 million/month) through NTFP diversification.
2) Business Characteristics Disparity: Jernang offers high return/high risk (volatile global prices). Conversely, Kelulut Honey and Rattan Handicrafts offer stable returns resilient to market fluctuations due to technology and downstreaming.
3) Strengthening Social Capital: Social sustainability is secured through the revitalization of local wisdom (Kenduri Glee) and positive behavioral

transformation from exploitative to conservative, supported by tenure security.

Suggestions

1) Downstreaming and Branding Strategy: Prioritize post-harvest technology and brand development to penetrate modern markets and reduce reliance on middlemen, especially for volatile commodities like Jernang.
2) Corporate Institutionalization: Form a Village-Owned Enterprise (BUMG) or Cooperative integrated with KTH business units to facilitate formal capital access and strengthen bargaining power.
3) Ecotourism Diversification: Optimize environmental services (Putroe Dusun Waterfall and Arboretum) as alternative non-extractive revenue streams to support cash flow when commodity prices drop

FURTHER STUDY

Given the study's findings on high economic vulnerability due to global commodity price volatility and the weak bargaining position of farmers within traditional supply chains, future research must prioritize the development of a 'Value Chain Strengthening Model and Downstreaming Strategy for NTFP Products Based on Farmer Corporate Institutions in Alue Simantok Community Forestry.

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